

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)
Puducherry

Minutes of Meeting

of

6th Meeting of Board of Studies

for the courses

B.Tech – Computer Science and Engineering
M.Tech-Computer Science Engineering
M.Tech-Computer Science Engineering(Big Data Analytics)

Venue

Seminar Hall, Department of CSE

4th Floor, New Building
and Online Zoom Meeting
Sri Manakula Vinayagar Engineering College
Madagadipet, Puducherry – 605 107

Date & Time 22.07.2023 & 11.00 AM Onwards

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE



(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution & Accredited by NAAC with "A" Grade)

Madagadipet, Puducherry - 605 107



Department of Computer Science and Engineering

Minutes of 6th Board of Studies Meeting (UG)

The Sixth Board of Studies meeting of Computer Science and Engineering Department was held on 22nd July 2023 at 11:00 A.M in Seminar Hall (CSE Department), University block, Sri Manakula Vinayagar Engineering College, with Head of the Department in the Chair through online mode.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS
	Dr.K. Premkumar Professor and Head	
1.	Sri ManakulaVinayagar Engineering College hodcse@smvec.ac.in 9842127679	Chairman
1568	Mr. M. Shanmugam	Burn of States
	Associate Professor,	1 - 11 ph 27 1 1 1 1
2.	Sri Manakula Vinayagar Engineering College	Member Secretary
7 ·	shanmugam.mm@smvec.ac.in 9444370963	
	Dr. S. R. Balasundaram	
	Professor and Head	Subject Expert
	Department of Computer Applications,	(Pondicherry University
3.	National Institute of Technology, Trichy.	Nominee)
1 45	blsundar@nitt.edu	The state of the s
	9994291420	
	Dr.Chokkalingam Subramanian	H 2 1 M 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1
	Professor & Head,	G 11
U.S.	Department of Information Technology,	Subject Expert
4.	Saveetha University, Chennai.	(Academic Council
L marks	chomas75@gmail.com	Nominee)
	9840161575	
	Dr.S.Udhayakumar	- ×
	Professor,	ng gini ga dayan i
10 a - 11	Department of Computer Science and Engineering,	Subject Expert
5.	Rajalakshmi Engineering College, Chennai.	(Academic Council
Ser Control	mailtoudhay@gmail.com	Nominee)
manager start	9841593116	
	S.Diwahar	A TOTAL THE APPLE
11,55,970	Senior Engineer,	Dommogantative
6.	Dell Technologies, Bangalore	Representative
aty 5	diwahar.sivaraman@gmail.com	from Industry
ien il	9442300744	Letter Vind / Bess / 6 : 1
7.	R.SakthiMurugan	Postgraduate Alumnus
/-	Director,	(nominated by the Principal)

	Interjet India Pvt. Ltd., Puducherry, sakthimuruga@gmail.com 9994298296	
8.	Dr. M. Ganesan Associate Professor, Department of Computer Science and Engineering, SMVEC	Internal Member
9.	Dr. R. Ramachandiran Associate Professor, Department of Computer Science and Engineering, SMVEC	Internal Member
10.	Dr.J.Raja Associate Professor, Department of Computer Science and Engineering, SMVEC	Internal Member
11.	Dr. T. Megala Assistant Professor Department of Computer Science and Engineering, SMVEC	Internal Member
12.	Dr.M.A.IshrathJahan Associate Professor, Department of English, SMVEC	Internal Member
13.	Dr.T.Jayavarthanan Professor and Head, Department of Physics, SMVEC	Internal Member
14.	Dr.S.Savithiri Professor and Head, Department of Chemistry, SMVEC	Internal Member
15.	Prof.K.Raja	Internal Member

Agenda of the Meetin	
Item No.: / BoS / 6 / 2023 / CSE / UG/ 6.1	Welcome Address and to confirm the minutes of the Fifth meeting of Board of Studies held on 17.09.2022.
Item No.: / BoS / 6 / 2023 / CSE / UG /6.2	To discuss and approve the B.Tech. Degree Regulations (R-2023), Curriculum for eight semesters and syllabi of first and second Semesters for the B.Tech Computer Science and Engineering students to be admitted from the academic year 2023-24
Item No.: / BoS / 6 / 2023 / CSE / UG /6.3	To discuss and approve the Honours Degree Programme introducted for B.Tech Computer Science and Engineering under R-2023 regulation from the Academic Year 2023 -2024
Item No.: / BoS / 6 / 2023 / CSE / UG /6.4	To apprise about the List of Courses for Professional Electives / Open Electives / Ability Enhancement Courses / Skill Enhancement Courses / Mandatory Courses under R-2023 for the students admitted from the academic Year 2023-24
Item No.: / BoS / 6 / 2023 / CSE / UG /6.5	To apprise about the Industry Institute Interactions of the department of Computer Science and Engineering • Guest lectures
- I - I -	

	Internship details		
	 MOUs 		
	 Industrial Visits 		
	Value Added Courses		
	To apprise the End Semester Results of the students admitted in the		
Item No.: / BoS / 6 /	Academic Year 2020-2021 (V sem), 2021-2022 (III sem), 2022-		
2023 / CSE / UG /6.6	2023 (I sem) and to discuss about Extra-Curricular and Co-		
	Curricular activities.		
T4 N / DoC / 6 /	To apprise the schedule of the End Semester Examination to be		
Item No.: / BoS / 6 /	conducted in the month of July/August 2023 and to discuss and		
2023 / CSE / UG /6.7	recommend the panel of examiners to the Academic Council		
Item No.: / BoS / 6 /	Any other item with the permission of chair		
2023 / CSE / UG 6.8			

Minutes of the Meeting

Dr. K.Premkumar, Chairman, BoS opened the meeting by welcoming and introducing the external members, to the internal members and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Item No.: / BoS / 6 / 2023 / CSE / UG 6.1

Welcome Address and to confirm the minutes of the Fifth meeting of Board of Studies held on 17.09.2022.

Chairman, BoS, apprised the minutes of 6th BoS, its implementation and then it is confirmed with the approval in 5th BoS meeting for the incorporation of minor revisions needed as mentioned below.

S. No	Regulation	Semester	Course Name with Code	Unit	Suggestions given and Changes incorporated
1.	R-20	VIII	Block chain and Cryptography (U20CST819)	I	Experts Recommended to remove the topic "Hash function and digital signature" from unit I since the syllabus as separate unit on cryptographic Techniques. The expert panel has suggested to rename unit IV title as "Cryptography Techniques" instead of "Introduction to Cryptography"
2.	R-20	VIII	Practical- Entrepreneurship Management- (U20HSP804)		Experts have suggested to include latest version of the text book.

Page | 3

3.	R-20	VIII	Professional Elective V - Pervasive Computing (U20CSE824)	п	Recommended to include the topic "Wireless Markup Language(WML)" since introducing WML with XML would be appropriate.
4.	R-20	VIII	Professional Elective VI – Quantum Computing (U20CSE826)	, etc.	The Expert Panel as recommended to reduce the Syllabus since it is a very new domain under research.
5.	R-20	VIII	Professional Elective VI — Trusted computing (U20CSE827)	III,V	The Expert panel has suggested to remove the title "Trusted Platform Module tools" from unit V and to include the same in unit III as unit III introduces different tools.
6.	R-20	VIII	Professional Elective VI – Client Server	II	Experts have recommended to include topics on "Middleware" in Unit II
legnife so bolé	s d ii roù bi g arolal vi	a noquest ortalio ao	Computing (U20CSE828)	III	Recommended to include new types of servers in Unit III.

The above correction was incorporated and approved by BoS members in 5th BoS meeting, and the details were appraised in the meeting.

Item No.: / BoS / 6 / 2023 / CSE / UG 6.2

To discuss and approve the B.Tech. Degree Regulations (R-2023), Curriculum for eight semesters and syllabi of first and second Semesters for the B.Tech Computer Science and Engineering students to be admitted from the academic year 2023-24.

The B.Tech. Degree curriculum and syllabus approval of I and II semesters under Autonomous Regulations 2023 for the B.Tech Programme and the students admitted in the AY 2023-24 were discussed and recommended with the following modifications.

S. No	Regulation	Semester	Subject Name with code	Unit	Particulars
1	R-23	ed Argae al alabet accessed	Practical- Programming in C Laboratory (U23CSPC01)	unei 10	Experts recommends to use "To write a C program" instead of "To create a C program"

The above correction was incorporated and the details of curriculum and Syllabi is enclosed in Annexure –I and II.

Item No.: / BoS / 6 / 2023 / CSE / UG 6.3

To discuss and approve the Honours Degree Programme Introducted for B.Tech Computer Science and Engineering under R-2023 regulation from the Academic Year 2023 -2024

The Details of Honours degree is apprised and approved by the experts.

Item No.: / BoS / 6 / 2023 / CSE / UG 6.4

To apprise about the List of Courses for Professional Electives / Open Electives / Ability Enhancement Courses / Skill Enhancement Courses / Mandatory Courses under 2023-24

The details of Ability Enhancement Courses / Skill Enhancement Courses / Mandatory Courses under R-2023 for the students admitted from the academic Year 2023-24 is enclosed in Annexure-I

Consideration of offering of Professional and Open electives for the IV semester students and VI semester students under R-2020 for the students admitted in the Academic Year 2021-22 and 2020-21.

The students are registered the following professional electives in IV and VI semester

Offering Department	Semester	Course Code / Course Name	Number of Students registered
	IV	U20CSE402: E-Business	120
CSE		U20CSE402: Object Oriented Analysis and Design	68
CSE	VI	U20CSE612: Service Oriented Architecture	188

a) The students are registered the following *Open electives* in IV and VI semester which is offered by other department

Offering Department	Semester	Course Code / Course Name	Number of Students registered
AIDS	IV	U20ADO401: Knowledge representation and reasoning	188
MBA	VI	U20HSO601: Product Development and Design	188

Item No.: / BoS / 6 / 2023 / CSE / UG 6.5

To apprise about the Industry Institute Interactions of the department of Computer Science

and Engineering

- Guest lectures
- Internship details
- MOUs
- Industrial Visits
- Value Added Courses

Guest lectures

The guest lectures held in the department of Computer Science and Engineering were apprised.

Internship details

The students have undergone internship program to Unisys and various other multinational companies

MOU Signed

The MOU signed with the industries was apprised.

Industrial Visits

The Industrial visit of I,II and III year were apprised.

Value Added Courses

The value added courses provided to the students was apprised and approved

The details of various Industry Institute Interactions is enclosed in Annexure (IV



Item No.: / BoS / 6 / 2023 / CSE / UG 6.6

To apprise the End Semester Results of the students admitted in the Academic Year 2020-2021 (V sem), 2021-2022 (III sem), 2022-2023 (I sem) and to discuss about Extra-Curricular and Co-Curricular activities

The details of End semester Results and the student's participation in Extra-Curricular and Co-Curricular activities was apprised in the meeting.

Item No.: / BoS / 6 / 2023 / CSE / UG 6.7

To apprise the schedule of the End Semester Examination to be conducted in the month of July/August 2023 and to discuss and recommend the panel of examiners to the Academic Council

The list of question paper setters and Evaluators was presented and recommended by the BoS members to the academic council and the details are enclosed in Annexure.

Item No.: BoS/ UG/ CSE 6.8

Any other item with the permission of chair.

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Madagadipet, Puducherry - 605 107



Department of Computer Science and Engineering

Minutes of 6th Board of Studies Meeting (M.Tech -Computer Science and Engineering)

Agenda of the Meetin	Agenda of the Meeting			
Item No.: BoS / 6 / 2023 / CSE / PG /6.1	Welcome Address and to confirm the minutes of the Fifth meeting of Board of Studies held on 17.09.2022			
Item No. : BoS / 6 / 2023 / CSE / PG/ 6.2	To discuss and approve the M.Tech. Degree Regulations (R-2023), Curriculum for four semesters and syllabi of first and second Semesters for the M.Tech Computer Science and Engineering students to be admitted from the academic year 2023-24			
Item No.: BoS / 6 / 2023 / CSE / PG /6.3	To apprise the End Semester Results of the students admitted in the Academic Year 2021-2022 (III sem), 2022-2023 (I sem). and to discuss about Extra-Curricular and Co-Curricular activities.			
Item No.: BoS / 6 / 2023 / CSE / PG /6.4	To apprise about the List of Courses for Professional Electives / Ability Enhancement Courses under R-2023 for the students admitted from the academic Year 2023-24.			
Item No.: BoS / 6 / 2023 / CSE / PG /6.5	To apprise the schedule of the End Semester Examination to be conducted in the month of July/August 2023 and to discuss and recommend the panel of examiners to the Academic Council			
Item No.: BoS / 6 / 2023 / CSE / PG /6.6	Any other item with the permission of chair			

Minutes of the Meeting

Dr. K.Premkumar, Chairman, BoS opened the meeting by welcoming and introducing the external members, to the internal members and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Item No.: BoS / 6 / 2023 / CSE / PG /6.1

Welcome Address and to confirm the minutes of the Fifth meeting of Board of Studies held on 17.09.2022

Chairman, BoS, apprised the minutes of 6th BoS, its implementation and then it is confirmed with the approval in 5th BoS meeting.

Item No.: BoS / 6 / 2023 / CSE / PG /6.2

To discuss and approve the M.Tech. Degree Regulations (R-2023), Curriculum for four semesters and syllabi of first and second Semesters for the M.Tech Computer Science and Engineering students to be admitted from the academic year 2023-24

The M.Tech. Degree curriculum and syllabus approval of I and II semesters under Autonomous Regulations 2023 for the M.Tech programme and the students admitted in the AY 2023-24 were discussed and recommended with the following modifications.

S. No	Regulati on	Semester	Subject Name with code	Unit	Particulars
1	R-23	I	Advanced Data structures and Algorithms (P23CSTD01)	V	Experts recommended to rename unit v name "Linear Programming" to "Dynamic Programming"
2	R-23	I	Block chain and crypto currency (P23CSE104)	I	Experts recommends to rename "Basic of Blockchain" to "Introduction to blockchain"
3	R-23	II	Advanced Operating Systems (P23CST205)	V	Experts recommended to include Tiny OS
4	R-23	п	Smart sensing for IOT (P23CSE210)	V	Experts recommended to rename "Preparing for IOT project as "IOT Projects"

The above correction was incorporated and approved by BoS members in 6th BoS meeting, and the details are enclosed in Annexure - V.

Item No.: BoS / 6 / 2023 / CSE / PG/ 6.3

To apprise the End Semester Results of the students admitted in the Academic Year 2021-2022 (III sem), 2022-2023 (I sem). and to discuss about Extra-Curricular and Co-Curricular activities

The panel discussed about Results of I and III semester and the students participation in Extra-Curricular and Co-Curricular activities

Item No.: BoS / 6 / 2023 / CSE / PG /6.4

To apprise about the List of Courses for Professional Electives / Ability Enhancement Courses under R-2023 for the students admitted from the academic Year 2023-24.

Discussed about the offering of List of Courses for Professional Electives / Ability Enhancement Courses under R-2023 for the students admitted from the academic Year 2023-24 and the same was approved by BoS members and details are enclosed in Annexure-V

Item No.: BoS / 6 / 2023 / CSE / PG/ 6.5

To apprise the schedule of the End Semester Examination to be conducted in the month of July/August 2023 and to discuss and recommend the panel of examiners to the Academic Council

The list of question paper setters and Evaluators was presented and recommended by the

Department of CSE – Sixth BoS Meeting

BoS members to the academic council (enclosed in Annexure-III)

Item No.: BoS / 6 / 2023 / CSE / PG/ 6.6

Any other item with the permission of chair

The panel discussed about bringing up new industry oriented topic in curriculum

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Madagadipet, Puducherry - 605 107



Department of Computer Science and Engineering

Minutes of 6th Board of Studies Meeting M.Tech- Computer Science Engineering(Big Data Analytics)

Agenda of the Meeting			
Item No.: BoS / 6 / 2023 / CSE / PG – M.Tech. CSE (BDA) /6.1	To discuss and approve the M.Tech. Degree Regulations (R-2023), Curriculum for four semesters and syllabi of first and second Semesters for the M.Tech Computer Science Engineering (Big Data Analytics) students to be admitted from the academic year 2023-24.		
Item No.: BoS / 6 / 2023 / CSE / PG – M.Tech. CSE (BDA) /6.2	To apprise about the List of Courses for Professional Electives / Ability Enhancement Courses under R-2023 for the students admitted from the academic Year 2023-24		
Item No.: BoS / 6 / 2023 / CSE / PG – M.Tech. CSE (BDA) /6.3	Any other item with the permission of chair		

Minutes of the Meeting

Dr. K.Premkumar, Chairman, BoS opened the meeting by welcoming and introducing the external members, to the internal members and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Item No.: BoS / 6 / 2023 / CSE / PG - M. Tech. CSE (BDA) /6.1

To discuss and approve the M.Tech. Degree Regulations (R-2023), Curriculum for four semesters and syllabi of first and second Semesters for the M.Tech Computer Science Engineering (Big Data Analytics) students to be admitted from the academic year 2023-24.

The M.Tech. Degree curriculum and syllabus approval of I and II semesters under Autonomous Regulations 2023 for the M.Tech Programme and the students admitted in the AY 2023-24 were discussed and recommended with the following modifications.

S. No	Regulation	Semester	Subject Name with code	Unit	Particulars
1	R-23	I	Big Data Framework (P23BDT103)	II	Panel members suggested to rename title of the unit as "Hadoop ecosystem"

	F	15		III	Experts suggested to Include topics related to "spark"
2	R-23	I	Semantic web and knowledge Management (P23BDE214)	III	Panel members suggested to rename title of the unit III as "Introduction to Knowledge management"

The above correction was incorporated and approved by BoS members in 6th BoS meeting, and the details are enclosed in Annexure – VI.

Item No.: BoS / 6 / 2023 / CSE / PG - M. Tech. CSE (BDA)/ 6.2

To apprise about the List of Courses for Professional Electives / Ability Enhancement Courses under R-2023 for the students admitted from the academic Year 2023-24.

Discussed about the offering of List of Courses for Professional Electives / Ability Enhancement Courses under R-2023 for the students admitted from the academic Year 2023-24 and the same was approved by BoS members and details enclosed in Annexure-VI

Item No.: BoS / 6 / 2023 / CSE / PG - M. Tech. CSE (BDA) /6.3

Any other item with the permission of chair

No other item discussed by the panel.

The meeting for the above Agenda regarding B.Tech – Computer Science and Engineering, M.Tech-Computer Science and Engineering and M.Tech-Computer Science Engineering(Big Data Analytics) was concluded by 3:00 pm by **Dr. K.Premkumar**, Chairman-BoS and Head of Department, Department of Computer Science and Engineering, Sri Manakula Vinayagar Engineering College.

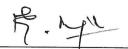
1. E	Dr. K.Premkumar Professor and Head, Department of Computer Science and Engineering, Sri Manakula Vinayagar Engineering	Chairman	d. L
N	College		
2. E	Mr. M. Shanmugam Associate Professor, Department of Computer Science and Engineering Sri Manakula Vinayagar Engineering College	Member Secretary	Ulshy

Extern	al Members		7
3.	Dr. S. R. Balasundaram, Professor and Head Department of Computer Applications, National Institute of Technology, Trichy.	Subject Expert (Pondicherry University Nominee)	s. 2. Balasundovanz
4.	Dr. Chokkalingam Subramanian, Professor & Head, Department of Information Technology, Saveetha University, Chennai.	Subject Expert (Academic Council Nominee)	Sp. chonka"; yam).
5.	Dr.S.Udhayakumar, Professor, School of Engineering, Amrita Vishwa Vidyapeetham, Chennai	Subject Expert (Academic Council Nominee)	mundfina !
6.	S.Diwahar, M.Tech., Senior Engineer, Dell Technologies, Bangalore	Representative from Industry	S. Diwahar
7.	R.Sakthi Murugan, Director, Interjet India Pvt. Ltd., Puducherry.	Postgraduate Alumnus (nominated by the Principal)	districts?
т.,	1 Monday		
	I Members Dr. M.Ganesan Professor, Department of CSE, SMVEC.	Internal Member	M. house
9.	Dr.R.Ramachandiran Associate Professor, Department of CSE, SMVEC.	Internal Member	R. Ruli
10.	Dr.J.Raja Associate Professor, Department of CSE, SMVEC	Internal Member	of the second se
11.	Dr.T.Megala Assistant Professor, Department of CSE, SMVEC	Internal Member	(My)
Co-opt	ed Members	ness Berg string sometime s	- Laster
		yes should not a pale	1 1 - 20 to 500 to
12.	Dr.M.A.Ishrath Jahan Associate Professor, Department of English, SMVEC	Internal Member	
13.	Dr.T.Jayavarthanan Professor, Department of Physics, SMVEC	Internal Member	1.2.ec
14.	Dr.S.Savithiri, Professor, Department of Chemistry, SMVEC	Internal Member	S-Sith

Prof.K.F	Raja,
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15. Assistant Professor, Department of Mathematics, SMVEC

Internal Member



Head of the department (Dr.K.Premkumar)

Dean-Academics (Dr.S.Anbumalar)

Director cum Principal (Dr.V.S.K.Venkatachalapathy)

ANNEXURE I CURRICULUM

B.TECH.

COMPUTER SCIENCE AND ENGINEERING



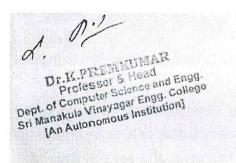
SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

B.TECH. COMPUTER SCIENCE AND ENGINEERING

ACADEMIC REGULATIONS 2023 (R - 2023)



CURRICULUM



B.Tech. Computer Science and Engineering

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COLLEGE VISION AND MISSION

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION

M1: Quality Education :To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation : To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and

Entrepreneurship : To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values

:To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT VISION AND MISSION

VISION

To create a productive learning and research environment for graduates to become highly dynamic, competent, ethically responsible, professionally knowledgeable in the field of computer science and engineering to meet the industrial needs on par with global standards.

MISSION

M1: Quality Education: Empowering the students with the necessary technical skills through quality education to grow professionally.

M2: Innovative Research: Advocating the innovative research ideas by incorporating with industries for developing products and services.

M3: Placement and Entrepreneurship: Advancing the education by strengthening the Industry-academic relationship through hands-on training to seek placement in the top most industries or to develop a start-ups.

M4: Ethics and Social Responsibilities: Stimulating professional behaviour and good ethical values to improve the leadership skills and social responsibilities.

B.Tech. Computer Science and Engineering

2. 4.3.20

PROGRAMME OUTCOMES (POs)

PO1:Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2:Problem analysis:

Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3:Design/development of solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4:Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6:The engineer and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7:Environment and sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.

PO8:Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10:Communication:

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11:Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning:

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B.Tech. Computer Science and Engineering

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PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Competitive Platform: To create a competitive platform for solving critical problems in a wide variety of fields.

PEO2: Exploration: Enthusiastic participation in learning, understanding, designing and applying new innovative research ideas as the field evolves.

PEO3: Career: Applying cutting-edge technology that improves knowledge and to commit students for lifelong learning to reach the leading positions in the career.

PEO4: Professional Values: Simulate the graduates to hold the responsibilities in the context of technology, ethics, society and humanity.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Computational Skills: Graduates with the ability to apply basic knowledge of Computer Science in solving the critical problems.

PSO2: Studious Research: Ability to convert innovative ideas into research or society oriented projects through current trending technologies.

PSO3: Employability: Acquire placement in highly reputed industries or accomplish new technical business skills with the contemporary trends in the industry.

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B.Tech. Computer Science and Engineering

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STRUCTURE FOR UNDERGRADUATE ENGINEERING PROGRAMME

SI. No.	Course Category	Breakdown of Credits
1	Humanities and Social Sciences including Management courses (HS)	45
2	Basic Science Courses (BS)	15
3	Engineering Science including workshop, drawing, basics of electrical / mechanical / computer etc. (ES)	20 18
4	Professional Core Courses (PC)	77
5	Professional Electives Courses (PE)	TALCOLI
6	Open Electives Courses (OE)	18
7	Project Work and Internship (PA)	9
8	Ability Enhancement Courses (AEC*)	13
9	Mandatory Courses (MC*)	
	Total	170

SCHEME OF CREDIT DISTRIBUTION - SLIMMARY

SI. No	AICTE	(e)	Credits per Semester								
	Suggested Course Category	- T	II	III	IV	V	VI	VII	VIII	Credits	
1	Humanities and Social Sciences (HS)	5	3	1	1	2	75.7 To	- 1	3	15	
2	Basic Sciences (BS)	8	3	5	4	-	-	_	-	20	
3	Engineering Sciences (ES)	9	5	-	4	-	-		<u>s</u> 1	18	
4	Professional Core (PC)	3	8	17	11	12	15	11	1 3219	77	
5	Professional Electives (PE)	-	_	-	3	3	3	3	6	18	
6	Open Electives (OE)	-	_	-	-	3	3	3	7 7 1 1 1 1 1	9	
7	Project Work (PA)	-	_	_	_	1	1	2	8	12	
8	Internship (PA)		-	-	_ =		200	1		12	
9	Employability Enhancement Courses (AEC)*	-	-	-	-	5 - 158	. = 1	- 0		a land	
10	Mandatory Courses (MC)*	7. 1	"	1	_50	4	11 11 2		- 100		
	Total	25	19	23	23	21	22	20	17	170	

* AEC and MC are not included for CGPA calculation

HONOURS DEGREE PROGRAMME:

The student is permitted to opt for earning an *honours degree* in the same discipline ofengineeringin addition to the degree in his/her own discipline. To earn an honours degree the student is required to earn an additional 18 - 20 credits (over and above the total 170 credits prescribed in the curriculum) starting from fourth semester onwards by completing 5 additional courses offered in respective semesters. A student is eligible to exercise this option if he/she has passed all the courses offered upto third semester in the first attempt itself and has earned a CGPA / GPA* (*for lateral entry) of not less than 8.0.The prescribed courses offered for Honours degree are given in **Annexure IV**.

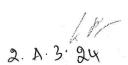
B.Tech. Computer Science and Engineering

2 1.3.2.3

		SE SE	MESTER - I					125		
SI.		O Title	Cotomoni	P	erio	ls	Credits	IV	lax. Mar	ks
No.	Course Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total
Theo	ry		_ 1 d = a 1					_ =0	JE	1
1	U23MATC01	Engineering Mathematics - I	BS	3	1	0	4	25	75	100
2	U23ESTC03	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	25	75	100
3	U23CSTC01	Programming in C	ES	3	0	0	3	25	75	100
4	U23CSTC02	Problem Solving Approach	PC	3	0	0	3	25	75	100
5	U23HSTC01	Universal Human Values-II	HS	2	0	0	2	25	75	100
Theo	ry Cum Practica	i e								
6	U23ENBC01	Communicative English -I	HS	2	0	2	3	50	50	100
Pract	tical	1/16	= (u.	ř.	(62
7	U23ESPC01	Basics of Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	50	50	100
8	U23CSPC01	Programming in C Laboratory	ES	0	0	2	1	50	50	100
9	U23ESPC03	Engineering Graphics using AutoCAD	ES	0	0	2	1	50	50	100
Abilit	ty Enhancement	Course								
10	U23AEC1XX	Certification Course – I **	AEC	0	0	4	-	100	1-06	100
Mano	datory Course							17.5		1
11	U23CSM101	Induction Programme	MC	2	Wee	ks		4-7.	1	
			* 2" - 4		2 :	· · ×	21	425	575	1000

	1.35	SE	MESTER - II					250		
SI.				Periods			0 114-		lax. Mark	S
No.	Course Code	Course Title	Category	L	Т	Р	Credits	CAM	ESM	Total
The	ory				1,-	E H		449.53		
1	U23MATC02	Engineering Mathematics - II	BS	3	1	0	4	25	75	100
2	U23BSTC01	Physical Science for Engineers	BS	3	0	0	3	25	75	100
3	U23ADTC01	Programming in Python	ES	3	0	0	3	25	75	100
4	U23CSTC03	Data Structures	PC	3	0	0	3	25	75	100
5	U23ITTC01	Digital Design and System Architecture	PC	3	0	0	3	25	75	100
The	ory Cum Practica	al ·						7 T/ A	25	
6	U23ENBC02	Communicative English -II	HS	2	0	2	3	50	50	100
Prac	tical					- <			27 1 29-1	
7	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
8	U23ADPC01	Programming in Python Laboratory	ES	0	0	2	1	50	50	100
9	U23CSPC02	Data Structures Laboratory	PC	0	0	2	1	50	50	100
10	U23ITPC01	Digital Design and System Architecture Laboratory	PC	0	0	2	1	50	50	100
Abili	ty Enhancement	Course						sangle:		
11	U23AEC2XX	Certification Course – II **	AEC	0	0	4	- 3.	100	- Barrier	100
Man	datory Course	THO DIRECTOR IN LESS OF THE PARTY.	18/41 (9)	-/	Harris .	2.6				
12	U23CSM202	Sports Yoga and NSS	MC	0	0	2		100	434514	100
11.3	better for an element						23	575	625	1200

^{**} Certification Courses are to be selected from the list given in Annexure III



Course Code Course Title Category Fe U T P Credits CAM ESM		Max. Marl	KS							
SI.	Course Code	Course Title	Category	L			Credits			Total
lo.	Course Code			1 2	71.0	Tipe is			الم المراجع	100
heo	γ	I OL Cation	BS	3	1	0	4	25	75	100
1	U23MATC03	Probability and Statistics					2	25	75	100
2	U23ITTC02		PC	3	0	0				100
		Software Engineering and	PC	3	0	0	3	25	75	100
3	U23CST301	Testing		- 0		_	3	25	75	100
4	U23CSDC01	Automata and Compiler Design			_					100
		Computer Networks	PC	3	U	U			14, 21, 217	
							<u> </u>		To Rose	400
Inec	ry Cuill Fractical	Design and Analysis of	PC	2	0	2	- 3	50	50	100
6	U23CSBC01	Algorithms		1			7-1, 111	, 	T What it	16351
Duna	tical	/g		_				50	50	100
		Caparal Proficiency -	HS	0	0	2	1	50	30	100
7	U23ENPC01			1		2	1	50	50	100
	LI23MAPC01		BS	0	0	2				D-11-36069
8	UZSIVIAI OUT	Laboratory		1		2	1	50	50	100
-	LI22ITPC02	Microprocessors and Embedded	PC	0	10	2	1	4 2 4	negrabni	rin Taga
9	023117002	Systems Laboratory				2	1	50	50	100
40	1123CSP301	Software Engineering and	PC	0	0	2			500000	A STATE OF
-				1 1	-1	. 5	et it is	1 4 25 2		100
Abil	ity Enhancement	Course	AFC	0	10	4	-	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		100
11	U23AEC3XX	Certification Course – III	SEC	0	0	_	-	100	-	100
. 12	U23CSS301	Skill Enhancement Course – I*	000			12.6		3 Fa(\$a		100
	datory Course		MC	2	To	0	,	100	1.0	100
13	U23CSM303	Climate Change	IVIC			1 -	23	675	625	1300

	•	SEME	STER - IV					N/	lax. Mar	(S
	And the second second		Catagory	P	eriod		Credits	CAM	ESM	Total
SI.	Course Code	Course Title	Category	L	T	Р	1.50	CAIVI	LOW	1 Otal
No heo	rv.		T 50		4	0	4	25	75	100
1	U23MATC05	Discrete Mathematics	BS	3		-	3	25	75	100
	U23ITTC03	Programming in Java	ES	3	0	0	3	25	75	100
2	U23CSTC05	Operating Systems	PC	3	0			25	75	100
3		Database Management Systems	PC	3	0	0	3		75	100
4	U23CSTC06	Professional Electivel #	PE	3	0	0	3	25	13	100
5	U23CSE4XX				1,1		2	50	50	100
	ry Cum Practica	Cloud Computing and Big Data	PC	2	0	2	3	1 30	- 100	70.7 8
6	U23CSB401	Cloud Companing and		-		-	1	50	50	100
Prac	tical	General Proficiency -II	HS	0	0	2	1	50	50	100
7	U23ENPC02	Programming in Java Laboratory	ES	0	0	2	11		50	100
8	U23ITPC03	Programming in Sava Educatory	PC	0	0	2	1	50	30	100
9	U23CSPC03	Operating Systems Laboratory Database Management Systems		0	0	2	1	50	50	100
10	U23CSPC04	Laboratory	PC	U	U			E-7 3.33	DEACK	3 1 1 1
	ity Enhancemen	Course		1.	1 0	1	-	100	tar Quera	100
	ty Ennancemen	Certification Course – IV **	AEC	0	0	4		100	A WITCH	100
11	U23AEC4XX	Skill Enhancement Course -II *	SEC	0	0	2		100		
12	U23CSS402	Skill Elillancoment		116			<u> </u>	-	Trans.	
Man	datory Course	Right to Information and Good	MC	2	0	0	. 0	100	100000	100
13	U23CSM404	Governance	IVIC				23	675	625	130

B.Tech. Computer Science and Engineering

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[#] Professional Electives are to be selected from the list given in Annexure I
* Skill Enhancement Courses (1 and 2) are to be selected from the list given in Annexure III

		SEMES	STER – V				to design and	- 1974 L STR.		
SI.	Course Code	Course Title	Catamami	Р	erio	ds	Cuadita	N	lax. Ma	irks
No	Course Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total
Thec	ory	×								-014 I
1	U23HSTC02	Research Methodology	HS	2	0	0	2	25	75	100
2	U23CST503	Android Programming	PC	3	0	0	3	25	75	100
3	U23CSTC07	Artificial Intelligence	PC	3	0	0	3	25	75	100
4	U23CST504	Web Designing	PC	3	0	0	3	25	75	100
5	U23CSE5XX	Professional Elective II #	PE	3	0	0	3	25	75	100
6	U23XXO5XX	Open Elective \$	OE	3	0	0	3	25	75	100
Prac	tical			-7				- 1-1.19	Se Air	PIPE !
7	U23CSP502	Android Programming Laboratory	PC	0	0	2	· 1 1 ·	50	50	100
8	U23CSPC05	Artificial Intelligence Laboratory	PC	0	0	2	1	50	50	100
´ 9	U23CSP503	Web Designing Laboratory	PC	0	0	2	1	50	50	100
Proje	ect Work		_ = s						1-	
10	U23CSW501	Micro Project	PA	0	0	2	1	100	[U _]	100
Abili	ty Enhancement	Course					1			= -
11	U23AEC5XX	Certification Course–V **	AEC	0	0	4	-	100	-	100
Mano	datory Course					2 12 2	*	a Tarres	us i	
12	U23CSM505	Essence of Indian Traditional Knowledge	MC	2	0	0		100	la thi	100
	1 12 .				- 4		21	600	600	1200

110	Grandalina Milita	SEMESTER	R – VI							
SI.	Course Code	ode Course Title	Catagory	Periods			Cradita	Max. Marks		
No	Course Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total
Theo	ory	The Kingletter of the second o	and services	, ÷.						
1	U23ITTC04	Machine Learning	PC	3	0	0	3	25	75	100
2	U23CST605	Designing and Building of Bots	PC	3	0	0	3	25	75	100
3	U23CST606	Animation and Visual Effects	PC	3	0	0	3	25	75	100
4	U23CSE6XX	Professional Elective III #	PE	3	0	0	3	25	75	100
5	U23XXO6XX	Open Elective II \$	HS	3	0	0	3	25	75	100
Theo	ry Cum Practica	al								i de la companya de
6	U23CSB602	Blockchain Concepts and Applications	PC	2	0	2	3	50	50	100
Prac	tical				1			- Make	line E	
7	U23ITPC04	Machine Learning Laboratory	PC	0	0	2	1	50	50	100
8	U23CSP604	Designing and Building of Bots Laboratory	PC	0	0	2	1 -	50	50	100
9	U23CSP605	Animation and Visual Effects Laboratory	PC	0	0	2	1	50	50	100
Proje	ect Work		- 17	1		1-10-1	e			
10	U23CSW602	Mini Project	PA	0	0	2	1	100	-	100
Abilit	ty Enhancement	Course	eta Tarre	100		/- e	.n. 1	V 1		
11	U23AEC6XX	Certification Course – VI **	AEC	0	0	4	e	100	(.	100
Mand	datory Course		2 1			386	Agail ya yayana		L in a	
12	U23CSM606	Gender Equality	MC	2	0	0	i j	100		100
	-					- 11	22	625	575	1200

^{\$} Open electives are to be selected from the list given in Annexure II

B.Tech. Computer Science and Engineering

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		SEN	IESTER – VII				Giggs 1		per la	# 5	
SI.	0	Course Title	Cotonomi	Periods			Credits	Max. Marks			
No	Course Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total	
Thec	ory	Minerico					eran Dr. J				
1	U23CST707	IoT and Edge Computing	PC	3	0	0	3	25	75	100	
2	U23CST708	Data Science and Digital Marketing Analytics	PC	3	0	0	3	25	75	100	
3	U23CST709	Network Security and Cryptography	PC	3	0	0	3	25	75	100	
4	U23CSE7XX	Professional Elective IV #	PE	3	0	0	3	25	75	100	
5	U23XXO7XX	Open Elective III \$	OE	3	0	0	3	25	75	100	
Prac	tical		Evilla 7						, -		
6	U23CSP706	IoT and Edge Computing Laboratory	PC	0	0	2	1	50	50	100	
7	U23CSP707	Data Science and Digital Marketing Analytics Laboratory	PC	0	0	2	1.11	50	50	100	
Proje	ect Work										
8	U23CSW703	Project phase – I	PA	0	0	4	2	50	50	100	
9	U23CSW704	Internship / Inplant Training	PA	0	0	2	1	100	-	100	
						14.5	20	375	525	900	

	A MARIE BY	S	EMESTER -	/III							
SI. No.		O	Catanani	Periods			Credits	Max. Marks			
	Course Code	Course Title	Category	L	Т	Р	Credits	CAM	ESM	Total	
Theo	ory				7			3			
1	U23HSTC03	Entrepreneurship and Business Management	HS	3	0	0	3	25	75	100	
2	U23CSE8XX	Professional Elective V#	PE	3	0	0	3	25	75	100	
3	U23CSE8XX	Professional Elective VI #	PE	3	0	0	3	25	75	100	
Proje	ect Work	1030		v Friedl	Ou s	4.0 4.00		× 12			
4	U23CSW805	Project phase – II	PA	0	0	16	8	50	100	150	
		. (9	Vine De appert in	111715		87°- 8	17	125	325	450	

ANNEXURE - I PROFESSIONAL ELECTIVE COURSES

SI. No.	Course Code	Course Title
1.	U23CSE401	Programming in C++
2.	U23CSE402	Cryptography for Cyber Security
3.	U23CSE403	Distributed Systems
4.	U23CSE404	IoT Design Protocols
5.	U23CSE405	Cognitive Neuroscience
		Offered in Semester V)
SI. No.	Course Code	Course Title
1.	U23CSE506	Programming in C#
2.	U23CSE507	Network Security through Data Analysis
3.	U23CSE508	Azure Cloud
4.	U23CSE509	IOT challenges and Future
5.	U23CSE510	Human Cognitive Process
		Offered in Semester VI)
SI. No.	Course Code	Course Title
1.	U23CSE611	Haskell Programming
2.	U23CSE612	Information Security
3.	U23CSE613	Cloud Data Management
4.	U23CSE614	Open Source Programming for IOT
5.	U23CSE615	Computational Neuroscience
		Offered in Semester VII)
SI. No.	Course Code	Course Title
1.	U23CSEC01	Go Programming
2.	U23CSE716	Cyber Forensics
3.	U23CSE717	Service Oriented Computing
4.	U23CSE718	Internet Cryptography
5.	U23CSE719	Brain Inspired Computing
	The state of the s	
		Offered in Semester VIII)
SI. No.	Course Code	Course Title
1.	U23CSE820	Redux Programming
2.	U23CSE821	Mobile and Wireless Security
3.	U23CSE822	Cloud Security
4.	U23CSE823	Introduction to Industry 4.0
5.	U23CSE824	Cognitive Modelling
Professio	nal Elective –VI (Offered in Semester VIII)
SI. No.	Course Code	Course Title
1.	U23CSE825	Kotlin Programming
2.	U23CSE826	Internet Protocols and Networking
3.	U23CSE827	Distributed operating System
4.	U23CSE828	IOT Security
5.	U23CSE829	Computational and Cognitive models of perception: Vision, Sound

ANNEXURE - II
OPEN ELECTIVE COURSES (P. 2022)

S.No	Course Code	Course Title	Offering Department	Permitted Departments
Open I	Elective – I (Offere	d in Semester V/VI)	27 I ps	
1	U23CSO501	Structured Query Language	CSE	ECE, EEE, ICE, MECH, CIVIL, BM and MECHTRONICS
2	U23CSO502	Computer Peripherals and Networking	CSE	Offered to all Branches
Open El	ective – II (Offered	in Semester VII)	-	
1	U23CSO701	Web Programming	CSE	ECE, EEE, ICE, MECH, CIVIL, BMI AND MECHTRONICS
2	U23CSO702	Cloud Technology	CSE	ECE, EEE, ICE, MECH, CIVIL, BM and MECHTRONICS



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution) Puducherry – 605 107 TRAIN LAB ACADEMY

The following courses are provided by Trainlab Academy for Regulation 2023:

ABILITY ENHANCEMENT COURSES-(A) CERTIFICATION COURSES

S. No	Course Code	Course Title	Certified By
. 1	U23XXCX01	Adobe Photoshop	Adobe
2	U23XXCX02	Adobe Animate	Adobe
3	U23XXCX03	Adobe Dreamweaver	Adobe
4	U23XXCX04	Adobe After Effects	Adobe
5	U23XXCX05	Adobe Illustrator	Adobe
6	U23XXCX06	Adobe InDesign	Adobe
7	U23XXCX07	Autodesk AutoCAD -ACU	Autodesk
8	U23XXCX08	Autodesk Inventor - ACU	Autodesk
9	U23XXCX09	Autodesk Revit - ACU	Autodesk
10	U23XXCX10	Autodesk Fusion 360 - ACU	Autodesk
11	U23XXCX11	Autodesk 3ds Max - ACU	Autodesk
12	U23XXCX12	Autodesk Maya - ACU	Autodesk
13	U23XXCX13	Cloud Security Foundations	AWS
14	U23XXCX14	Cloud Computing Architecture	AWS
15	U23XXCX15	Cloud Foundation	AWS
16	U23XXCX16	Cloud Practitioner	AWS
17	U23XXCX17	Cloud Solution Architect	AWS
18	U23XXCX18	Data Engineering	AWS
19	U23XXCX19	Machine Learning Foundation	AWS
20	U23XXCX20	Robotic Process Automation / Medical Robotics	Blue Prism
21	U23XXCX21	Advance Programming Using C	CISCO
22	U23XXCX22	Advance Programming Using C++	CISCO
23	U23XXCX23	C Programming	CISCO
24	U23XXCX24	C++ Programming	CISCO
25	U23XXCX25	CCNP Enterprise: Advanced Routing	CISCO
26	U23XXCX26	CCNP Enterprise: Core Networking	CISCO
27	U23XXCX27	Cisco Certified Network Associate - Level 2	CISCO
28	U23XXCX28	Cisco Certified Network Associate- Level 1	CISCO
29	U23XXCX29	Cisco Certified Network Associate- Level 3	CISCO
30	U23XXCX30	Fundamentals Of Internet of Things	CISCO
31	U23XXCX31	Internet Of Things / Solar and Smart Energy System with IoT	CISCO
32	U23XXCX32	Java Script Programming	CISCO
33	U23XXCX33	NGD Linux Essentials	CISCO
34	U23XXCX34	NGD Linux I	CISCO
35	U23XXCX35	NGD Linux II	CISCO
36	U23XXCX36	Advance Java Programming	Ethnotech
37	U23XXCX37	Android Programming / Android Medical App Development	Ethnotech
38	U23XXCX38	Angular JS	Ethnotech

39	U23XXCX39	Catia	Ethnotech
40	U23XXCX40	Communication Skills for Business	Ethnotech
41	U23XXCX41	Coral Draw	Ethnotech
42	U23XXCX42	Data Science Using R	Ethnotech
43	U23XXCX43	Digital Marketing	Ethnotech
44	U23XXCX44	Embedded System Using C	Ethnotech
45	U23XXCX45	Embedded System with IOT / Arduino	Ethnotech
46	U23XXCX46	English For IT	Ethnotech
47	U23XXCX47	Plaxis	Ethnotech
48	U23XXCX48	Sketch Up	Ethnotech
49	U23XXCX49	Financial Planning, Banking and Investment Management	Ethnotech
50	U23XXCX50	Foundation Of Stock Market Investing	Ethnotech
51	U23XXCX51	Machine Learning / Machine Learning for Medical Diagnosis	Ethnotech
52	U23XXCX52	IOT Using Python	Ethnotech
53	U23XXCX53	Creo (Modelling & Simulation)	Ethnotech
54	U23XXCX54	Soft Skills, Verbal, Aptitude	Ethnotech
55	U23XXCX55	Software Testing	Ethnotech
56	U23XXCX56	MX-Road	Ethnotech
57	U23XXCX57	CLO 3D	Ethnotech
58	U23XXCX58	Solid works	Ethnotech
59	U23XXCX59	Staad Pro	Ethnotech
60	U23XXCX60	Total Station	Ethnotech
61	U23XXCX61	Hydraulic Automation	Festo
62	U23XXCX61	Industrial Automation	Festo
63	U23XXCX62	Pneumatics Automation	Festo
1000000			IBM
64	U23XXCX64	Agile Methodologies Block Chain	IBM
65	U23XXCX65		IBM
66	U23XXCX66	Devops Autificial Intelligence	ITS
67	U23XXCX67	Artificial Intelligence	ITS
68	U23XXCX68	Cloud Computing	
69	U23XXCX69	Computational Thinking	ITS
70	U23XXCX70	Cyber Security	ITS
71	U23XXCX71	Data Analytics	
72	U23XXCX72	Databases	ITS
73	U23XXCX73	Java Programming	ITS
74	U23XXCX74	Networking	ITS
75	U23XXCX75	Python Programming	ITS
76	U23XXCX76	Web Application Development (HTML, CSS, JS)	ITS
77	U23XXCX77	Network Security	ITS & Palo alto
78	U23XXCX78	MATLAB	MathWorks
79	U23XXCX79	Azure Fundamentals	Microsoft
80	U23XXCX80	Azure AI (AI-900)	Microsoft
81	U23XXCX81	Azure Data (DP -900)	Microsoft
82	U23XXCX82	Microsoft 365 Fundamentals (SS-900)	Microsoft
83	U23XXCX83	Microsoft Security, Compliance and Identity (SC-900)	Microsoft
84	U23XXCX84	Microsoft Power Platform (PI-900)	Microsoft
85	U23XXCX85	Microsoft Dynamics Fundamentals 365 – CRM	Microsoft
86	U23XXCX86	Microsoft Excel	Microsoft
87	U23XXCX87	Microsoft Excel Expert	Microsoft
88	U23XXCX88	Securities Market Foundation	NISM
89	U23XXCX89	Derivatives Equinity	NISM
90	U23XXCX90	Research Analyst	NISM
91	U23XXCX91	Portfolio Management Services	NISM

92	U23XXCX92	Cyber Security	Palo alto
Ac 93 emi	CULTERNINGXARE SY	I la loiulid-Se2 Grity	Palo alto
94	U23XXCX94	PMI – Ready	PMI
95	U23XXCX95	Tally – GST & TDS	Tally
96	U23XXCX96	Advance Tally	Tally
97	U23XXCX97	Associate Artist	Unity
98	U23XXCX98	Certified Unity Programming	Unity
99	U23XXCX99	VR Development	Unity

ABILITY ENHANCEMENT COURSES - (B) SKILL ENHANCEMENT COURSES

SI. No.	Course Code	Course Title				
		Skill Enhancement Course 1 *				
	1100000004	Computer Assembly and Troubleshooting				
.1.	U23CSS301	2) Aptitude - I				
- m		Electronic Devices and Circuits				
No. 20		Skill Enhancement Course 2 *				
2	1100000400	Exploring Photoshop				
2.	U23CSS402	2) Aptitude - II				
		3) Office Automation				

* Any one course to be selected from the list

B.Tech. Computer Science and Engineering

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ANNEXURE - IV

HONORS DEGREE

B.Tech.(Honors) in Computer Science & Engineering (with Specialization in Artificial Intelligence and Data science)

	7.00.0	radification.	SEMESTE	R – VIII				MT 44			
SI.	Somostor Course Title			Category	Periods			Credits	Max. Marks		
No.		Code	Oddise Title	Category	L	Т	Р	Credits	CAM	ESM	Total
Theo	ory										
1	IV	U23CSH401	Al for Data Science	PC	3	1	0	4	25	75	100
2	V	U23CSH502	Data Visualization Techniques	PC	3	1	0	4	25	75	100
3	VI	U23CSH603	Data Warehousing & Data Mining	PC	3	1	0	4	25	75	100
4	VII	U23CSH704	Deep Learning	PC	3	1	0	4	25	75	100
5	VIII	U23CSH805	Optimization Techniques for Data Science	PC	3	1	0	4	25	75	100
- 1			Total	, 1		-		20	125	375	500
			Equivalent NPTI	EL courses#	#						
1		V	Introduction to Artificial Intelligence					3			
2	IV		Artificial Intelligence Search Methods ForProblem Solving					3			
3	to	U23CSHN01	Data Mining-Introduction					4		2 Week Course	•
	VIII	_	Deep Learning					3		Course	
4		* *	Machine learning and Deep Learning					3			
5			Big Data Computing					3			
			Reinforcement Learning					3	2		

The student shall be given an option to earn 3 credits through one 12 week NPTEL course (equivalent) instead of any one course listed for honours degree programme and shall be completed before the commencement of eighth semester. The equivalent courses are subject to change based on its availability as per NPTEL course list.

B.Tech. Computer Science and Engineering

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ANNEXURE II SYLLABUS

B.Tech.
Computer Science and Engineering

B.Tech. Computer Science and Engineering

SEMESTER I

B.Tech. Computer Science and Engineering

W.

Department	Mathematics	Progran	nme:B.	Tech.	ar est		091200	
Semester	I I	Course	Catego	ry: BS	End	Semester I	Exam Type	: TE
Course Code	U23MATC01	Periods	Week		Credit	Maxin	num Marks	
		L	Т	Р	С	CAM	ESE	TM
Course Name	Engineering Mathematics – I	3 Propoboo	1 Event	CCPC)	4	25	75	100
Prerequisite	(Common to ALL Basic Mathematics	brancies	Except	CSDS)				
	On completion of the course, the stude	onto will b	o oblo	ło.		***************************************	BT Ma	pping
	-						(Highest	
	CO1 Understand the concept of Eigen values	s and Eigen	vectors	, Diagonal	ization of a l	Matrix	K	
Course Outcomes	CO2 Solve higher order differential equations	3	113111	e e 9 a			_ luner K	3
Outcomes	CO3 Understand the different types of partial			ns			K	3
	CO4 Know about the Applications of double	and triple in	egrals				K	3
10000	CO5 Gain the knowledge about Vector Calcu	ılus and its /	Applicati	ons			K	3
UNIT – I	Matrices				Periods:12			·
	Systems of Linear Equations – Characteristic atrix–Diagonalization of Matrices.	equation –	Cayley H	Hamilton T	heorem – E	igen values	and Eigen	CO1
UNIT – II	Differential Equations (Higher Order)		118.5	ľ	Periods:12	2	- 174	.L
	equations of higher order with constant coefford of Variation of parameters.	ficients – E	uler's lii	near equa	tion of high	er order wi	th variable	CO2
UNIT – III	Functions Of Several Variables				Periods:12	2		.[
Partial derivatives	- Total derivatives – Maxima and Minima of two	variables –	Lagran	ae's Meth	od of multipl	iers.		CO3
UNIT – IV	Multiple Integrals			-	Periods:12			
Multiple Integrals	 Change of order of integration (Cartesian for integral (Cartesian form). 	rm). Applica	tions: A	I			ian form) –	CO4
UNIT – V	Vector Calculus				Periods:12	2		
	ence and Curl – Directional derivatives – Irrotatio Theorem and Stoke's Theorem (without proofs		lenoidal	vector fiel	ds – Proper	ties (Statem	ent only) –	CO5
Lecture Period	ls:45 Tutorial Periods:15	Practica	al Perio	ds:-	Т	otal Perio	ds:60	1
Text Books	*							
1. M.K. Venkatara	aman, "Engineering Mathematics",The National I							
		homotice" I	-11:	Dublicatio	ne Now Do	lhi 9 th Editic	n. 2018.	
2. N. P Bali and	Manish Goyal, "A Text Book of Engineering Mat							
2. N. P Bali and B. S. Narayanan Ltd, 2009.	and T.K. Manickavasagam Pillay," Differential E							ers Pv
2. N. P Bali and B. S. Narayanan Ltd, 2009. Reference Book	and T.K. Manickavasagam Pillay," Differential E	equations ar	d Its Ap	plications'	, Viswanath	an.S, Printe		ers Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Bool 1. G. Balaji, "Mat	and T.K. Manickavasagam Pillay," Differential E s rices and Calculus (Engineering Mathematics –	Equations ar	d Its Ap	plications'	, Viswanath	an.S, Printe		ners Pv
2. N. P Bali and B. S. Narayanan Ltd, 2009. Reference Book I. G. Balaji, "Mat 2. A. Singaravel	and T.K. Manickavasagam Pillay," Differential E s rices and Calculus (Engineering Mathematics – u, "Engineering Mathematics – I", Meenakshi pu	Equations ar I)" Balaji Pu Iblications, 1	d Its Ap	plications'	, Viswanath	an.S, Printe		ners Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Bool 1. G. Balaji, "Mat 2. A. Singaravel 3. Erwin Kreyszi	and T.K. Manickavasagam Pillay," Differential E (s rices and Calculus (Engineering Mathematics – u, "Engineering Mathematics – I", Meenakshi pu g, "Advanced Engineering Mathematics ", Wiley,	quations ar I)" Balaji Pu iblications, 1	blication 998.	plications' ns, 9 th Edit	, Viswanath	an.S, Printe		ners Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Bool 5. G. Balaji, "Mat 6. A. Singaravel 6. Erwin Kreyszig 6. B.V.Ramana,"	and T.K. Manickavasagam Pillay," Differential E (s rices and Calculus (Engineering Mathematics – u, "Engineering Mathematics – I", Meenakshi pu g, "Advanced Engineering Mathematics", Wiley, Higher Engineering Mathematics", Tata McGrav	iquations ar I)" Balaji Publications, 10th Edition w – Hill, Nev	blication 998. , 2019. v Delhi,	plications' ns, 9 th Edit 6 th Edition	, Viswanath	an.S, Printe		ners Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Bool 1. G. Balaji, "Mat 2. A. Singaravel 3. Erwin Kreyszig 4. B.V.Ramana," 5. C W. Evans, "	and T.K. Manickavasagam Pillay," Differential Execution (S) rices and Calculus (Engineering Mathematics — u, "Engineering Mathematics — I", Meenakshi pu g, "Advanced Engineering Mathematics", Wiley, Higher Engineering Mathematics", Tata McGrav Engineering Mathematics", A Programmed Appr	iquations ar I)" Balaji Publications, 10th Edition w – Hill, Nev	blication 998. , 2019. v Delhi,	plications' ns, 9 th Edit 6 th Edition	, Viswanath	an.S, Printe		ers Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Bool 1. G. Balaji, "Mat 2. A. Singaravel 3. Erwin Kreyszig 4. B.V.Ramana," 5. C W. Evans, " Web References	and T.K. Manickavasagam Pillay," Differential Execution (S) rices and Calculus (Engineering Mathematics — u, "Engineering Mathematics — I", Meenakshi pu g, "Advanced Engineering Mathematics", Wiley, Higher Engineering Mathematics", Tata McGrav Engineering Mathematics", A Programmed Appr	iguations ar I)" Balaji Pu iblications, ' 10 th Edition w – Hill, Nev roach, 3 rd Ed	blication 998. 1, 2019. 10 Delhi, 10 dition, 20	plications' ns, 9 th Edit 6 th Edition 019.	ion June 20	an.S, Printe	rs & Publish	iers Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Book 4. G. Balaji, "Mat 2. A. Singaravel 3. Erwin Kreyszig 4. B.V.Ramana," 5. C W. Evans, " Web References 6. http://www.yor	and T.K. Manickavasagam Pillay," Differential E (s rices and Calculus (Engineering Mathematics – u, "Engineering Mathematics – I", Meenakshi pu g, "Advanced Engineering Mathematics", Wiley, Higher Engineering Mathematics", Tata McGrav Engineering Mathematics", A Programmed Appr	iguations ar I)" Balaji Pu iblications, ' 10 th Edition w – Hill, Nev roach, 3 rd Ed	blication 998. 1, 2019. 10 Delhi, 10 dition, 20	plications' ns, 9 th Edit 6 th Edition 019.	ion June 20	an.S, Printe	rs & Publish	ers Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Bool 1. G. Balaji, "Mat 2. A. Singaravel 3. Erwin Kreyszig 4. B.V.Ramana," 5. C W. Evans, " Web References 1. http://www.yor 2. http://www.ma	and T.K. Manickavasagam Pillay," Differential Exercises and Calculus (Engineering Mathematics — u, "Engineering Mathematics — I", Meenakshi pug, "Advanced Engineering Mathematics", Tata McGrav Engineering Mathematics", Tata McGrav Engineering Mathematics", A Programmed Appros	iguations ar I)" Balaji Pu iblications, ' 10 th Edition w – Hill, Nev roach, 3 rd Ed	blication 998. 1, 2019. 10 Delhi, 10 dition, 20	plications' ns, 9 th Edit 6 th Edition 019.	ion June 20	an.S, Printe	rs & Publish	ers Pv
2. N. P Bali and 3. S. Narayanan Ltd, 2009. Reference Book 1. G. Balaji, "Mat 2. A. Singaravel 3. Erwin Kreyszig 4. B.V.Ramana," 5. C W. Evans, " Web Reference 5. http://www.mat 6. https://nptel.ad	and T.K. Manickavasagam Pillay," Differential Executions (S) rices and Calculus (Engineering Mathematics — u, "Engineering Mathematics — I", Meenakshi pu g, "Advanced Engineering Mathematics", Wiley, Higher Engineering Mathematics", Tata McGrav Engineering Mathematics", A Programmed Appr S ku.ca/yaoguo/math1025/slides/chapter/kuttler-light.cum.edu/~wn0g/2ch6a.pdf	iguations ar I)" Balaji Pu iblications, ' 10 th Edition w – Hill, Nev roach, 3 rd Ed	blication 998. 1, 2019. 10 Delhi, 10 dition, 20	plications' ns, 9 th Edit 6 th Edition 019.	ion June 20	an.S, Printe	rs & Publish	ers Pv

* TE – Theory Exam, LE – Lab Exam

B.Tech. Computer Science and Engineering

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COs	a, si e matur	i'ş€iπc Jus	E MIE	7 1.	Prog	ram O	utcom	es (PO	s)					ram Spo omes (P	
+7	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
1	3	2	1	-	2	1	1	-	-	1= 6	-	- 1	3	-	atia u
2	3	2	1	1	-	1	1	1112	-	5 Pa 1		1	3	-	-
3	3	2	1	1	-	1	1	-		-	-	1	3	-	c+1
4	3	2	1	1		1	1	-	-	-		1	3	-	-
5	2	2	1	-	-	-	1	-	-	-	-	1	3	-	- i

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Contin	uous Asse	ssment Marks (C	CAM)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	EEE a	and ECE	Program						
Semester	1/11	Er Always III II	Course				nd Semeste		
0-4-	LIOOE	etco2	Perio	ods/We	ek	Credit	· 	mum Mark	T
Course Code	4	STC03	L	T	Р	С	CAM	ESE	TM
Course Name		s of Electrical and Electronics neering	3	-	-	3	25	75	100
		(Common to CSE, IT, MECH, CIVIL,	MCTR, CCE	, AI&DS	FT and	CSBS Bra	nches)	- p-2 m	
Prerequisite	Mathe	matics and Physics							
	On co	mpletion of the course, the students	will be able	to to				(Highes	
	CO1	Apply the basic concepts and various	laws in DC	circuits.					(3
	CO2	Analyze the AC circuits and develop r	esonance co	onditions	for tran	smitter and	receiver circu	iits. K	(3
Course Outcomes	CO3	Gain the knowledge of power system and real time applications of transform	ner and moto	or.			fety measure		2
	CO4	Understand the operator of semicond	uctor diode	and its a	pplicatio	ns.			(2
	CO5	Explain the characteristics and operate	tion of BJT a	nd FET.	1				(2
	CO6	Relate and Explain Different Commur			rur Er V			K	(2
84.7		Section A – E	lectrical E	nginee	ring	I			
UNIT - I	DC Ci	rcuits			18/ -	Periods:		nd Valtara	1
sources - ideal	and pra	ference, Current, Resistance, Inductand ctical sources - concept of dependent R, L, C components, Voltage Divider a Theorems - Superposition, Thevenin, N	and independent l	endent s Divider f	sources, Rules, M	lesh and N	, Kirchnon's i	aw, series	CO1
UNIT - II	AC Ci					Periods:	8		
polar and rectar Resonance in se	ngular fo eries an	s - form factor, peak factor, R-L, R-C, Form, concept of impedance, admittanced parallel circuits, band-width and quarwo Wattmeter method.	e. active. re	active, a	apparent	and comp	iex power, po	wer lactor,	CO2
UNIT - III	Electr	ical Safety and Electrical Machines				Periods:			7
insulators and ca Faraday's Law on principle, load to	ables, Sa of electro est and	wer system and its functions, Wiring afety devices - fuse, relay and circuit bromagnetic induction, Fleming's Right a performance characteristics - Auto trancitor start and run induction motor – Lo	eaker - Sens nd Left han nsformer, Si	sors and d rule -	DC Gen	s. erator and	DC Motor - c	onstruction,	CO3
		Section B – Ele	ectronics l	Engine	ering				
UNIT - IV	Semio	conductor Diodes And Applications				Periods:			·
characteristics -	diffusion	ctor materials – Doping - Intrinsic and depletion capacitance - Rectifier, r – Light Emitting Diode (LED) - Solar C	, Hair wave a	c Semic and Full	wave re	or – PN ju ctifier - zen	nction diode, er diode chara	structure, acteristics -	CO4
UNIT - V	Trans	istors				Periods:			
characteristics -	Biasing	stor - construction – operation - Comn g - numerical application. Junction Field DMOSFET operation characteristics - N	Effect Trans	iistor (Jh	-ヒI), Me	etai oxide se	emiconductor	figuration – Field Effect	CO5
LINIT - VI	Comm	nunication Systems				Periods:		veforme	T
Comparison of o	digital a d and wi	 Block diagram of analog communion and analog communication system- Block direless Channel – Block diagram of control Communication System. 	ck diagram	of digita	al commi	unication sy	/stem – Elect	romagnetic	CO6
Lecture Periods	s: 45	Tutorial Periods:-	Practica	l Period	ds:-		Total Period	is: 45	
Text Books			<u> </u>			I			
1. R. K. Rajput, 2. Dr. R. Sarav	anakum ier, 2 nd f ramania	Electrical and Electronics Engineering", lar, Dr.V. Jegathesan, Dr. K. Vinoth K Edition, 2022. am, S. Salivahanan and K. A. Murelee	umar, Dr. K	, Kowsa	пуа, ва	SIC Electric	al and Electro		



Reference Books

- 1. A. Sudhakar and S. P. Shyam Mohan, "Circuits and Networks: Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi, 4th Edition, 2017.
- 2. D. P. Kothari and I. J. Nagrath, "Electric Machines", Tata McGraw Hill, New Delhi, 5th Edition, 2017.
- 3. B. L. Theraja, A. K. Theraja, "A Textbook of Electrical Technology Volume II", S Chand & Co. Ltd., New Delhi, 23rd Edition. 2009.
- 4. David. A. Bell, "Electronic Devices and Circuits", PHI Learning Private Ltd, India, 4th Edition, 2020
- 5. Wayne Tomasi, "Electronic Communication Systems- Fundamentals Theory Advanced", Pearson Education, 6th Edition, 2018.

Web References

- 1. https://nptel.ac.in/courses/108/108/108108076/
- 2. https://www.electrical4u.com/
- 3. https://nptel.ac.in/courses/108/102/108102146/
- 4. https://onlinecourses.nptel.ac.in/noc21_ee55/
- 5. https://nptel.ac.in/courses/117/102/117102059

COs/POs/PSOs Mapping

COs			4		Prog	gram O	utcome	es (POs)	- N	1 2 9	2. *	Prog Outo	ram Spe omes (P	ecific SOs)
	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	145	2	-	-	-	-	-		1	3	2	14-1
2	3	3	3		2	-	-		-	* 1 - 0	-	1	3	2	in sasa
3	3	3	3	-	2	-	4	1 -	-	-	-	1	3	2	vara Tolka
4	3	3	3	_	2	-	-	, - ·	-		1 50	1	3	2	am.A.s
5	3	3	3	-	2	-	-	-	-		-	1	3	2	42.19
6	3	3	3		2	-	-			•		1	3	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Coi	ntinuous Assess	ment Marks (CAM)	eller, a miles	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

B.Tech. Computer Science and Engineering

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^{*} TE – Theory Exam, LE – Lab Exam

Department	Comp	outer Science and Engineering		nme:B.T			10 .		
Semester	1/11		<u> </u>	Categor			nd Semeste		
Course Code	11230	STC01		ds/Wee		Credit		ximumMa	·····
Course Code]		L	T	Р	С	CAM	ESE	TM
Course Name	Progi	ramming in C	3	- 1	-	3	25	75	100
1 -= 1 -		(Common to All Brand	ches Exce	ept CSB	S and F	- T)			
Prerequisite	NIL							BTM	apping
	On co	ompletion of the course, the stu		l be able	e to			(Highe	
0	CO1	Comprehend the basics of Computer		Maria (A)		1 1-1,2			
Course Outcomes	CO2	Illustrate the concepts of control stru	ctures and	looping.					(2
Catoomico	CO3	Implement programs using arrays ar	d function	s.					(3
	CO4	Demonstrate programs using Structu	ire and Po	inters.	1				(3
	CO5	Build the programs using Union and	File mana	gement C	peration	ns.		1 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(3
UNIT - I	Intro	duction				Periods			
Generation and C	lassificat	on of Computers - Block Diagram of	of a Comp	uter –Ca	tegories	of Softwa	re – Networ	k Structure	co
Number System –	Binary –	Decimal – Conversion – Algorithm – Forgramming Basics	seudo cod	IE – FIOW	Olidit.	Periods			
UNIT - II	Determine	ming Posic structure of a 'C' progra	m – compi	ilation and	d linking	processes	- Constants	s, Variables	4
Data Types – Exp	ressions	using operators in 'C' - Managing In	put and O	utput ope	erations	Decision	Making and	Branching	- CO
Looping statement	s.					Periods			
UNIT - III	Array	s and Functions claration – One dimensional and Tw	dimonoio	nal array	e Strin			String Array	/S.
Simple programs- value – Pass by re	sorting-	searching – matrix operations- Funct	ion – defir	nition of f	unction	Declarat	ion of function	on – Pass	by CO
LINUT IV	Struc	ture and Pointers				Periods		,	
Structure Introduc Pointers - Definitio	tion – St n – Initia	ructure definition – Structure declara lization – Pointers arithmetic – Pointer	ition – Str s and arra	ucture wi ys -Pointe	thin a ser to Fu	structure – nction –Poi	Self Referent nter and Stru	tial Structu cture-Simp	re. ole CO
programs. UNIT - V	Unio	ns and Files				Periods			
		Using Structures and Unions -	Introducti	on to File	e - File	Operation	s - File Inpu	t and Outp	out or CC
Functions - Rando Directives- Dynam	om Acce	ss to Files - File System Functions	Comman	u Line A	rgumen	is- Storage	Olasses - I	10 1 10000	
Lecture Periods	:45	Tutorial Periods: -	Praction	cal Perio	ds: -		Total Peri	ods:45	
Text Books									
Balagurusamy. Yashvant Kand Herbert Schild Reference Bool	etkar, "Le t," C: The (s	ramming in ANSI C", Tata McGraw Hil t us C", BPB Publications, 16th Editior Complete Reference", McGraw Hill, F	ourthEdition	on,2014.	0010				
2. Ashok N Kam	thane, "C	P. Mirani, "Computer Fundamentals, I computer Programming", Pearson edu book on C ", Cengage Learning, Secon	cation, Sec	:000 1111pi 2012	ession,2		Edition Sti	Krishna Pu	blicatio
 P. Visu, R.Sri 2012. PradipDev, M Web Reference 	anasGho s	ush, "Programming in C", Second Edi					i Editori, Sir		

* TE – Theory Exam, LE – Lab Exam



COs		The str	64 2 KB		Prog	ram O	utcom	es (PO	s)	-	,			ram Spo omes (P	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1:-	-	-	3		-	-	-	-	-		3		3
2	2	1	1=1	-	3	. (-)	-	-	=	-		-	3	-	3
3	3	2	1	1	3	-	-	<u>.</u>	-	-		· -	3	~-	3
4	3	2	1	1	3		-	-	-	-	-	-	3	-	3
5	3	2	1	1	3	-	-	-	-	-	-	'	3	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

WI .		Conf	inuous Assess	ment Marks (CA	M)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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2. A. 3.44

Department	Comp	uter So	cience and Engineering	Program						
Semester	1	. ,		Course					Exam Typ	e: TE
0-1-	U23CS	TCO2		Perio	ds/Wee	ek	Credit		um Marks	
Course Code	02303	01002		L	Т	Р	C	CAM	ESE	TM
Course Name	Proble	m Sol	ving Approach	3	-	-	3	25	75	100
			(Common to 0	CSE, ICE	and CC	E)				
Prerequisite	NIL									
	After o	57.0	etion of the course, the st						BT Ma (Highes	t Leve
	CO1	Expla	in the basic concepts of comp	outational tl	ninking a	and proble	m solving.	#1 1.4 m	K	2
Course	CO2	Expla	in basic concepts of algorithn	n and data	organiza	ation.			K	2
Outcomes	CO3	Illustr	ate algorithmic solution to pro	blem solvir	ig.				K	3
	CO4	Expla	ain the concepts of array, mer	ging, sortin	g & sear	ching.			К	2
	CO5		ement recursive algorithm to s			1 5 - 1 -		A T	- K	3
UNIT-I		1 .	nal Thinking and Logic-S				Period	s:9		
ONII -I	king – Inf	ormatio	n and Data – Converting Info	rmation into	Data –	Data Capa	acity – Data	Types and	Encoding -	-
ogic-Solving Prob	lems – Lir	nits of (Computation – Pseudocode ar	nd Flow Ch	art.					CO1
I INIT_II	Algori	ithmic	Thinking and Data Organ	nization			Period			
Magrithmic Thinki	na: Algori	thms -	Software and Programming	Language	es – Ac	tions. Dat	a Organiza	tion: Nam	e list, Grap	h
lierarchies – Spre	ad Sheets	– Text	processing – Patterns – Pseu	idocode an	d Flow (Chart.	•			CO
UNIT-III	Funda	menta	al Algorithms and Factori	ng Metho	ds		Period			
Digit-Base Conver	sion – Cha	aracter	ng – Counting – Summing – to number conversion. Factor eudocode and Flow Chart.	Factorial in Facto	Computa s: Findin	ation – Fit g Square	oonacci Seq Root – Grea	uence – F atest Comr	non Divisor	CO
UNIT-IV	Array	, Merg	ing, Sorting and Searchir	ng			Period			
Removal of Dupli	Introducti cate – Pa	ion – A artitionii Pseudo	rray order reversal – Array C ng – Longest monotone. So code and Flow Chart.	ounting or orting and	searciii	ng. Sorun	g by bubbi	e, ocicon	ım of a Set on, Insertio	n. CO4
LIMIT V	Toyt F	Proces	sing Pattern Searching a	and Recu	rsive A	Igorithm	s Period	s:9		
Key word Searchir Sample Generatio	ng – Text n – Combi	Line Ad nation (ljustment – Linear Pattern Se Generation – Permutation Ger	arch – Sub neration – I	Linear Seudoc	Pattern Se ode and F	earch. Recui low Chart.	rsion: I owe	ers of Hanol	CO
Lecture Period	ls:45		Tutorial Periods: -	Practic	al Peri	ods:-	1	otal Peri	ods:45	
Toyt Books										
1. David Riley and 2014.	low to col	vo it by	mputational Thinking for Mode Computer",PHI,2008. a Programmer: Problem Solvir							outing,
Reference Bool	(S									
1. Kathryn Rentz, 2. Don McAdam, F 3. V Anton Spraul,	Paula Len Roger Win "Think Lik Problem- a & Gerald	n, "A Pr ke a Pro	roblem-solving Approach", Mo oblem-solving Approach", Pre ogrammer: An Introduction to Approach", Delmar/Cengage ssman, "Structure and Interpr	Creative Pr	oblem S	olving", Ce	ingage Lea			997.
1 https://www.edv		/proble	m-solvina							-

COs	F F #			. =	Prog	ram O	utcom	es (PO	s)	-				ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
1	2	1	-	-	1			-	1	-	-	1	3	2	3
2	2	1	-	-	1		-	-		-	-	1	3	2	3
3	2	1	-	-	1	-	-	-		-	-	1	3	2	3
4	2	1	-	-	1		-	-	-	-	8=8	1	3	2	3
5	3	2	1	1	1			-			-	1	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

3		Continu	ious Ass	essment Marks	(CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	·/- 1	0	5	5	5	75	100

^{*}Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

B.Tech. Computer Science and Engineering

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Department	00p	uter Science and Engineering			Tech.	1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =			
Semester	1/11		Course C			TT	d Semester		
0-1-	HOOLI	STC01	Perio	ds/We	ek	Credit		numMarks	
Course Code	U23H	51001	L	Т	Р	C	CAM	ESE	TM
Course Name	Unive	rsal Human Values – II	2	-	-	2	25	75	100
		(Commo	n to all Bra	inch)					
Prerequisite	UHV -	- I				u_br_usr	11/11/2	print 2	
	On co	empletion of the course, the stud	lents will b	e able	to			BT Ma (Highest	
	CO1	Evaluate the significance of value in their life and profession							2
Course	CO2	Distinguish between values and skil the Self and the Body, Intention and					sical facilities	' ка	2
Outcomes	соз	Analyze the value of harmonious religions profession	ationship ba	ased on	trust ar	nd respect in	their life and	i K	2
	CO4	Examine the role of a human being in	n ensuring h	armony	in socie	ty and natu	e.	K	2
	CO5	Apply the understanding of ethical profession.						К	2
UNIT - I	Introd	duction to Value Education				Periods:	06		
Understanding h	luman b	eing as the Co-existence of the Self a	and the Bod	y-Disting	guishing	between th	e Needs of th	ne Self and	СО
UNIT - II Understanding I	luman b	ony inthe Human Being eing as the Co-existence of the Self a	and the Bod	y-Distin	guishing	Periods:	e Needs of th	ne Self and	
the Body-The B Programme to e	ody as nsure se	an Instrument of the Self-Understand elf-regulation and Health	aing Harmoi	ny in ui	e Sell-r	Tarriorly of	the Sen with	the Body	CO
UNIT - III	Harm								
Harmony in the		ony in the Family and Society				Periods:			
Evaluation - Oth	Family - er Feeli	Basic Unit of Human Interaction- 'trus ngs, Justice in Human-to-Human Rela	t' - Foundati ationship - U	onal Va Indersta	lue in Re nding H	elationship -	'Respect' - a	s the Right	co
Evaluation - Oth Universal Huma	Family - er Feeli n Order.	Basic Unit of Human Interaction- 'trus ngs, Justice in Human-to-Human Rela	t' - Foundati ationship - U	onal Val	lue in Render	elationship -	'Respect' - a ne Society-Vi	s the Right	co
Evaluation - Oth Universal Huma UNIT - IV	Family - er Feeli n Order. Harm	Basic Unit of Human Interaction- 'trus ngs, Justice in Human-to-Human Rela	elf-regulatio	ndersta n and N	nding H	elationship - larmony in the Periods:	'Respect' - and Society-Vision of the Foundation	SION IOI THE	
Evaluation - Oth Universal Huma UNIT - IV Understanding I Nature - Realizin UNIT - V	Family - per Feeling Order. Harmony Harmony Existe	Basic Unit of Human Interaction- 'trus ngs, Justice in Human-to-Human Relationy in the Nature / Existence in the Nature-Interconnectedness, sence as Co-existence at All Levels - Hocations of the Holistic Underspand Interconnected Interconnectedness of the Holistic Underspand Interconnected	elf-regulationship - U	n and Montion of	Mutual F Harmon	Periods: Ulfilment any in Existen Periods:	"Respect" - ane Society-Vision of the Founce	r Orders of	co
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- https://fdp-si.aicte-india.org/8dayUHV_download.php
- https://www.youtube.com/watch?v=8ovkLRYXIjE

COs/POs/PSOs Mapping

COs				, 2, 9 .	Prog	ram O	utcom	es (PO	s)	5		. C tol		ram Spo omes (P	
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	32 50/6		_	2	3	2	2			3	-	-	, =
2	- 1571-14	4.75	-		-	2	3	2	2	-	-	3	-		-
3	-	-		-	-	3	3	2	2	-	-	3	800		-
4				-	-	2	3	2	2		. (4 2 ×	3	uSu•ret -		Tible
5	40 (5 m)	ne _{ol} i			,	2	3	2	2	_		3	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Contin	uous Assess	sment Marks (CA	AM)	End	mar da
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	. 1	0	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

^{*} TE – Theory Exam, LE – Lab Exam

	English		Programm	e: B.Tec h					
Semester	Ingal ^{eg} 1		Course Ca	tegory: H	}	End S	Semeste	r Exam Ty	pe: TE
Course Code	U23ENBC01		Periods	/Week	Cred	dit	Max	dimum Mar	ks
Course Code	UZSENBCUI		L	T P	С		CAM	ESE	TM
Course Name	Communica	tive English - I	2	- 2	_ 3	-	50	50	100
		\	LL Branches ex	cept CSBS	3)				
Prerequisite	Basics of Eng	llish Language							
	On complet	ion of the course, the st	udents will be a	able to				BT Ma (Highest	
	CO1 Unders	stand the communication flow	in organization a	nd its objec	tives			K2	2
Course	CO2 Write to	ne technical contents with gra	mmatically precis	e sentence	Similar			K2	?
Outcomes	CO3 Articula	ate with correct pronunciation	and overcome ve	rnacular im	pact in spea	aking		K3	3
Gutoomoo	CO4 Expres	s opinions confidently in form	al and informal co	mmunicati	ve contexts		1,711.4	K2	2
		interview with assertiveness						K3	3
UNIT - I	Workstead C	ommunication	4-1-1-1		Period	s:10	* -		
Communication, Communication -	Definition, Pro Listening, Type	cess, Channels, Barriers, s, Barriers, Enhancing Listeni	Strategies for I ing Skills - Bibliog	Effective C raphy: Bool	ommunicati k, Journal ar	on, Ve nd Inte	rbal and rnet Refe	Nonverba erences	CO1
UNIT - II	Common Err	ors In Writing And Comp	rehension Str	ategies	Period	s:10			••••••
Subject Verb Agre Fragment - Read Prediction, and C	ding Compreher	ced Modifiers, Squinting Modi nsion: Technical passage, S	fiers, Dangling M trategies: Skimm	odifier, Fuse ing, Scanni	ed Sentence ng, Intensiv	e, Com e and	ma Splice Extensiv	e, Sentence /e Reading	CO2
UNIT - III	Phonetics	TI9			Period	s:10			
		sonants and vowels, Sounds	Mispronounced.	Silent and			. Intonati	on, Spelling	002
Rules and Words UNIT - IV	often misspelle	d, Mother Tongue Influence (l ion Practice - I	MTI), Various Ted	hniques for	Neutralizat Period:	ion of I	Mother To	ongue	1003
ist of Exercises					1			,	T
	troduction, Exte	mpore, and Role Play hension Passage							CO4
UNIT - V	Interpersona	l Communication - I			Periods	s:15	14.7.1		, = ,
List of Exercises Listening: Speed Speaking: Debat Reading: Commo Writing: Transcri	ch Sounds, Inter e, Structured Gr only Confused W	oup Discussion, and Convers	sation						CO5
Lecture Period	s: 30	Tutorial Periods: -	Practical P	eriods: 30		Tot	al Period	ds: 60	
Text Books			1			.1			1
Text Books 1. Richa Mis Revised E 2. Rizvi M. / 2010. 3. Balasubra	Edition 2021. Ashraf, "Effectiv amanian T, "Eng	o, "A textbook of English La re Technical Communication" lish Phonetics for Indian stud	", New Delhi: Tat	a-McGraw-	Hill Publishi	llan Po	mpany L	India Priva	
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1. Richa Mis Revised E 2. Rizvi M. / 2010. 3. Balasubra Reference Boo 1. N.P.Sudh 2. Raman, M Press, 20 3. Comfort, Cambridg	Edition 2021. Ashraf, "Effectivamanian T, "Engots ks arshana, C. Sav Meenakshi, and Sav Jeremy, etal., " e, Reprint 2011.	re Technical Communication' lish Phonetics for Indian stud vitha," English for Engineers", Sharma, Sangeetha, "Technic Speaking Effectively: Develo	", New Delhi: Tat ents workbook", 2 Cambridge Unive cal Communication	a-McGraw- and Edition, ersity Press, n - Principle kills for Bu	Hill Publishi Trinity Pres 2018. es and Pract siness Engl	llan Poing Coss, 2010	mpany L 6. rd Editior	India Priva imited, 4th	Edition,
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* TE – Theory Exam, LE – Lab Exam



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3	1	-	_	-	-	-	-			3			-	-	-
4	1						3			3	u" 🖷 ng	1 -	5 = -14	- "	
*			-		-	-		-		3		1	-	-	
5	1	-	-	-	-	-	-	-	1	3	-	1	4		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

Theory Continuous Assessment Marks (CAM) **End Semester** Assessment **Model Exam** Examination (ESE) CAT 1 CAT 2 Attendance **Total Marks** Marks 10 75 5 5 Marks 60 (to be weighted for 50 20(to be weighted for 10 marks) marks)

Practical Continuous Assessment Internal Evaluation **End Semester Internal Evaluation Total Marks** 30(to be weighted for 10 marks) 30 marks Listening (L)* Listening (L)* 10 Speaking(S) 5 Speaking(S) 5 40 Reading(R)* 10 Reading(R)*
Writing(W)* 10 Writing(W)* 5 5

LRW components of Practical can be evaluated through Language Lab Software

Department	EEE a	nd ECE	Programm	ne: B.Tec l	1.	地位 西路		1-1-00		
Semester	1/11		Course C	ategory: E	S	End Se	mester E	xam Typ	e: LE	
			Р	eriods/We	ek	Credit	Max	kimumMa	ırks	
Course Code	U23ES	SPC01	L	ZaT C	Р	С	CAM	ESE	TM	
Course Name		of Electrical and Electronics 0 0 2 1 50 pering Laboratory							100	
		(Common to CSE, IT, MECH, CIVIL, M	ICTR, CCE, I	AI&DS, FT	, CSBS E	Branches)		- / -		
Prerequisite	Mathen	natics and Physics	-† -=							
	On cor	mpletion of the course, the students v	vill be able to)				BT Mappir (Highest Le		
	CO1	Build the different wiring for domestic	and commerc	ial applica	tions.			K3		
Course	CO2	Design and analyze the domestic pow	er distribution	١.	- *	200		K	3	
Outcomes	CO3	Estimate the performance of transform						K	3	
	CO4	Describe characteristics of semicondu	ictor diode an	d utilize it	for differe	nt application	ons	K5		
CO5 Relate the characteristics of various transistor								K2		
CO6 Understand Rectifiers and Regulators								2		
£	<u>. I</u>	List of E	xperiments	;			tis region	trade of		

Section- A Electrical Experiments

Demonstration on Power Sources, Ammeter, Voltmeter, Wattmeter and Energy meter are Pre-requisite for conducting this Electrical Engineering Lab.

- Electrical safety precautions and study of tools, accessories, electrical joints and electrical symbols.
- **Domestic Wiring Practice**
 - · Staircase wiring
 - · Doctor's room wiring
 - · Godown wiring
 - · Wiring of Ceiling fan, LED lamps and Iron Box.
- Design of Domestic power distribution. 3.
- Measurement of 3-phase power using two wattmeter method 4.
- Load test on DC shunt motor. 5.
- Load test on single phase transformer.
- Load test on single phase Induction Motor. 7.

Section - B Electronics Experiments

- Study of Electronic components and equipment: Resistor, Capacitor
- Measurement of AC signal parameter (Peak-Peak, rms period, frequency) using CRO. 2.
- VI Characteristics of PN junction diode, Zener diode 3.
- Input and output characteristics of Common Emitter configuration of BJT 4.
- Characteristics of JFET 5.
- Measurement of Ripple factor of HWR, FWR

7. Voltage Regulator using Zener Di	ode	7	T T
Lecture Periods: -	Tutorial Periods: -	Practical Periods:30	Total Periods:30
· · · · · · · · · · · · · · · · · · ·		.1	

Reference Books

- S. Gowri, T. Jeyapoovan Nadar, "Engineering Practices Lab Manual", Vikas Publishing House Private Limited, New Delhi, 5th Edition, 2014.
 A. Sudhakar and S. P. Shyam Mohan, "Circuits and Networks: Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi,
- D. P. Kothari and I.J. Nagrath, "Electric Machines", Tata McGraw Hill, New Delhi, 5th Edition, 2017.
- Edward Hughes, John Hiley, Keith Brown, Ian McKenzie Smith, "Electrical and Electronics Technology", Pearson Education Limited, New Delhi, 12th Edition, 2016.
- S.K. Sahdev, "Fundamentals of Electrical Engineering and Electronics", Dhanpat Rai and Co, 2017.

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- https://www.electronics-tutorials.ws/accircuits/series-circuit.html
- https://www.allaboutcircuits.com/textbook/experiments/
- https://www.electronicshub.org/measurements-of-ac-current/
- http://www.electronics-tutorials.ws
 - * TE Theory Exam, LE Lab Exam

Cos	C reper	Program Outcomes (POs)								2	Program Specific Outcomes (PSOs)				
	PO1	P02	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	-	-	1	-	-	3	, -, - -	-63 -	. 1	3	2	-
2	3	2	3	-		1	-	-	3	-	1 1 1	- 1	3	2	-1-10-11-1
3	3	2	3	-		1	-	-	3	-	-	1	3	2	-
4	3	2	3		-	1	-	-	3	-)ii	1	3	2	F-12 5
5	3	2	3	-	ı	1	-	-	3	-	e - "	1	3	2	-
6	3	2	3	-	-	1	-	_	3			1	3	2	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

	Co	ontinuous	Assess	ment Marks (CAI	A)		
Assessment	Performano cla	e in Practi sses	cal	Model	_ = 25 1 - 1 - 14	End Semester Examination	Total Marks
	Conduction of Practical	Record work	viva	Practical Examination	Attendance	(ESE) Marks	Walks
Marks	15	5	5	15	10	50	100

Department Semester	Computer Science and Engineering	1		Tech.	76.5			
	1/11	Course			1	d Semeste		
0 0 1	LIG2CEDC04	Perio	ds/We	ek	Credit		ximumMa	
Course Code	U23CSPC01	L	T	Р	С	CAM	ESE	TM
Course Name	Programming in C Laboratory	0	0	2	1	50	50	100
	(Common to All Brand	ches Exce	ept CSB	S and F	-T)			
Prerequisite	NIL						DTM	
	On completion of the course, the stud						(Highes	apping st Leve
	CO1 Implement logical formulations to solve							(3
Course	CO2 Execute C programs for simple applica strings.							(3
Outcomes	CO3 Experiment C programs involving func	tions, recu	rsion, po	inters, a	nd structures	•		(3
	CO4 Demonstrate applications using seque	ntial and ra	andom a	ccess file	e processing.		ŀ	(3
	CO5 Build solutions for online coding challe						ŀ	〈 3
		f Exercis	es					
4. Write a C 5. Demonstr 6. Find the fa 7. Write a C	program to check whether a given character is program to Print the numbers from 1 to 10 alor ate do—While loop in C to find the sum of 'n' nactorial of a given number using Functions in C program to check whether a given string is paliprogram to check whether a value is prime or not be the control of the	ig with the umbers. ndrome or	r square	S.	- Oaso statel			
10. Construct 11. Implemen 12. Write a C 13. Develop a 14. Write a C 15. Write a C 16. Construct 17. Write a C 18. Write a F 19. Write a C 20. Write a C	a C program to swap two numbers using call by a C program to find the smallest and largest elt matrix multiplication using C program. program to perform various string handling fund C program to remove all characters in a string program to find the sum of an integer array using program to find the Maximum element in an integer array using program to display Employee details using program to display the contents of a file on the leby getting the input from the keyboard and reprogram to create two files with a set of values program to pass the parameter using command.	value and ement in a ctions like except all ng pointers eger array structure monitor setrieve the . Merge the d line argu	call by r n array. strlen, st bhabets. s. using pos creen. contents e two file	ointers. of the fire content	cat, strcmp. le using file o s to form a si	peration co ngle file Total Peri d		
10. Construct 11. Implemen 12. Write a C 13. Develop a 14. Write a C 15. Write a C 16. Construct 17. Write a C 18. Write a F 19. Write a C 20. Write a C 20. Ecture Periods	a C program to swap two numbers using call by a C program to find the smallest and largest elt matrix multiplication using C program. program to perform various string handling fun C program to remove all characters in a string program to find the sum of an integer array usi program to find the Maximum element in an integer array to display Employee details using program to display the contents of a file on the leby getting the input from the keyboard and reprogram to create two files with a set of values program to pass the parameter using command.	value and ement in a ctions like except alpositers eger array a Structure monitor so etrieve the dine argu	call by r n array. strlen, st phabets. s. using pos creen. contents e two file ments.	orcpy, strong of the fire content ods:30	cat, strcmp. le using file os to form a si	Total Peri	ods:30	

5. https://fresh2refresh.com/c-programming/* TE – Theory Exam, LE – Lab Exam



COs					Prog	ram O	utcom	es (PO	s)					ram Spe omes (P	
J h	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
1	2	1		-	3	1	-	-	-	·	×	-	3		3
2	2	1		-	3		-	-	1150		-	-	3		3
3	3	2	1	1	3	-	-	-	-	-	-	j - :	3	-	3
4	. 3	2	1	1	3	-5	-	-	-	-	-	-	3		3
5	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

	С	ontinuous	Asses	sment Marks (CA	M)	* * * x	
Assessment	Performand cla	ce in practi	cal	Model		End Semester	Total
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Conduction of practical	Record work	viva	Practical Examination	Attendance	Examination (ESE) Marks	Marks
Marks	15	5	5	15	10	50	100

B.Tech. Computer Science and Engineering

2. A. 3.54

Department	Mecha	nical Engineering	Progra	ımme: I	B.Tech.		MOME ? 25		7,2010	
Semester	1/11		Course	e Categ	jory: ES	End	Semeste			
			Per	iods/W	eek	Credit	Max	kimum M	arks	
Course Code	U23ES	SPC03	L	T	Р	С	CAM	ESE	TM	
Course Name	Engin	eering Graphics Using AutoCAD		-	2	1	50	50	100	
		(Common	to all Bra	anches)			1			
Prerequisite	Nil								- 17	
		completion of the course, the stud	ents wil	l be ab	le to				apping st Level	
	CO1	Familiarize with the fundamentals and s	standards	of engi	neering gra	phics.		/ 134 may 155	K3	
Course	CO2	Perform drawing of basic geometrical c	onstructio	ons and	multiple vie	ws of object	cts.		K2	
Outcomes	CO3	Visualize the isometric and perspective	sections	of simpl	le solids.			123.160	K3	
	CO4	Connect side view associate on front vi	ew.		tuttulu			K4		
	CO5	Correlate sectional views and lateral su	ırface de	/elopme	nts of vario	us solids.	6		K4	
 Drawing Drawing Drawing Drawing Drawing Drawing Drawing Drawing Drawing Creating 	a Title B 2D sketce front vie front vie a plan o sectiona lateral s isometri 3D mod	e polygon and general multi-line figures. lock with necessary text and projection so the by applying modify tools like fillet, mirrow and top view of simple solids like prism w, top view and side view of objects from f residential building (Two bed rooms, kit al views of prism, pyramid, cylinder, cone surface development of prism, pyramid, corprojection of simple objects. Let of simple object and obtaining 2D multidrawings must be made for each exercise.	ror, array, n, pyramin n the give tichen, hal n, etc, ylinder, co	d, cylind n pictori ll, etc.) one, etc. awings.	al views (e	g. Simple si	tool, V-bloo	CK, MIXIE E	Base).	
Lecture Per		Tutorial Periods: -	Practio	cal Peri	iods: 30		Tota	l Periods	:: 30	
Poforonce Bo	ooks	I	I							
1. James D. E	Bethune,	"Engineering Graphics with AutoCAD",	A Spectru	ım book	1st Edition	, Macrome	dia Press,	Pearson, 2	2020.	
2 NS Parthas	sarathy a	and Vela Murali, "Engineering Drawing",	Oxford ur	niversity	press, 201	5.				

- NS Parthasarathy and Vela Murali, "Engineering Draw
- 3. M.B Shah, "Engineering Graphics", ITL Education Solutions Limited, Pearson EducationPublication, 2011.
- 4. Bhatt N.D and Panchal V.M, "Engineering Drawing: Plane and Solid Geometry", Charotar Publishing House, 2017.
- 5. Jeyapoovan T, "Engineering Drawing and Graphics Using AutoCAD", Vikas Publishing House Pvt Ltd., 7th Edition, New Delhi,
- 6. C M Agrawal, Basant Agrawal, "Engineering Graphics", McGraw Hill, 2012.
- 7. Dhananjay A. Jolhe, "Engineering Drawing: With An Introduction To CAD", McGraw Hill, 2016.
- 8. James Leach, "AutoCAD 2017 Instructor", SDC Publications, 2016.

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- http://www.nptelvideos.in/2012/12/computer-aided-design.html
- https://mech.iitm.ac.in/meiitm/course/cad-in-manufacturing/
- 4. https://autocadtutorials.com
- 5. https://dwgmodels.com

* TE – Theory Exam, LE – Lab Exam

COs		Program Outcomes (POs) 1											Program Specific Outcomes (PSOs		
000	P01	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	-	-	3	-	-	-	3			2	3	3	3
2	3	1	-	-	3	-, .	-	-	3		-	3	3	3	3
3	3	1	-	-	3	-	-	-	3	-	-	3	3	. 3	3
4	3	1	-	-	3	-		-	3	-	-	2	3	3	3
5	3	1	-	-	3	-		-	3	3 - 13		3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

74.5	Co	ntinuous A	ssess	ment Marks (CA	AM)	1 <u>4</u> . 111		
Assessment	Performan cla	ce in pract asses	ical	Model	Attendance	End Semester Examination	Total Marks	
	Conduction of practical	Record work	viva	Practical Examination	Attendance	(ESE) Marks	t suc	
Marks	15	5	5	15	10	50	100	

	Computer Science and Engineering	Progra	amme: E	3.Tech.				
Department	Computer Science and Engineering	Course	e Cated	ory: AEC	End	Semeste		
Semester			riods/We		Credit	Maximum Marks		
Course Code	LICOCOLAVY	1	T	Р	С	CAM	ESE	TM
	U23CSC1XX	<u> </u>	•	1		100	-	100
Course Name	Certification Course – I	-		4		1		

Students shall choose an international certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence. Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.

III the subsequent years			
Lecture Periods: -	Tutorial Periods: -	Practical Periods: 50	Total Periods: 50

B.Tech. Computer Science and Engineering

l. W

2.3. 1.58

Department	Computer Science and Engineering	Programme: B.Tech.				
Semester	1	Course Category: MC	Er	d Semester		
	LIOOCEMANA	Periods/Week	Credit		imumMark	
CourseCode	U23CSM101	L T P	С	CAM	ESE	TM
Course Name	Induction Programme	2 Weeks	Non-Cred	it -	-	-
Prerequisite	NIL					
	On completion of the course, the stud	ents will be able to				apping
_					(Hignes	t Level)
	CO1 Developholisticattitudeandharmonyin	the individual, family, and So	ociety		K	
0	CO2 Acquiregrammar skills and capable to CO3 Understand the basic concepts in Ma	thomatics and Programmi	na		K	
Course Outcomes		e andliterature ofthisvasts	ecularnation		K	
Outcomes	CO4 Knowabouttheartandculture, languag CO5 Identify the inherent talent and develo	on it professionally	30010111011011		K	
UNIT - I	Universal Human Values	pp it professionally	Periods:1	2		
Welcome and I	ntroductions - Getting to know each other, A	spirations and Concerns			Career,	
Expectations of	Family Peers Society Nation Fixing one's Go	pals.Self-Management - S	Self-confidenc	e, Peer Press	sure, time	
Management A	nger Stress Personality Development, Self-	improvement.Health - F	lealth issues,	Healthy die	t, Healtny	
lifectule Hostel	life Relationshins - Home sickness, Gratitude t	owards Parents, Teachers	and others h	agging and it	nteraction,	CO1
Competition and	Cooperation, Peer Pressure, Society - Particit	pation in Society, Natural E	-nvironment -	Participation	in Nature,	
	of Education, Need for a Holistic Perspective, So	elf-evaluation and Closure	- Sharing and	тееораск.		<u> </u>
UNIT - II	Proficiency in English		Periods:1		liomo and	I
Communication	skills - Prognosticteston Grammar - Synony	yms, Antonyms, Tenses,	Sentence C	Agreement	- Writing -	CO2
Phrases, One-	vord Substitution, Homophones, Homonyms,	Ose of Prepositions, Sui	ojeci – verb -	Agreement	- writing -	COZ
	g, Letter writing, Essay writing, Story Developm Bridge Course in Mathematics and C I	Programming	Periods:1	2		L
UNIT - III	Bridge Course in Mathematics and Ci	Togramming	1 CHOUST	_		ĺ
Mathematics:	differentialandintegralcalculus:Theory and Pra	actice Limit of function	- Fundamen	tal results o	n limits -	
Continuity of a	function - Concept of differentiation - Concep	t ofderivative - Slope of a	curve -Diffe	entiation Tec	chniques -	
Dorivatives of e	lementary functions from first principle -Deriva	tives of inverse functions -	 Logarithmic 	differentiation	1 –Ivietnoa	
of substitution -	Differentiation of parametric functions – Differe	ntiation of implicit function	s –Higher ord	er derivatives	i. Integrais	CO3
of functions con	taining linear functions -Method of integration	(Decomposition method, I	nethod of sub	stitution, inte	gration by	000
parts)-Definite i	ntegrals. Simple definite integrals –Properties	of Definite integrals -Rec	luction formul	ae - Area an	dvolume -	
Lengthof curve	-surfaceareaofa solid.					
C Programmin	g:	i-bles energione Dat	a types For	natted input	and output	
Features of C a	nd its basic Structure - Keywords - constants - \nterms ntrol and Looping statement - Arrays - Functior	ariables - operators - Dai	a types - 1 on	natted input a	and output	
		15 - Ottlings - Writing simpl	Periods:	2		L
UNIT - IV	Literary Activities ctivities - Quiz - Oral Exercises - Group discus	sion Debate Extempore			பொழிவு –	004
ream building a	ictivities - Quiz - Orai Exercises - Group discus ற்றும் தமிழர் தொழில் நுட்பம்.	ision, Debate, Extempere,	riolo piaj, o	. و		CO4
UNIT - V	Creative Arts		Periods:	2		
Introduction to r	painting and renowned artworks - Documentar	y and Short films - Music	-Vocal, Instru	ımental - Dar	nce -	CO5
	natic -Mimicry -Mime.	•				<u> </u>
Lecture Perio		Practical Periods:-		Total Perio	ds:60	
Poforonce Boo	ke					
1. R.R Gaur.	R. Asthana, G.P. Bagaria," A Foundation Cou	rse in Human Values and	Professional I	thics", Excel	Books, Nev	w Delhi,
2 nd Revise	d Edition, 2019					
2 Kumar Mo	han R "English Grammar for all (Functional and	d Applied Grammar)", Unio	care Academy	, 2022.		
3. Seely, Joh	n," Oxford A-Z of Grammar and Punctuation, O	xford Publication, 2013.	th = 004	0		
4. B.V. Rama	ana," Higher Engineering Mathematics", Tata M	cGraw – Hill, New Delhi, b	Edition, 201	8.		
5. Dr. A. Sing	garavelu, "Engineering Mathematics - I", Meena	KSNI PUDIICATIONS, TAITIII N	adu, 2019.			
6. E. Balagui	rusamy, "PROGRAMMING IN ANSI C", Mc Gra illay, "Social Life of Tamils", A joint publication of	FTNTR & ESC and RMRI				
7. Dr. K.K. P	shnan, "Journey of Civilization", Rojamuthiah re	search publishers 1st Edit	ion 2019.			
8. R. Balakris	ரலாறு - மக்களும்பண்பாடும், பிள்ளை, கே. மே.	கே சென்னை : உலகக்க	லிமாராய்ச்சி	ிநிறுவனம் ,	2002.	
9. தமிழகவ 10. கணினித்	தமிழ் - முனைவர்இல.சுந்தரம், விகடன்பிரசு	ரம்.				
11 \$100 - 0	தயிழ் - பூல்லினர்இல் சந்ததர்க், விக்கள்பிர் வகை நதிக்கரையில் சங்ககால நகர நாகரி	கம், தமிழக தொல்லியல்	துறை.			
Web Reference						
	n.newsociety.com/Books/S/Slow-isBeautiful					
2. https://ww	w.aplustopper.com/formal-letter/					
3. https://ww	w.javatpoint.com/c-programming-language-tuto	rial				
4 http://www	math.cum.edu/~wn0g/2ch6a.pdf					
5. https://edu	ication.nsw.gov.au/teaching-and-learning/curric	ulum/creative-arts				

B.Tech. Computer Science and Engineering

W.

SEMESTER II

B.Tech. Computer Science and Engineering

2. A. 3. b.

Department	Mathe	ematics	Programme	: B.Tech.					
Semester	111		Course Cat	egory: BS		End So	emester Ex	am Type: T	E
	1		Periods/W	eek		Credit	Max	kimum Marl	(S
CourseCode	U23M	ATC02	L	T	Р	С	CAM	ESE	TM
Course Name	Engin	eering Mathematics – II	3	. 1	-	4	25	75	100
	L	(Commor	to ALL Branches	Except CS	BS, FT)				
Prerequisite	Basic	Mathematics					······		
	On co	mpletion of the course, the	students will be	able to				BT Ma (Highes	apping t Level)
	CO1	Convert a periodic function	into series form.					K	2
Course	CO2	Compute Fourier transform	s of various functi	ons.				К	3
Outcomes	CO3	Solve Differential Equations	using Laplace tr	ansforms.				K	3
	CO4	Apply inverse Laplace trans	form of simple fu	nctions.				К	3
	CO5	Solve difference equations u						- K	3
UNIT – I		er Series	<u> </u>	7		Periods:12		L	
		eneral Fourier series – Odd ar	nd Even functions	– Half-Ran	ge sine :	series and co	sine series	 Change 	of CO1
intervals – Parse						Periods:12			
UNIT – II		er Transforms ts inverse – Properties of Fou	urior Transform (vithout proc	f) – Fou	1770		nsforms an	Н
rourier Transion their properties (iller Hallstollii (t	vitilout proc	1) — 1 Ou	iller sille and	COSITIO TTG	noionno an	CO2
UNIT – III	Lapla	ice Transforms				Periods:12			1
		ementary functions and Period		sic propert	es (excl	uding proof) -	 Laplace t 	ransforms	of CO3
w		 Initial and final value theorenge Eaplace Transforms 	ns.			Periods:12			
UNIT – IV		lace Transforms – Convoluti	on theorem (exc	uding proof) – Soli		ar Ordinar	v Differenti	al
Equations of sec	ond orde	r with constant coefficients.	on theorem (exc	duling proof	, - 0010	Audito of Line	ar Ordinar	, Dinorona	" CO4
UNIT – V	Z-T	ransforms	*		-	Periods:12			,
		ary Properties – Inverse Z-tr	ansforms (using	partial frac	tion and	Residues) -	- Solution	of difference	e cos
equations using Lecture Period		orm. Tutorial Periods:	15 Practical	Periods:-		1	otal Period	ds:60	
Text Books	13.73								×.
	n "Engin	neering Mathematics", Tata Mo	Graw Hill New De	elhi. 3 rd Edit	on.2011				
2. C. P. Gupta	Shree F	Ram Singh. M. Kumar, "Engin	eering Mathemati	cs for seme	ster I &	II". Tata McG	raw Hill, Ne	ew Delhi,2 ⁿ	Edition
2016.	, 0111001	tam emgm m rtemer, engm				and the second second	2011 Paris 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
B. H.K. Dass, "	Advance	d Engineering Mathematics", S	S. Chand, New De	elhi,22 nd Ed	ition 201	9.			
Reference Book									
		anish Goyal, "A TEXTBOOK	OF ENGINEERIN	IG MATHEI	MATICS'	", UNIVERSI	TY SCIENC	E PRESS,	India, 8
Edition 2016	3	Das and C. Vijayakumari, "Eng							
2. P. Sivarama	Krishna L	anced Engineering Mathemati	neering Mathema	Cone Now	Dolhi 1	oth Edition, 20	10	Ltu, muia i	2017.
B. Erwin Kreys	zig, "Adva	g Mathematics - Transforms a	nd Partial Differe	atial Equation	ne" G	Ralaii Puhlish	ers 18 th Ed	ition 2022	
		r Engineering Mathematics", 1				Daiaji i ubiisii	010, 10 Eu		
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^{*} TE – Theory Exam, LE – Lab Exam

B.Tech. Computer Science and Engineering

1. A.3.63

COs	-	Program Outcomes (POs)													cific SOs)
900	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	-	1	-	-	-	-	-	1	1	-	-
2	3	2	1	1	-	1	-	-	-	-	-	1	3		17 4
3	3	2	1	1	-	1	-	-	-		. .	1	3	., - :	-
4	3	2	1	1	-	1	-	-	-		-	1	3		-
. 5	3	2	1	1		1	-	-	-	-		1	3	•	•

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

ET P V P	, · · · =	Co	ontinuous Ass	essment Marks (CA	M)	End Semester	-23.5
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5 ·	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

B.Tech. Computer Science and Engineering

2. 12. 3. 634

Semester	Department Physics / Chemistry Programme: B.Tech.								
Semester	1/11	Course (Category	: BS	Er		Exam Type	TE	
Course Code	U23BSTC01	Perio	ds/Week		Credit	Maxim	um Marks	,	
Course Code		L C	Т	Р	C	CAM	ESE	TM	
Course Name	Physical Science for Engineers	3		•	3	25	75	100	
	(Comm	on to all Brai	nches)						
Prerequisite	Physics of 12 th standard or equivalent / Che	mistry of 12 th	standard	or equi	valent.		or Apple.	<u> </u>	
	On completion of the course, the stude					5.0		apping	
	CO1 Understand the basic ofproperties of			and supe	erconductors	L		st Level	
	CO2 Identify the wave nature of the parti						P	(3	
Course	CO3 Understand the basic principles of la							(2	
Outcomes	CO4 Understand and familiar with the wat	er treatment.	OPTION OF					(2	
Catoomoo	CO5 Understand the electrode potential		tv inelect	rochemi	cal reaction	and		(2	
	uses of variousbatteries.		,				Bea Cirk		
	CO6 Understand the specific operating co	ndition under	which co	rrosion	occurs and	y faire	pr 4	(2	
	suggest a method to control corrosio	n. ON A - PHY	SICS						
UNIT - I	Magnetic, Dielectric and Supercondu				Periods: 8				
Introduction to	magnetic materials, Ferromagnetism- Doma	in theory-Tyn	es of e	nerav-H			ft magnetic	1	
materials-ferrites	-Dielectric materials-Typesof polarization – lown- Ferroelectric materials-Superconducting	Langevin-De	ebye equ	uation-F	requency e	ffects on p	oolarization-	CO1	
UNIT - II	Quantum Mechanics	2.56 1.558			Periods: 7	,			
				40.00	r enous. r				
Matter Waves -	de Broglie Wavelength - Uncertainty Princip	le –Physical	Significa	nce of v	wave function	ns - Schro	dinger wave	CO2	
Matter Waves - Equation - Time		le –Physical o Particle in a	Significa One Din	nce of v	wave function	ns - Schro	dinger wave	CO2	
Equation - Time	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics	o Particle in a	One Din	nensiona	wave functional Box - Tuni Periods: 7	ons - Schroo nel Diode.		CO2	
Equation - Time UNIT-III Lasers - Principl	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application t Laser and Fiber Optics les of Laser - Spontaneous and Stimulated En	o Particle in a	One Din	nensiona oefficien	wave functional Box - Tuni Periods: 7 its - Populat	ons - Schroonel Diode.	n and Laser		
Equation - Time UNIT-III Lasers - Principl Action —compon	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Enterts of laser - Types of Lasers - NdYAG, CO	o Particle in a nissions - Ein: 0 ₂ laser, GaA	One Din	nensiona oefficien Fiber Op	wave functional Box - Tuni Periods: 7 uts - Populate offices - Prince	ons - Schroo nel Diode. ion Inversion ple and Pro	n and Laser	CO2	
Equation - Time UNIT-III Lasers - Principl Action —compon	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Enterts of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle	o Particle in a nissions - Ein 0 ₂ laser, GaA Types of op	One Din	nensiona oefficien Fiber Op	wave functional Box - Tuni Periods: 7 uts - Populate offices - Prince	ons - Schroo nel Diode. ion Inversion ple and Pro	n and Laser		
Equation - Time UNIT-III Lasers - Principl Action —compon	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Enterts of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle	o Particle in a nissions - Ein: 0 ₂ laser, GaA	One Din	nensiona oefficien Fiber Op	wave function Box - Tuni Periods: 7 its - Populate otics - Prince erial, refraction	ons - Schroo nel Diode. ion Inversion ple and Pro ve index, mo	n and Laser		
Equation - Time UNIT-III Lasers - Principl Action —compon light in optical fit	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment	o Particle in a nissions - Eine 2 laser, GaA - Types of op N B – CHEM	One Din	oefficien Fiber Op rs (mate	wave function la Box - Tuni Periods: 7 lts - Populat lotics - Prince lerial, refraction Periods: 8	ons - Schroo nel Diode. ion Inversion ple and Pro ve index, mo	n and Laser pagation of ode)	соз	
Equation - Time UNIT-III Lasers - Principl Action –compon light in optical fib UNIT-IV Water: Sources hardness, alkali hard water in bo	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination of boiler - Treatment of boiler feed water: Internal	o Particle in a nissions - Eine 2 laser, GaA - Types of op N B - CHEM s: Definition of brackish I treatment (p	stein's Cost Laser of Strate of Stra	oefficien Fiber Op rs (mate	wave function Periods: 7 tts - Populate potics - Prince prial, refraction Periods: 8 periods: 8 periods: 8 periods: 8	ons - Schrod nel Diode. ion Inversion iple and Pro ye index, mo odour, tu	n and Laser pagation of ode) rbidity, pH, s of using		
Equation - Time UNIT-III Lasers - Principl Action -compon light in optical fib UNIT-IV Water: Sources hardness, alkali hard water in be conditioning) and	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination of External treatment—lon exchange demineralized External treatment—lon exchange demineralized.	o Particle in a nissions - Eine 2 laser, GaA 3 - Types of op N B - CHEM s: Definition of brackish al treatment (particular)	stein's Cost Laser of Strate of Stra	oefficien Fiber Op rs (mate	wave function Periods: 7 tts - Populate potics - Prince prial, refraction Periods: 8 periods: 8 periods: 8 periods: 8	ons - Schrod nel Diode. ion Inversion iple and Pro ve index, mo dour, tu sadvantage aluminate	n and Laser pagation of ode) rbidity, pH, s of using	co3	
Equation - Time UNIT-III Lasers - Principl Action -compon light in optical fit UNIT-IV Water: Sources hardness, alkali hard water in be conditioning) and UNIT-V Galvanic cells.	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination of the External treatment—lon exchange demineralized Electrochemical Cells and Storage Desingle electrode potential, standard electrochemical cells.	nissions - Eine D2 laser, GaA E - Types of op N B - CHEM ES: Definition of brackish all treatment (praction and zeo Devices Deduction of potential,	one Din stein's Cost Laser of tical fibe ISTRY and signification of the cost o	nensiona oefficien Fiber Op rs (mate gnificanc Reverse e, colloi ess.	wave function Periods: 7 Its - Populate Periods: 8	ons - Schrod nel Diode. ion Inversion iple and Prove index, mo ve index, mo dour, turissadvantage aluminate a	n and Laser opagation of ode) rbidity, pH, s of using and Calgon	CO3	
Equation - Time UNIT-III Lasers - Principl Action —compon light in optical fib UNIT-IV Water: Sources hardness, alkali hard water in be conditioning) and UNIT-V Galvanic cells, measurement. N	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, COper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination of the External treatment—lon exchange demineralized Electrochemical Cells and Storage Designed electrode potential, standard electroders equation. Electrolyte concentration cell.	nissions - Eine D2 laser, GaA e - Types of op N B - CHEM s: Definition of brackish al treatment (partion and zeo levices ode potential, Reference e	one Din stein's Cost Laser of tical fibe ISTRY and signification of the cost o	nensiona oefficien Fiber Op rs (mate gnifican Reverse e, colloi ess. chemica s-hydrog	wave function Periods: 7 Its - Populate Periods: 8	ons - Schroomel Diode. ion Inversion iple and Prove index, modur, turn isadvantage aluminate a MF of a collandAg/AgC	n and Laser pagation of ode) rbidity, pH, s of using and Calgon rell and its	co3	
Equation - Time UNIT-III Lasers - Principl Action —compon light in optical fib UNIT-IV Water: Sources hardness, alkali hard water in be conditioning) and UNIT-V Galvanic cells, measurement. N	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination of the External treatment—lon exchange demineralized Electrochemical Cells and Storage Desingle electrode potential, standard electrochemical cells.	nissions - Eine D2 laser, GaA e - Types of op N B - CHEM s: Definition of brackish al treatment (partion and zeo levices ode potential, Reference e	one Din stein's Cost Laser of tical fibe ISTRY and signification of the cost o	nensiona oefficien Fiber Op rs (mate gnifican Reverse e, colloi ess. chemica s-hydrog	wave function Periods: 7 Its - Populate Periods: 8	ons - Schroomel Diode. ion Inversion iple and Prove index, modur, turn isadvantage aluminate a MF of a collandAg/AgC	n and Laser pagation of ode) rbidity, pH, s of using and Calgon rell and its	CO3	
Equation - Time UNIT-III Lasers - Principl Action —compon light in optical fib UNIT-IV Water: Sources hardness, alkali hard water in be conditioning) and UNIT-V Galvanic cells, measurement. N and fuel cells: Tapplications.	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination oblier - Treatment of boiler feed water: Internated External treatment—lon exchange demineralized Electrochemical Cells and Storage Disingle electrode potential, standard electrochemical cells and Storage Dispess of batteries- alkaline battery-lead storages.	nissions - Eine D2 laser, GaA e - Types of op N B - CHEM s: Definition of brackish al treatment (partion and zeo levices ode potential, Reference e	one Din stein's Cost Laser of tical fibe ISTRY and signification of the cost o	nensiona oefficien Fiber Opers (mate gnificano Reverse de, colloi dess.	wave function Periods: 7 tts - Populate totics - Prince totics - Periods: 8 Periods: 8 Periods: 8 Periods: 8 Jen, calome battery- fue	ons - Schroomel Diode. ion Inversion iple and Prove index, modur, turn isadvantage aluminate a MF of a collandAg/AgC	n and Laser pagation of ode) rbidity, pH, s of using and Calgon rell and its	CO3	
Equation - Time UNIT-III Lasers - Principl Action –compon light in optical fib UNIT-IV Water: Sources hardness, alkali hard water in be conditioning) and UNIT-V Galvanic cells, measurement. N and fuel cells: Tapplications. UNIT-VI	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination biller - Treatment of boiler feed water: Internated External treatment—lon exchange demineralized Electrochemical Cells and Storage Disingle electrode potential, standard electrochemical cells and Storage Dispess of batteries - alkaline battery-lead storage Corrosion	nissions - Eine D ₂ laser, GaA e - Types of op N B - CHEMI s: Definition of brackish al treatment (pation and zeo levices ode potential, Reference e age battery-	one Din stein's Cost Laser lotical fibe ISTRY and signature: For the sphate process electrodes nickel-ca	nensiona oefficien Fiber Opers (mate gnificano Reverse de, colloi dess.	wave function Periods: 7 ts - Populate office - Prince office - Prince office	ons - Schroomel Diode. John Inversion of the line of	rbidity, pH, s of using and Calgon ell and its Cl. Batteries D ₂ fuel cell-	CO3	
Equation - Time UNIT-III Lasers - Principl Action –compon light in optical fib UNIT-IV Water: Sources hardness, alkali hard water in be conditioning) and UNIT-V Galvanic cells, measurement. N and fuel cells: 1 applications. UNIT-VI Corrosion –Introd material select	de Broglie Wavelength - Uncertainty Princip Dependent - Time Independent - Application to Laser and Fiber Optics les of Laser - Spontaneous and Stimulated Entents of laser - Types of Lasers - NdYAG, Coper - Numerical aperture and acceptance angle SECTION Water and its Treatment and impurities, Water quality parameter inity, TDS, COD and BOD. Desalination of External treatment—lon exchange demineralized Electrochemical Cells and Storage Designed electrode potential, standard electron designed electron electrolyte concentration cell. Types of batteries- alkaline battery-lead stored control of the cont	o Particle in a nissions - Eine 2 laser, GaA - Types of op N B - CHEM s: Definition of brackish al treatment (partion and zec levices ode potential, Reference e age battery- emical corros tection - sacri	one Din stein's Cost Laser of the listry and signature of the listry and signature of the listry electrodes of the listry of the	nensiona oefficien Fiber Op rs (mate gnificanc Reverse e, colloi ess. chemica s-hydrog admium anic, dif	Periods: 8 Description of the priods: 9 Description of the priods: 7 Description of the priods: 7 Description of the priods: 7 Description of the priod of the priods: 7 Description of the priod of t	ons - Schroomel Diode. find Inversion in In	rbidity, pH, s of using and Calgon cell and its Cl. Batteries D ₂ fuel cell-sion control ent cathodic	CO3	



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- 2.S.S Dara "A text book of Engineering Chemistry" 15th Edition, 2021. S.Chand Publications.
- 3. C. Jain, Monica Jain, —"Engineering Chemistryll" 17th Ed. Dhanpat Rai Pub. Co., NewDelhi, (2015).

Reference Books

- 1. R. Murugeshan, "Modern Physics", S. Chand &Co, New Delhi 2006.
- William D Callister Jr., "Material Science and Engineering", 6th Edition, John Wiley and sons, 2009.
 Jain & Jain "Engineering chemistry", 23rd Edition, Dhanpat Rai Publishing Company. 2022
- 4. Mars Fontana "Corrosion Engineering", July 2017
- 5. Jina Redlin, "Handbook of Electrochemistry", March 28, 2005

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- 3. https://study.com/academy/lesson/semiconductors-superconductors-definition-properties.html
- 4. https://mechanicalc.com/reference/engineering-materials
- 5. http://ndl.ethernet.edu.et/bitstream/123456789/89589/1/%5BPerez N.%5D Electrochemistry and corrosion%28 BookZZ.org%29.pdf

COs/POs/PSOs Mapping

COs		5 # W V			Program S Outcomes										
-	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	1	MATERIAL &	6 2 44	? (j.b €	单元的	M. Led or	War in	-19(=1, -1)	ri pir emil	1 6.6	5-7-710
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6	3	1	-	-	-	-	211.			-	-	· -	-		- 1 n

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

	- "	Contin	uous Asses	sment Marks (CA	M)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

^{*} TE - Theory Exam, LE - Lab Exam

Department	Artificial Intel	igence and Data Science	Program	me: B.T	ech			F.A. ac.)	
Semester	11/111		CourseC	ategory	ES		End Semester	Exam Type	: TE
		Ŷ.	Perio	ds/Weel	ζ	Cred	it Ma:	ximum Mark	S
Course Code	U23ADTC01		L	Т	Р	С	CAM	ESE	TM
Course Name	Programming	in Python	3	0	0	3	25	75	100
		(Common	to All Brai	nches)			.	7 7	
Prerequisite	NIL								
	On completion	of the course, the students w	vill be abl	e to				BT Ma (Highes	
	CO1 Interpret	he basic concepts of Python pr	rograms.			1		K	2
Course Outcomes	CO2 Articulate	the concepts of Sets, Dictional	ries and O	bject-Ori	ented o	concepts.		K	2
Outcomes	CO3 Experime	nt with Numpy package.		17			v 1. 1 1	K	3
	CO4 Apply and	d analyze Data Manipulation wi	th Pandas					K	3
	CO5 Illustrate	programming concept for Visua	alization wi	th Matple	otlib.			K	3
UNIT - I	Introduction 7	o Python				Periods	s:09		
Structure of Pyth Branches and Lo	non Program – Uno pops – Functions –	derlying mechanism of Module Lambda Functions – Lists and	Execution Mutability	n – Bran – Proble	ching a m Solvi	and Looping ing Using L	g – Problem S ists and Funct	olving Usin ions.	CO1
UNIT - II	Sequence Dat	atypes and Object-Oriente	ed Progr	amming	3	Periods	s:09		
Sequences – Ma	pping and Sets – Essions using "re" m	Dictionaries. Classes: Classes a	and Instan	ces – Inh	eritanc	e – Except	ion Handling –	Introduction	C02
UNIT - III	Using Numpy					Periods			
Basics of NumPy	/ – Computation on	NumPy - Aggregations - Com	putation o	n Arrays	– Com	parisons -	Masks and Bo	oolean	200
		rrays - Structured Data: NumF	Py's Struct	ured Arra	ay.	T n	00		CO3
UNIT - IV	Data Manipula	ation with Pandas		D-4- !	D	Periods			7
ntroduction to Pa	andas Objects – Da	ata indexing and Selection – Op Data Sets. Aggregation and Gro	perating or ouning – P	i Data in ivot Tab	Panua les –Ve	s – nandiii ectorized St	ring Operation	a — s — Working	CO4
vith Time Series	- High Performand	ce Pandas – eval() and query().					9 -1		
UNIT - V	Visualization	With Matplotlib				Periods			
Basic functions of Customizing Plot	of Matplotlib – Simp Legends – Colour	le Line Plot – Scatter Plot – De Bars – Three-Dimensional Plot	nsity and titing in Ma	Contour tplotlib.	Plots –	Histogram	s – Binnings aı	nd Density –	CO5
ecture Periods		Tutorial Periods:	Practica		s:-		Total Perio	ds:45	
Text Books		~	1						
2. Zhang.` 3. Wesley Reference Book	Y, "An Introduction J Chun, "Core Pythes s	Data Science Handbook - Esse to Python and Computer Progra non Programming", Pearson Ed	amming", S ducation, 2	Springer nd Edition	Publica n, 2006	ations, 2016	5.		
		assaron, "Python for Data Scie							
 Jesus F Brian D 	Rogel-Salazar, "Dat raper, "Python Prog	a Science and Analytics with P gramming A Complete Guide fon ndependent Publishing Platforn	ython", CR or Beginne	C Press	Taylor	and Franci	s Group, 2017		amming
Mark Lu	itz. Laura Lewin, Fi	ank Willison, "Programming Py "Introduction to Python Progra	/thon", O'F	Reilly Med	dia, 3 rd ss, 2018	Edition, 20	06.		***************************************
Veb Reference:			- 1						
		106/106/106106212/			-				
		.org/data-analysis-visualization	n-python/						
		earn/python-data-analysis							
700 CONTURBUSION	ww.python.org/								
https://v	www.programiz.com	n/python-programming							

* TE – Theory Exam, LE – Lab Exam

B.Tech. Computer Science and Engineering

W.

COs				Program Specific Outcomes (PSOs)											
_	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-		3	-		-	-	-	x= x		3		3
2	2	2	1	3	-	-	-	-	-	7=1	-	2	2	2	3
2	3	2	2	3	-	-	-	-	-		-	2	3	2	3
3	3	3	2	3	-	-	•	-	•	-	·	3	3	3	3
2	3	3	2	3	-	-	-	-	-	-	-	2	3	3	3
3	3	3	2	3	- 1		-	-	- "	-	-	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Co	ntinuous Assess	ment Marks (CAM))	End	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

B.Tech. Computer Science and Engineering

0 1 2 68

Department	Computer Science and Engineering	Programn	ne: B.Teo	ch				***************************************
Semester	11/111	Course	Category	: ES	End	d Semester	Exam Type:	TE
Course Code		Perio	ds/Weel	(Credit	Max	kimum Marks	3
	U23CSTC03	L	Т	Р	С	CAM	ESE	TM
Course Name	Data Structures	3	0	0	3	25	75	100
	(Common to All Bran	nches excep	t CSBS	and FT)			<u> </u>	
Prerequisite	Any Programming Knowledge							***************************************
	On completion of the course, the students						BT Map (Highest	Level)
Course	CO1 Compute time and space complexity fo CO2 Demonstrate stack, queue and its oper		iems		AND THE PERSON NAMED OF TH		K2 K2	
Outcomes	CO3 Illustrate the various operations of links			·····			K3	
	CO4 Use the concepts of tree for various ap						K3	
	CO5 Outline the various Tables, Graphs and	d Sets techn	iques.				K3	}
UNIT - I	Basic Terminologies of Data Structures				Periods:09	7 (7 (7 (7 (7 (7 (7 (7 (7 (7 (A400 (200 (200 (200 (200 (200 (200 (200 (
Search and Bir	sic Terminologies – Asymptotic Notations: Con eary Search Techniques. Sorting: Bubble So and Comparison among the sorting methods.							
UNIT - II	Stack and Queue Operations				Periods:09			•••••
	ues: ADT Stack and its operations. Applications one. Types of Queue: Simple Queue - Circular C					luation. AD	T Queue	CO2
UNIT - III	Linked List Operations				Periods:09			
Deletion. Linked	gly linked list: Representation in memory. Algori representation of Stack and Queue. Doubly linke						Insertion -	CO3
UNIT - IV	Trees				Periods:09			
Tree Traversals	e Terminologies. Different types of Trees: Binar s – AVL Tree- Red Black Tree.	y Tree - Thr	eaded B	inary Tr	·	earch Tree	- Binary	CO4
UNIT - V	Graphs, Tables and Sets				Periods:09			•
	rminologies and Representations - Graph travers Applications. Sets: Representation of Sets- Ope					ables - Has	h Table and	COS
Lecture Periods		Practica			······································	otal Period	ds:45	1
Text Books		1				0.0		
1. Ellis Horowitz.	Sartaj Sahni," Fundamentals of Data Structures'	". Illustrated	Edition.	Compu	ter Science Pr	ess 2018		
	reman, Charles E. Leiserson, Ronald L. Rivest a						nird Edition, 2	2010.
	Jeffrey D. Ullman, John E. Hopcroft, "Data Struc						ACCES TO DATE CONTROL OF S	
Reference Book	(S							
 Robert Kruse, Second Edition Mark Allen We Mark Allen We Publishing Con Mark Allen We Edition, 1995. 	eiss, "Data Structures and Algorithm Analysis in Ceiss," Algorithms, Data Structures and Problempany, 1995. eiss," Algorithms, Data Structures and Problem S	and Program C", Pearson em Solving	Design Education with C	in c" . F on, Seco ++", Ill	ond. Edition,20 Justrated Edit	006. ion, Addis	•	ed
Web References								
2. https://www.ja 3. https://www.st 4. https://www.tu 5. https://www.w	eeksforgeeks.org/data-structures/ vatpoint.com/data-structure-tutorial/ udytonight.com/data-structures/ torialspoint.com/data_structures_algorithms/ 3schools.in/data-structures-tutorial/intro/							

* TE -- Theory Exam, LE – Lab Exam

COs		= 1			Pro	gram O	utcome	es (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1		-	-	-	-	-	-	:	3	2	3
2	3	2	1	1	-	-	-	-	-	-		-	3	2	3
3	3	2	1	1	3.	-	•	-	-1	·	-		3	2	3
4	3	2	1	1	-	-	-	· .	-	-	. 8	-	3	2	3
5	3	2	1	1	-	-	-	-	-		-	-	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Continu	ous Asse	ssment Marks (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	.0	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Inforr	nation Te	chnology	Program	nme: B.	Tech.		-700	THE RESERVE	i i
Semester		Variation N		Course			*End		Exam Type	
					ds/Wee		Credit		ximum Mar	T
CourseCode	U23IT			L	Т	Р	C	CAM	ESE	100
Course Name	Digita	al Design	and System Architecture	3	0	0	3	25	75	100
_			(Common	to CSE a	and IT)					
Prerequisite	Basic	mathema	atics, Basics of Electrical and	d Electroi	nics En	gineerin	g			
	On co	ompletion	of the course, the studer	nts will b	e able 1	to			BT Mar (Highest	Level
	CO1	Demonstr	ate simplifications of Boolean for	unctions.					K2	
Cauras	CO2	Describe	various combinational logic circ	cuits.					K2	<u>:</u>
Course Outcomes	CO3	Illustrate v	rarious sequential circuits.				1, 142	17 e 284	K2	!
=	CO4	Narrate th	e basic components and comp	uter orgar	nization				K2	<u>:</u>
			emory types and I/O organizati				Tau's Fr		K2	
UNIT - I		1	nber Systems				Periods:0	9		
nagnitude repre	sentatio	n and Cor	version of Number systems – E npliment representations - Bin unction: Theorems and laws, K	ary codes	 Roole 	ean Aige	bra – Boolea	n functions	s – canonica	CO1
UNIT - II	Logic	Gates a	nd its Types				Periods:0	9		7
ntroduction to c Adder – BCD Ad	ombina der – C	tional circu arry look a	uits – Design procedures of C head adder – Decoder – Encod	combinatio der – Prior	nal circuity Enco	uits – Ac der – Mu	dders - Subtr Iltiplexer.	actors – B	inary paralle	CO2
UNIT - III	Sequ	ential Lo	gic Design				Periods:0	9		.,
T Elin Elone	Evoitat	ion table o	 Latches - Types of Latches: f Flip-Flops - Counters : Asyrgisters : SISO,SIPO,PISO,PIP 	chronous	Counter	rs – Syn	cnronous coi	inters – ivid	od Counters	7
UNIT - IV	Fund	amentals	of Computer Organization	on			Periods:0	9	emerget/L	·
notructions Inni	it Our	tout and In	, Organization and Design: Ins terrupt, ALU design, Executior Pipelining: Basic concepts, Dat	n of a com	plete ins	struction-	-Multiple bus	organizatio	n, Hardwired	UU4
UNIT - V	Mem	ory And I	/O Organization				Periods:0	9		7
memory input-o	utput in	terface, as	/, Memory chip Organization, ynchronous data transfer, Mod I, USB), Case study – Advance	ies of tran	ster, Pri	, Associa	ate memory, rrupt, DMA -	Virtual me Buses Inte	mory, Cache rface circuits	COS
Lecture Period	ds:45		Tutorial Periods: -	Practic	al Perio	ods:-	1	Total Peri	ods:45	
Text Books		•					•••••••••••••••••••••••••••••••••••••••			
M. Morris M Stephen Bro	own and 2. ino, Co	d ZvonkoVi mputer Sy	Ciletti, Digital Design, Sixth Edit ranesic, "Fundamentals of Digi stem Architecture, Third Editio	ital Logic v	vith VHL	L Desigi	n", Tata McG	raw Hill Ed	ucation Pvt.	

B.Tech. Computer Science and Engineering

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Reference Books

- 1. Tocci R J and Widmer N S, "Digital Systems Principles and Applications", Prentice Hall of India, New Delhi,11th Edition, 2010.
- 2. John.F.Wakerly, "Digital Design Principles and Practices", Pearson Education, 4th Edition, 2006.
- 3. Carl Hamacher, ZvonkoVranesic and SafwatZaky, "Computer Organization", 5th edition, Tata McGraw Hill Education, 2011.
- 4. David A. Patterson and John L. Hennessey, "Computer Organization and Design", 5th edition, Morgan Kauffman /Elsevier, 2014
- 5. Roger Tokhiem, "Schaum's Outline of Digital Principles", McGraw Hill publication, 3rd Edition, 1994.

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- 2. https://nptel.ac.in/courses/117/105/117105080/
- 3. https://nptel.ac.in/courses/106/105/106105163/
- 4. https://www.javatpoint.com/computer-organization-and-architecture-tutorial
- 5. http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/gatesfunc/
 - * TE Theory Exam, LE Lab Exam

COs/POs/PSOs Mapping

COs				y	Prog	gram O	utcome	es (POs)			- 21	Prog Outo	ram Spe omes (P	cific SOs)
K.	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	2		1	-	-	-	-	1	2 to	· 10 -0, -1	3	д -	1 - 110
2	2	a. d	2	7 -	. 1	, - 1	-	-	-	1	1-	-	3	-	
3	3	1	2		1		-	-	-	1		· % · •	3	Sixin-	funk, ij
4	3	1	2	-	1		-		-	1	-	2-0	3	-	T = 200
5	3	1	2	-	1	-	- 1	-	-	1	12	<u>-</u> '1-	3	-	4 - 434

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

A STATE OF THE STA		Continuou	End Semester	Total			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	1	0	5	5	5	75	100

^{*}Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

B.Tech. Computer Science and Engineering

11

Department	English	Programr	ne: B.	Tech.		-		
Semester	11	Course C	ategor	y: HS	*Er	d Semeste	r Exam	Type: T
Course Code	U23ENBC02	Period	s/Wee	k	Credit		imum Ma	
		L	Т	Р	С	CAM	ESE	ТМ
Course Name	Communicative English - II	2	-	2	3	50	50	100
	(Common	to ALL Branches ex	xcept (CSBS)				1
Prerequisite	Basics of English Language		<u>-</u>	······································	······································			
	On completion of the course, the						1	apping st Level)
Course	CO1 Draft effective written commu	ınication in professi	ional e	nvironm	ent		•••	(2
Outcomes	CO2 Apply the mechanics of creat	ive writing with pred	cision	and clar	ity		ľ	(3
Outcomes	CO3 Acquire language skills pro sensitizing various etiquettes	in real time situation	n	e over	all personal	ity through	1	(2
n 1 #1	CO4 Develop language fluency and	d gain self-confider	псе				l k	(3
	CO5 Express thoughts and ideas v	vith clarity and focu	IS			•••••••••••••••••••••••••••••••••••••••		2
	Business Correspondence				Periods:10		.1	
ousiness Writing:	Circular, Agenda, Memoranda, Notice,	Instruction, Minutes	, Email	Writing	, Report Writ	ing- Official	and Der	ni
Jiliciai Letters : Ap	oplying for Educational / Car / Home Loa	ns / Joining Report, I	_eave L	etter. In	dustrial Visit	Innlant Train	aina Lette	-H
-etter, Bio-data, C'	ing for a quotation, Placing Order, Lette	er of Complaints, Let	ter see	king Cla	rification, Res	sume', Job	Application	n CO1
JNIT - II	Functional Writing Skills				D 1 1 40			
	ting, Sentence Structure, Art of condense	ation: Cummon, Writi		NI-1- NA	Periods:10			4
entence, Principle	es of paragraph writing, Techniques of Es	say Writing Jumbled	ng and	Note Ma	iking, Use of	ohrase and o	clause in	CO2
JNIT - III	Etiquettes	ody writing, Jumpled	Senter					
tiquette: Meaning		quette Telephone Eti	auotto	Email E	Periods:10	-114 1: =::		
tiquette: Meaning Dining Etiquette, C	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette	quette, Telephone Eti	quette,	Email E	tiquette, Soci	al Media Etic	quette,	CO3
JNIT - IV	, Kinds: Corporate Etiquette, Meeting Etic	quette, Telephone Eti	quette,	Email E	tiquette, Soci	al Media Etic	quette,	СОЗ
JNIT - IV ist of Exercises	, Kinds: Corporate Etiquette, Meeting Etic ommunication Etiquette Communication Practice-II	quette, Telephone Eti	quette,	Email E	tiquette, Soci	al Media Etic	quette,	СОЗ
JNIT - IV ist of Exercises istening: Letter v	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips		quette,	Email E	tiquette, Soci	al Media Etic	quette,	
JNIT - IV ist of Exercises istening: Letter v peaking: Just a N	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips //inute, Impromptu Speech, Contemporary		quette,	Email E	tiquette, Soci	al Media Etic	quette,	CO3
JNIT - IV ist of Exercises istening: Letter v peaking: Just a N leading: Variety o	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips //inute, Impromptu Speech, Contemporary of examples for Modes of Writing		quette,	Email E	tiquette, Soci	al Media Etic	quette,	
INIT - IV ist of Exercises istening: Letter v peaking: Just a N eading: Variety o /riting: Different t NIT - V	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips //inute, Impromptu Speech, Contemporary of examples for Modes of Writing		quette,	Email E	tiquette, Soci	al Media Etic	quette,	
JNIT - IV ist of Exercises istening: Letter v speaking: Just a N Reading: Variety o Vriting: Different t JNIT - V ist of Exercises	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips //inute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II		quette,	Email E	tiquette, Soci Periods:15	al Media Etic	quette,	
JNIT - IV ist of Exercises istening: Letter v ipeaking: Just a N Reading: Variety o Vriting: Different t INIT - V ist of Exercises istening: Video:	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips Minute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes		quette,	Email E	tiquette, Soci Periods:15	al Media Etic	quette,	
JNIT - IV ist of Exercises istening: Letter v peaking: Just a N reading: Variety of Vriting: Different t JNIT - V ist of Exercises istening: Videos peaking: Team	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips Minute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills		quette,	Email E	tiquette, Soci Periods:15	al Media Etic	quette,	C04
JNIT - IV List of Exercises Letter v Leading: Letter v Leading: Variety of Vriting: Different t JNIT - V List of Exercises List of Exerci	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips Minute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses	y Issues	quette,	Email E	tiquette, Soci Periods:15	al Media Etic	quette,	
JNIT - IV ist of Exercises istening: Letter v peaking: Just a N leading: Variety of /riting: Different t INIT - V ist of Exercises istening: Video: peaking: Team eading: Phras /riting: Free writ	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips // Jinute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing	y Issues		Email E	tiquette, Soci			CO4
JNIT - IV List of Exercises Listening: Letter v Epeaking: Just a N Leading: Variety of Vriting: Different t JNIT - V List of Exercises Listening: Video Listening: Team Leading: Phras Vriting: Free write Lecture Periods:3	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips // Jinute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing	y Issues		Email E	tiquette, Soci	al Media Etic		CO4
JNIT - IV List of Exercises Listening: Letter v Leading: Variety of Vriting: Different t INIT - V List of Exercises Listening: Videos Leading: Phras Leading: Phras Leading: Free write Lecture Periods:3 Lext Books	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips // Jinute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing Tutorial Periods: -	y Issues g Practice Practical Po	eriods	Email E	tiquette, Soci Periods:15 Periods:15			CO4
JNIT - IV List of Exercises Listening: Letter v Epeaking: Just a N Reading: Variety of Vriting: Different t INIT - V List of Exercises Listening: Videos Listening: Phras Vriting: Free write Lecture Periods:3 Lext Books 1. PC Das, "Le 2. Kumar, San	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips // Jinute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing Tutorial Periods: - etter Writing including Official and Busines jay, Pushpalatha," Communication Skills'	y Issues Practice Practical Poss Letters", New Cen ". Oxford University P	eriods: tral Boo	Email E	tiquette, Soci Periods:15 Periods:15 Tot			CO4
JNIT - IV ist of Exercises istening: Letter v ipeaking: Just a N leading: Variety of Vriting: Different t INIT - V ist of Exercises istening: Videos ipeaking: Team leading: Phras Vriting: Free write lecture Periods:3 ext Books 1. PC Das, "Le 2. Kumar, San 3. Raman, Me	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips Jinute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing Tutorial Periods: - etter Writing including Official and Busines jay, Pushpalatha," Communication Skills' enakshi & Sangeetha Sharma," Communication	y Issues Practice Practical Poss Letters", New Cen ". Oxford University P	eriods: tral Boo	Email E	tiquette, Soci Periods:15 Periods:15 Tot			C04
JNIT - IV ist of Exercises istening: Letter v peaking: Just a N leading: Variety of Vriting: Different t INIT - V ist of Exercises istening: Videos peaking: Team leading: Phras Vriting: Free write lecture Periods:3 ext Books 1. PC Das, "Le 2. Kumar, San 3. Raman, Me leference Books	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips //inute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing Interpersonal Communication Skills es and Clauses ting on any given topic, Paraphrasing Interpersonal Periods: - etter Writing including Official and Busines jay, Pushpalatha," Communication Skills' enakshi & Sangeetha Sharma," Communication Skills'	y Issues Practice Practical Poss Letters", New Cen ". Oxford University Polication Skills", New Description Skills", New Description Skills (1988)	eriods: tral Boo ress, 2 Delhi: O	:30 bk Agenc 018. UP,2018	Periods:15 Periods:15 Periods:15	al Periods:	:60	CO4
JNIT - IV ist of Exercises istening: Letter v peaking: Just a N leading: Variety of friting: Different t INIT - V ist of Exercises istening: Video peaking: Team leading: Phras friting: Free write lecture Periods:3 ext Books 1. PC Das, "Le 2. Kumar, San 3. Raman, Me leference Books 1. Sahukar, Ni	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips //inute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing on any given topic, Paraphrasing fully Tutorial Periods: - etter Writing including Official and Busines jay, Pushpalatha," Communication Skills' enakshi & Sangeetha Sharma," Communication s meran , Bhalla, Prem., "The book of Etiquettes meran , Bhalla, Prem., "The book of Etiquettes meran , Bhalla, Prem., "The book of Etiquettes research in the communication of the	y Issues Practice Practical Poss Letters", New Cen ". Oxford University Polication Skills", New Denication Skills (Control of the Control o	eriods: tral Boo ress, 2 Delhi: O	:30 bk Agenc 018. UP,2018	Periods:15 Periods:15 Periods:15 Total Sy, 2020.	al Periods:	:60	CO4
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JNIT - IV List of Exercises Listening: Letter vices Leading: Variety of Leading: Variety of Leading: Different ty List of Exercises Listening: Videos List of Exercises Listening: Phras Leading: Phras	, Kinds: Corporate Etiquette, Meeting Eticommunication Etiquette Communication Practice-II writing tips //inute, Impromptu Speech, Contemporary of examples for Modes of Writing ypes of letters Interpersonal Communication-II s on different types of Etiquettes Presentation, Negotiation Skills es and Clauses ting on any given topic, Paraphrasing on any given topic, Paraphrasing fully Tutorial Periods: - etter Writing including Official and Busines jay, Pushpalatha," Communication Skills' enakshi & Sangeetha Sharma," Communication s meran , Bhalla, Prem., "The book of Etiquettes meran , Bhalla, Prem., "The book of Etiquettes meran , Bhalla, Prem., "The book of Etiquettes research in the communication of the	y Issues Practice Practical Poss Letters", New Cen ". Oxford University Possition Skills", New Entertion Skills and Manners" Ford University Press	eriods: Press, 2 Delhi: O Pustak duct", P	Email E 30 ok Agenco 018. UP,2018 Wearson I	Periods:15 Periods:15 Periods:15 Total Sy, 2020.	al Periods:	:60	CO4

B.Tech. Computer Science and Engineering

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- https://www.indeed.com/career-advice/finding-a-job/how-to-write-an-application-letter
- https://owlcation.com/humanities/Four-Types-of-Writing https://targetstudy.com/languages/english/paragraph-writing.html
- https://www.businessnewsdaily.com/8262-email-etiquette-tips.html https://www.youtube.com/watch?v=UOceysteljo

COs/POs/PSOs Mapping

COs	1	Program Outcomes (POs)											Program Specific Outcomes (PSOs)		
1.75	P01	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	n iei	1004	- 4	2-9	₽ '_ 1	4.63	_ uq	173 🚉	3	-	1	- F-	V	-
2	1		-	-	-	-	-	-	1.	3	-	- 1		F . T	-
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5	1.	-	-	-	-	-	7			3		- 1	. N.¥ . /	67	115 1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

Theory

	Contin	nuous Ass	sessment Marks	(CAM)	End Semester	a to 1
Assessment	CAT 1	CAT 2	Model Exam	Attendance	Examination (ESE) Marks	Total Marks
	10	1	5	5	75	
Marks	20	(to be we	ighted for 10 mar	ks)	(to be weighted for 50 marks)	- 60

Practical

Continuous Assessmen	t Internal Evaluation	End Semester In	ternal Evaluation	Total Marks
30(to be weight	ed for 10 marks)	30 m	narks	10-4293
Listening (L)*	10	Listening (L)*	10	at energis of ?
Speaking(S)	5	Speaking(S)	5	40
Reading(R)*	10	Reading(R)*	10	g vesti .
Writing(W)*	5	Writing(W)*	5	E g va

LRW components of Practical can be evaluated through Language Lab Software

B.Tech. Computer Science and Engineering

^{*} TE – Theory Exam, LE – Lab Exam

Department Semester	•	anical Engineering	, , , , , , , , , , , , , , , , , , , ,	me: B.	I COII.				
Gerriesiei	1/11		Course			*End	Semester E		
	17.11			ds/Wee		Credit	Maxi	mum Ma	rks
CourseCode	U23ES	PC02	L	Т	Р	С	CAM	ESE	TM
Course Name	Design	n Thinking and IDEA Lab	-	-	2	1	50	50	100
		(Cor	nmon to ALL Bra	nches)		9,17		1 1 1 1 1 1	
Prerequisite	Basic I	Knowledge of Science		i i B					
	On c	ompletion of the course, the	students will l	oe able	to		* 1577 tur	(Highes	apping st Level)
	CO1	Demonstrate a comprehensive un IDEA Lab.	derstanding of th	e tools a	and inven	tory associat	ed with the	К	(2
	CO2	Develop proficiency in ideation teo various design challenges and pro	chniques to gener oblems	rate crea	ative and	innovative so	olutions for	K	(3
Course Outcomes	соз	Acquire practical knowledge of me hands-on experience with machin	echanical and ele ery, tools, and tec	ctronic t chniques	abrication s used in	the manufac	turing and	K	(3
	CO4	Cultivate the skills necessary for one ability to integrate user needs, madesign process.	developing innovant rket trends, and t	echnolo	gical adv	ancements II	nto tne	K	(4
	CO5	Apply iterative design methodologuser testing, and evaluation of fur	ies to refine and actional, aesthetic	improve , and us	solutions ability as	s based on fe pects	edback,	K	(4

Design process: Traditional design, Design thinking, Existing sample design projects, Study on designs around us, Compositions/structure of a design, Innovative design: Breaking of patterns, Reframe existing design problems, Principles of creativity Empathy: Customer Needs, Insight-leaving from the lives of others/standing on the shoes of others, Observation

Design team-Team formation, Conceptualization: Visual thinking, Drawing/sketching, New concept thinking, Patents and Intellectual Property, Concept Generation Methodologies, Concept Selection, Concept Testing, Opportunity identification Prototyping: Principles of prototyping, Prototyping technologies, Prototype using simple things, Wooden model, Clay model, 3D printing; Experimenting/testing.

Sustainable product design, Ergonomics, Semantics, Entrepreneurship/business ideas, Product Data Specification, Establishing target specifications, Setting the final specifications. Design projects for teams.

List of Lab Activities and Experiments

- 1. Schematic and PCB layout design of a suitable circuit, fabrication and testing of the circuit.
- 2. Machining of 3D geometry on soft material such as softwood or modelling wax.
- 3. 3D scanning of computer mouse geometry surface. 3D printing of scanned geometry using FDM or SLA printer.
- 2D profile cutting of press fit box/casing in acrylic (3 or 6 mm thickness)/cardboard, MDF (2 mm) board using laser cutter & engraver.
- 2D profile cutting on plywood /MDF (6-12 mm) for press fit designs. 5.
- Familiarity and use of welding equipment.
- Familiarity and use of normal and wood lathe. 7.
- Embedded programming using Arduino and/or Raspberry Pi.
- Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.
- 10. Discussion and implementation of a mini project.
- 11. Documentation of the mini project (Report and video).

Lectu	ecture Periods:- Tutorial P		torial Pe	iods:	•	Practical Periods:30			Total Periods:30				
Text E	Books			Ł									1
1.	Tim	Brown,	Change	by	Design:	How	Design	Thinking	Transforms	Organizations	and	Inspires	Innovation,
Harpe	erCollins	s Publishe	ers Ltd.	-									
2.	Work	shop / Ma	anufacturin	g Pra	actices (wit	h Lab	Manual), I	Khanna Bo	ok Publishing.				

B.Tech. Computer Science and Engineering

Reference Books

- 1. Ulrich and Eppinger, Product Design and Development, 3rd Edition, McGraw Hill, 2004
- 2. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018.
- 3. The Total Inventors Manual (Popular Science): Transform Your Idea into a Top-Selling Product. Sean Michael Ragan, Weldon Owen; 2017.
- 4. The Art of Electronics. 3rd edition. Paul Horowitz and Winfield Hill. Cambridge University Press.
- 5. Practical Electronics for Inventors. 4th edition. Paul Sherz and Simon Monk. McGraw Hill.
- Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards. Simon Monk and Duncan Amos. McGraw Hill Education.
- 7. Programming Arduino: Getting Started with Sketches. 2nd edition. Simon Monk. McGraw Hill.
- 8. Venuvinod, PK., MA. W., Rapid Prototyping Laser Based and Other Technologies, Kluwer
- 9. Chapman W.A.J, "Workshop Technology", Volume I, II, III, CBS Publishers and Distributors, 5th Edition, 2002

Web References

1. https://onlinecourses.nptel.ac.in/noc23_mg72

* TE - Theory Exam, LE - Lab Exam

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)												gram Spe comes (P	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	2	<u>_</u>	-	2		3	2	·		rucifares
2	3	3	3	2	2	2			2		3	2) = 生 m
3	3	3	3	2	3	2	-	e i viljula	2	7	3	2	-	-	-
4	3	3	3	2	3	2	-		2	p 16-71"	3	2	7		THE TOTAL
5	3	3	3	2	3	2	-	- 5-4	2	S _p ii	3	2		- 2	g util te

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Continuou	s Assessm	ent Marks (CAM)	-11 1 11				
Assessment	Performance i	in practical	classes	Model		End Semester Examination	Total		
vet.	Conduction of practical	Record work	viva	Practical Examination	Attendance	(ESE) Marks	Marks		
Marks	15	5	5	15	10	50	100		

B.Tech. Computer Science and Engineering

11

Department	Artifi	cial Intelligence and Data Science	Progran	nme: B.	Tech				
Semester			Course	Catego	ry: ES	End	Semeste	Exam T	ype: LE
Course Code			Perio	Max	/laximumMarks				
Oddisc Oddo	U23A	ADPC01	L	T	Р	С	CAM	ESE	TM
Course Name	II		50	50 100					
		(Common t	to All Bra	nches)					
Prerequisite	NIL								
A. Carlotte and the car	On c	ompletion of the course, the stude	nts will b	e able t	0				apping st Level)
	CO1	Describe common Python functionality a	nd feature	s used fo	or data s	cience.		T P	(2
Course	CO2	Query Data Frame structures for cleanin	g and pro	essing.				F	(2
Outcomes	CO3	Configure your programming environment	nt .					k	(3
		Experiment the concept using data visua						P	(3
	CO5	Analyze real time datasets,						pag P	(3
ist of Exercise									

1. Build a python program to implement Fibonacci series.

- 2. Build a python program to get a range of numbers from user and to separate even numbers and odd numbers respectively.
- 3. Build a function in Python to check duplicate letters. It must accept a string, i.e., a sentence. The function should return True if the sentence has any word with duplicate letters, else return False.

4. Build a program to perform arithmetic operations using lambda function.

5. Build a Python program that takes a list of numbers as input and returns a new list containing only the even numbers from the input list.

6. Build a python program to create a class called Car with attributes Company, model, and year. Implement a method that returns the age of the car in years.

- 7. Build a python program to create a base class called Shape that has a method called area which returns the area of the shape (set it to 0 for now). Then, create two derived classes Rectangle and Circle that inherit from the Shape class to calculate the area of derived classes.
- 8. Build a python program to implement aggregation using Numpy.

9. Build a python program to perform Indexing and Sorting.

- 10. Build a python program to perform Handling of missing data.
- 11. Build a python program to perform usage of Pivot table using Titanic datasets
- 12. Build a python program to perform use of eval () and query ()
- 13. Build a python program to perform Scatter Plot
- 14. Build a python program to perform 3D plotting
- 15. Implement an application to process a real time data.

Lecture Periods: -	Tutorial Periods: -	Practical Periods:30	Total Periods:30
Reference Books			

Chirag Shah, "A Hands-On Introduction to Data Science", Cambridge University Press, 2020.

- Siddhartha Chatterjee, Michal Krystyanczuk, "Python Social Media Analytics", Packt Publishing, 2017.
- Jake VanderPlas, "Python Data Science Handbook Essential Tools for Working with Data", O'Reily Media Inc, 2016.
- Zhang, Y, "An Introduction to Python and Computer Programming", Springer Publications, 2016.
- Wesley J Chun, "Core Python Programming", Pearson Education, 2nd Edition, 2006.

Web References

- https://nptel.ac.in/courses/106/106/106106212/
- https://www.geeksforgeeks.org/data-analysis-visualization-python/
- https://www.coursera.org/learn/python-data-analysis
- https://www.python.org/
- https://www.programiz.com/python-programming

* TE - Theory Exam, LE - Lab Exam

B.Tech. Computer Science and Engineering

COs/POs/PSOs Mapping

COs		Program Outcomes (POs) PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO1											Progr	ecific PSOs)	
	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	2	1	3	-	-	-	-	-	-	-	2	2	2
2	2	3	2	2	3	-	-	-	_	-	-	_	2	3	2
3	3	3	3	2	3	-	-	-	-		TIPHEN I	in Driv	3	3	3
4	3	3	3	3	3	- ", - -"			1 -	4.	· .	12.1	3	3	3
5	3	3	3	3	3	115	-	PA =		-1-	H 🖭	lar 🗷 🖟	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

Assessment	Co	ntinuous A	AM)	the state of the	Sept.			
	Performan cla	ce in pract asses	ical	Model		End Semester	Total	
Personal	Conduction of practical	Record work	viva	Practical Examination	Attendance	The Control of the Co	Marks	
Marks	15	5	5	15	10	50	100	

B.Tech. Computer Science and Engineering

LA

Department	Comp	uter Science and Engineering										
Semester	11/111		Course	Categoi	y: PC	*End S	Semester	Exam Typ	e: LE			
Course Code	U23C	SPC02	Perio	ds/Wee	k	Credit	Maximum		Marks			
Course Code	02300	37-002	L	Т	Р	С	CAM	ESE	TM			
Course Name	Data S	Structures Laboratory 0 0 2 1 50 50 100										
		(Common to all Brai	nches exce _l	ot CSBS	and FT)			***************************************			
Prerequisite	Basic	rogramming Knowledge										
Trerequisite	On c	On completion of the course, the students will be able to										
	CO1	Analyse the algorithm's / program's efficiency in terms of time and space complexity.							st Level) (3			
Course Outcomes	CO2	Solve the given problem by identifying	the appropri	ate Data	Structure	Э.		K3				
Outcomes	CO3	Solve the problems of searching and s	orting techni	ques.				K	(3			
	CO4	Solve problems in linear Data Structur	es.					K	(4			
	CO5	Solve problems in non-linear Data Structures.						K	(4			

List of Exercises:

- 1. Write a C program to implement recursive and non-recursive i) Linear search ii) Binary Search.
- 2. Write a C program to implement i) Bubble sort ii) Selection sort iii) Insertion sort iv) Shell sort v) Heap sort.
- 3. Write a C program to implement the following using an array, a) Stack ADT b) Queue ADT
- 4. Write a C program to implement list ADT to perform following operations a) Insert an element into a list. a) Delete an element from list b) Search for a key element in list c) count number of nodes in list.
- 5. Write a C program to implement the following using a singly linked list. a) Stack ADT b) Queue ADT.
- 6. Write a C program to implement the dequeue (double ended queue) ADT using a doubly linked list and an array.
- 7. Write a C program to perform the following operations:
 - a) Insert an element into a binary search tree.
 - b) Delete an element from a binary search tree.
 - c) Search for a key element in a binary search tree.
- 8. Write a C program that use recursive functions to traverse the given binary tree in
 - a) Preorder b) Inorder c) Postorder.
- 9. Write a C program to perform the AVL tree operations.
- 10. Write a C program to implement Graph Traversal Techniques.
- 11.Write a C program to implement the Set operations.
 a) Union b) Intersection c) Difference.

Lecture Periods:		Tutorial Periods:	-	Practical Periods: 30	Total Periods: 30
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Reference Books

- 1. Yashavant Kanetkar, "Data Structures through C", BPB Publications, 3rd Edition, 2019.
- 2. Tenebaum Aaron M, "Data Structures using C', Pearson Publisher, 1st Edition, 2019.
- 3. Manjunath Aradhya M and Srinivas Subramiam, "C Programming and Data Structures", Cengage India 1st Edition, 2017.
- 4.Reema Thareja, "Data structures using C", Oxford University, 2nd Edition, 2014.
- 5.Gav.pai, "Data Structures and Algorithms", McGraw-Hill India, 1st Edition, 2013.

Web References

- 1. https://www.tutorialspoint.com/data_structures_algorithms/
- https://www.w3schools.in/data-structures-tutorial/intro/
- 3. https://nptel.ac.in/courses/106103069/
- 4. https://swayam.gov.in/nd1 noc20 cs70/preview
- 5. https://nptel.ac.in/courses/106103069
- * TE Theory Exam, LE Lab Exam

B.Tech. Computer Science and Engineering

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)											Program Specific Outcomes (PSOs)		
.=.	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	20		t - n	- x=x	-		7=0	-	3	2	3
2	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
3	3	2	1	1	-		1 44	1-11-11-11-11-11-11-11-11-11-11-11-11-1	· _		-	78724	3	2	3
4	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
5	3	2	1	1	-	-	-	-	-	-	<-x	-	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Continuous	S Assess	ment Marks (CAI	M)			
Assessment	Performan cl	ce in pract asses	ical	Model	- P	End Semester	Total	
	Conduction of practical	Record work	viva	Practical Examination	Attendance	Examination (ESE) Marks	Marks	
Marks	15	5	5	15	10	50	100	

B.Tech. Computer Science and Engineering

2. A.3.80

Department	Inforn	nation Technology	Progran	nme: B.	Tech.				
Semester	11 - 1		Course	Catego	ry: PC	*Er	nd Semest	er Exam	Type: LE
CCl-	LIGGIT	DC04	Periods/Week Credit				Ma	Maximum Marks	
Course Code	U23IT	PCUT	L	Т	Р	С	CAM	ESE	TM
Course Name	ame Laboratory Digital Design and System Architecture 0 0 2 1							50	100
		(Common	to CSE a	nd IT)				7	
Prerequisite	NIL								
	On c	ompletion of the course, the stude	nts will I	e able	to			BT Mapping (Highest Level)	
	CO1	Experiment simplifications of Boolean fu	nctions	1 700			13 1 7 7 7	u caitule	К3
Course	CO2	Develop any combinational logic functio	ns and de	sign com	nbination	al circuit			К3
Outcomes	CO3	Demonstrate the behavior of sequential	circuits	· · · · · · · · · · · · · · · · · · ·					К3
	CO4	Simulate basic knowledge of computer of	organizatio	ns			- 1	FOU	К3
	CO5	Design memory unit and simulate memo	ory operati	ons					К3
List of Exercis	es					Periods:30	¥		1

HDL code to realize all the logic gates

2. Design and Simulation of adder, Serial Binary Adder, Multi Precession Adder, Carry Look Ahead Adder.

3. Design of 2-to-4 decoder

4. Design of 8-to-3 encoder (without and with parity)

Design of flip flops: SR, D, JK, T

- Design of a N- bit Register of Serial- in Serial –out, Serial in parallel out, Parallel in Serial out and Parallel in Parallel Out.
- 7. Design of ALU to Perform ADD, SUB, AND-OR, 1's and 2's Compliment,
- 8. Design of ALU to Perform Multiplication, and Division.
- 9. Memory unit design and perform memory operations.
- 10. 8-bit simple ALU design
- 11. 8-bit simple CPU design
- 12. Interfacing of CPU and Memory

	······································		
Lecture Periods: - Tu	utorial Periods: -	Practical Periods:30	Total Periods:30

Reference Books

- 1. J. Bhasker, "Verilog Hdl Synthesis, a Practical Primer", Trade Paperback, 2018.
- 2. Massimo Alioto, Elio Consoli, Gaetano Palumbo, "Flip-Flop Design in Nanometer CMOS", Springer, 2015.

3. Charles Platt, "Make: More Electronics", Make: community, 2014.

- 4. M K Gooroochurn," Introduction to Digital Logic & Boolean Algebra", Paperback, 2018.
- 5. Carl Hamacher, ZvonkoVranesic and SafwatZaky, "Computer Organization", fifth edition, Tata McGraw Hill Education, 2011.

Web References

- 1. http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/gatesfunc/
- 2. https://www.javatpoint.com/computer-organization-and-architecture-tutorial
- 3. https://www.tutorialspoint.com/digital_circuits/digital_circuits_flip_flops
- 4. https://www.geeksforgeeks.org/hardware-description-language/

B.Tech. Computer Science and Engineering

W

^{*} TE - Theory Exam, LE - Lab Exam

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)											Program Specific Outcomes (PSOs)		
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
1	2	1	2	-	1	-	-	-		1 :	had re		3	-57 -	
2	2	1	2	-	1	7-1	1-	-		1	-	-	3	da = 1	95 T-5-2 T
3	3	1	2		1	•	-	-	0.4	1	-	-	3	-	-
4	3	1	2		1	-	-	-	-	1	-	-	3	-	is after
5	3	1	2	-	1		-	-	-	1	-	-	3	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

Assessment	2	Continuous	End				
	Performa	nce in practica	ıl classes	Model Practical	Attendance	End Semester Examination (ESE) Marks	Total Marks
	Conduction of practical	Record work	Viva	Examination	Attendance	(LOL) marks	
Marks	15	5	5	15	10	50	100

B.Tech. Computer Science and Engineering

1.11

ANNEXURE III

INDUSTRY INSTITUTE INTERACTION



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi, & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution & Accredited by NAAC with "A" Grade) Madagadipet, Puducherry - 605 107



INDUSTRY INSTITUTE INTERACTION

Internship Details 2019-2023 Batch

				Starting	1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1	
S.No.	Reg.No	Name of the Student	Compnay	Date	End Date	Stipend
1	19TD0194	PANNEERSELVAM C	ZOHO	30.05.2022	30.06.2022	20,000
2	19TD0210	RAVI SHANKAR. M	ZOHO	30.05.2022	30.09.2022	20,000
3	19TD0164	KARTHIKEYAPASSUPATHY R	ZOHO	30.05.2022	30.09.2022	20,000
4	19TD0217	SAMHITHA A	ZOHO	30.05.2022	30.09.2022	20,000
5	19TD0197	PAVITHRA R	ZOHO	30.05.2022	30.09.2022	20,000
6	19TD0140	GOWTHAMI .S	ZOHO	30.05.2022	30.09.2022	20,000
7	19TD0270	VIJI D	ZOHO	30.05.2022	30.09.2022	20,000
8	19TD0195	PARKAVI. R	ZOHO	30.05.2022	30.06.2022	20,000
9	19TD0136	GAYATHRI C	ZOHO	30.05.2022	30.09.2022	20,000
10	19TD0229	SHANKAR ANAND. R	ZOHO	03.10.2022	15.11.2022	20,000
11	19TD0106	ALAN XAVIER MARTIAL. A	ZOHO	03.10.2022	15.11.2022	20,000
12	19TD0237	SOMESHVAR .V	ZOHO	03.10.2022	15.11.2022	20,000
13	19TD0177	MAGESH. R	ZOHO	03.10.2022	15.11.2022	20,000
14	19TD0246	SUDHERSANAN K	ZOHO	03.10.2022	15.11.2022	20,000
15	19TD0180	MITHRA .C	ZOHO	03.10.2022	15.11.2022	20,000
16	19TD0145	HARSHAVARTHINI S	ZOHO	03.10.2022	15.11.2022	20,000
17	19TD0102	ABHIRAM.P	Virtusa	27.06.2022	15.11.2020	8,000
18	19TD0261	VADAPALLI SRIDIVYA	Virtusa	27.06.2022	15.11.2020	8,000
19	19TD0109	ANAND NARAYANAN. S	KAAR	27.06.2022	15.11.2020	5,000
20	19TD0114	ASHATHULLA .J	KAAR	27.06.2022	15.11.2020	5,000
21	19TD0220	SARAN .G	KAAR	27.06.2022	15.11.2020	5,000
22	19TD0276	YOKESH KUMAR.M	FORD	27.06.2022	15.11.2020	5,000
23	19TD0211	RENITHA.K	CARATLANE	27.06.2022	15.11.2020	5,000
24	19TD0213	SAI KISHORE RAO. K	CARATLANE	27.06.2022	15.11.2020	5,000



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Madagadipet, Puducherry - 605 107



S.NO	DATE	TITLE	RESOURCE PERSON	YEAR	BATCH
1	19.11.2022	The Technologies Will	K. Krishnakumar,	II	2021-25
		Rule The Future World	Yes Software Technology,		-
		* .	CEO, Puducherry.		
2	19.11.2022	Project Management in	Mr.N.M.Jeevanatham,	III	2020-24
v—v		Industries	Developer, ZOHO Cooperation		
		- 0	Mr.A.Nevinkumar,		
			Developer, TCS Chennai.		
3	17.12.2022	Applications of Python	Dr.N.Sivakumar, Assistant	I	2022-26
-	1,,,,	Programming	Professor, Department of Computer		
			Science and Engineering,		
	-	- a	Puducherry Technological		
			University.		-
4	17.12.2022	OOPS Concepts	Dr.N.Sivakumar, Assistant	II	2021-25
7	17.12.2022	Oor 5 concepts	Professor, Department of Computer		
			Science and Engineering,		-
			Puducherry Technological		×
			University.		
5	03/12/2022	Advance Operating	Shakin Bsnu Haleem,	II	2021-25
3	03/12/2022	Systems	Design Engineer Specialist,		
		2,2	Ipswich,UK.		
6	10.12.2022	An Industrial Approach	Sathisk Kanna.M	II	2021-25
O	10.12.2022	for Problem Solving	Data Engineer,		
	_	lor reciem serving	TCS Chennai.		
7	10.12.2022	PPY-Modern python	A.Aasaimani,	I	2022-25
/	10.12.2022	application development	Exela Technologies,		Total de company (control
		in practice.	Chennai.		
_	24.12.2022		Nithyanandan.S	II	2021-25
8	24.12.2022	ACD- Automat's usage in compiler designing.	Software Engineer,		
	-	in compiler designing.	Texas Instruments.		TI TI
	04.01.0000	CI: 4 C	Vasanth,	IV	2019-23
9	04.01.2022	Client Server	System Admin,SMVEC(w)	1.	2017 25
		Technology		IV	2019-23
10	07.01.2023	Block chain	M.Anandkrishnan,	1 4	2017-23
	· -	Cryptography	Managing Director,		
			Yes soft		
			(w)Technology,Pondichherry	III	2020-24
11	19.11.2022.	PHP Development	Dr.M. Geetha,	Ш	2020-24
	1		Assistant Professor,		
	-		Pondicherry University,		
			Puducherry.		L

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ВАТСН	YEAR	SEMESTER	TOTAL STUDENTS	INDUSTRY NAME	LOCATION	DATE OF VISIT
2020-		4				_
2024	III	VI	170	Sniqsys Technosphere	Kazhakoottam, TVM - 695584	21-04-2023
2021-				Spectrum Softtech	V	
2025	II	IV	165	Solutions Pvt. Ltd.,	Kochi - 682 011, Kerala, INDIA	05.05.2023
2021-					Infopark, Kochi, Ernakulam	, i
2025	II	IV	165	Nestsoft Technologies	(District), Kerala,	05.05.2023
2022-						
2026	I	II	170	CodeBind Technologies	Gandhipuram, Coimbatore.	02.06.2023

ANNEXURE - IV

Details of Examiners for Question Paper Setter and Evaluators





Madagadipet, Puducherry - 605 107



Department of Computer Science and Engineering

Details of Examiners for Question Paper Setter and Evaluators

SI.No	Name of the Examiner	Specialization	Designation, Department and Institution in which currently working	Contact number and mail id
1	Dr. K. RAJA	Computer Graphics, Computer Networks, Multimedia	Assistant Professor / IT, Annamalai University, Chidambaram	9894304053, rajak cdm@yahoo.co.in
2	Dr.B.MURUGANANTHAM	Artificial Intelligence, Service Oriented Architecture, Webservices	Associate .Professor / CSE SRM Institute of Science and Technology, Chennai.	9940023373, muruganb@srmist.edu.in
3	Dr. V.TAMIZHAZHAGAN	Wireless Networks	Assistant Professor / IT, Annamalai University, Chidambaram	8925122220 rvtamizh@gmail.com
4	Dr. D. JAGANATHAN	Artificial Intelligence, Computer Networks	Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D institute of Science and Tecnology, Chennai	9994524148 djagannathan@veltech.edu.in
5	Mr. V. PRABHU	DBMS, Data Structures	Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D institute of Science and Tecnology, Chennai	9597739629 vprabhu@veltech.edu.in

		P	_	
6	Dr. LAKSHMI DHEVI	Internet of Things, Compute Organization, Computer Graphics	Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D institute of Science and Tecnology, Chennai	9551145796 blakshmidhevi@veltech.edu.in
7	Dr.MANJUNATHAN Dr.MANJUNATHAN Dr.MANJUNATHAN Database Management Systems, Operating Systems Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D institute of Science and Tecnology, Chennai		9791060024 nmanjunathan@veltech.edu.in	
8	Dr. A. RAMACHANDRAN	Digital Design, Computer Design, Web Technology	Assistant Professor and Head (i/c), Department of Computer Science and Engineering, University College of Engineering, Panruti.	9790900771 ramautpc@gmail.com, ram@ucep.edu.in
9	Dr. C. NAVANEETHAN Java, Python, Artificial Intelligence, Data Structures Associated Professor Departrices Software System System School Inform Technool Engineeri		Associate Professor / CSE Department of Software and Systems Engineering, School of Information Technology & Engineering, VIT, Vellore - 632014	9962327007 navaneethan.c@vit.ac.in
10	Dr. G. GUNASEKARAN.	Artificial Intelligence, AR & VR, Compiler Design	Associate Professor / CSE Department of Smart Computing, School of Information Technology & Engineering, VIT, Vellore - 632014	9443049982 ggunasekaran@vit.ac.in

11	Dr. AMRITHA SARAVANAN	Data Structures, Operating Systems	Associate Professor / CSE Department of CSE, University college of Engineering, Villupuram	9791555778 aasaravanan777@gmail.com
12	Dr. BALAJI. N	Computer Networks, Cloud Computing	Professor and Head, Department of CSE, Sri Venkateswara College of Engineering and Technology, Puducherry.	9944199803 nbalajime1983@gmail.com

Annexure V

(M.Tech - Curriculum and Syllabus)



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

(As per UGC - 2018 Regulations and Affiliated to Pondicherry University)

PUDUCHERRY - 605107

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M.TECH.

COMPUTER SCIENCE AND ENGINEERING

(REGULATIONS - 2023)

CURRICULUM AND SYLLABI



M.Tech. Computer Science and Engineering

COLLEGE VISION AND MISSION

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION

M1: Quality Education

: To provide comprehensive academic system that amalgamates

the cutting edge technologies with best practices.

M2: Research and Innovation : To foster value-based research and innovation in collaboration

with industries and institutions globally for creating

intellectuals with new avenues.

M3: Employability and

Entrepreneurship

: To inculcate the employability and entrepreneurial skills

through value and skill based training.

M4: Ethical Values

: To instill deep sense of human values by blending societal

righteousness with academic professionalism for the growth

of society.

DEPARTMENT VISION AND MISSION

VISION

To create a productive learning and research environment for graduates to become highly dynamic, competent, ethically responsible, professionally knowledgeable in the field of computer science and engineering to meet the industrial needs on par with global standards.

MISSION

M1: Quality Education: Empowering the students with the necessary technical skills through quality education to grow professionally.

M2: Innovative Research: Advocating the innovative research ideas by incorporating with industries for developing products and services.

M3: Placement and Entrepreneurship: Advancing the education by strengthening the Industryacademic relationship through hands-on training to seek placement in the top most industries or to develop a start-ups.

M4: Ethics and Social Responsibilities: Stimulating professional behaviour and good ethical values to improve the leadership skills and social responsibilities.

M.Tech. Computer Science and Engineering

PROGRAMME OUTCOMES (POs)

PO1: Exploration of Research:

An ability to independently carry out research/investigation and development work to solve practical problems.

PO2: Technical Skill:

An ability to write and present a substantial technical report/document.

PO3: Expertise in Academics:

Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4: Problem solving:

An ability to discriminate, analyzes, evaluate and synthesize the technologies to provide solution for multidimensional engineering problems.

PO5: Usage of Modern Tools:

Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations..

PO6: Ethical Practices and Social Responsibility:

Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Technical Knowledge: To acquire a comprehensive knowledge in computer science engineering concepts and apply them for the investigation of real world problems.

PEO2: Research and Development: To prepare graduates who will demonstrate analytical, research, design and implementation skills offering techno-commercially feasible and socially acceptable solutions.

PEO3: Leadership: To prepare graduates who will demonstrate analytical, research, design and implementation skills offering techno-commercially feasible and socially acceptable solutions

PEO4: Professional Behavior: To deliver graduates to design and implement solutions for rapidly changing computing problems and information system environments to adapt innovation.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Technical Knowledge in Computer Science and Engineering: Graduates with the ability to apply basic knowledge of Computer Science in solving the critical problems.

PSO2: Multidisciplinary Competency: Ability to convert innovative ideas into research or society oriented projects through current trending technologies.

PSO3: Employability: Acquire placement in highly reputed industries or accomplish new technical business skills with the contemporary trends in the industry.

M.Tech. Computer Science and Engineering

STRUCTURE FOR POST GRADUATE ENGINEERING PROGRAM

SI.No	Course Category	Breakdown of Credits
1	Humanities and Social Sciences (HS)	6
2	Basic Sciences(BS)	3
3	Engineering Sciences (ES)	<u> </u>
4	Professional Core (PC)	25
5	Professional Electives (PE)	18
6	Open Electives (OE)	a state of the state of
7	Project Work and Internship(PA)	20
8	Ability Enhancement Courses (AEC)	· X & • 1
9	Mandatory courses (MC)	
	Total	72

SCHEME OF CREDIT DISTRIBUTION - SUMMARY

SI.No	Course Category		Credits per Semester					
	Course Category	I	П	Ш	IV	Credits		
1	Humanities and Social Sciences (HS)	4	2	-	-	6		
2	Basic Sciences(BS)	3	+_ ;		-	3		
3	Engineering Sciences (ES)	177	12.	12-7	1	-		
4	Professional Core (PC)	11	14	-	BOES	25		
5	Professional Electives (PE)	3	6	9	-	18		
6	Open Electives (OE)	-	-	-	-	-		
7	Project Work and Internship(PA)			8	12	20		
8	Ability Enhancement Courses (AEC)*	-	-	-	-	-		
9	Mandatory Courses (MC)*		-	-	-	-		
	Total	21	22	17	12	72		

^{*} AEC, MC Credits are not included for CGPA calculation

CURRICULUM

	SEMESTER – I										
SI. Course			Cotomomi	Periods				Max. Marks			
No.	Code	Course Title	Category	L	T	P	Credits	CAM	ESM	Total	
The	Theory										
1	P23MAT103	Mathematical Foundation of Formal Approach	BS	2	1	0	3	40	60	100	
2	P23CSTD01	Advanced Data Structures and Algorithms	PC	3	0	0	3	40	60	100	
3	P23CST102	Cloud and Big Data Analytics	PC	3	0	0	3	40	60	100	
4	P23CSTD02	Speech and Language Processing	PC	3	0	0	3	40	60	100	
5	P23HSTC01	Research Methodology and IPR	HS	2	0	0	2	40	60	100	
6	P23CSE1XX	Professional Elective – I *	PE	3	0	0	3	40	60	100	
Prac	tical										
7	P23CSP101	Advanced Data Structures and Algorithms Laboratory	PC	0	0	4	2	50	50	100	
8	P23HSPC01	Technical Report Writing and Seminar	HS	0	0	4	2	100	-	100	
Abili	ty Enhanceme	nt Course									
9	P23CSC1XX	Certification Course-I #	AEC	0	0	4	-	100	-	100	
10	P23ACT10X	Audit Course-I**	AEC	0	0	2	-	100	-	100	
							21	590	410	1000	

	SEMESTER – II										
SI.	Course	Course Title	Category	Pe	Periods		Credits	Max. Marks			
No.	Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total	
The	Theory										
1	P23CST203	Advanced Software Engineering and Testing	PC	3	0	0	3	40	60	100	
2	P23CST204	Adhoc and Wireless Sensor Networks	PC	3	0	0	3	40	60	100	
3	P23CST205	Advanced Operating Systems	PC	3	0	0	3	40	60	100	
4	P23CST206	Advanced Python Programming	PC	3	0	0	3	40	60	100	
5	P23CSE2XX	Professional Elective - II	PE	3	0	0	3	40	60	100	
6	P23CSE2XX	Professional Elective - III	PE	3	0	0	3	40	60	100	
Prac	tical										
7	P23CSP202	Advanced Python Programming Laboratory	PC	0	0	4	2	50	50	100	
8	P23HSPC02	Seminar on ICT a hands on approach	HS	0	0	4	2	100	-	100	
Abili	ty Enhanceme	nt Course									
9	P23CSC2XX	Certification Course-II #	AEC	0	0	4	-	100	-	100	
10	P23ACT20X	Audit Course-II**	AEC	0	0	2	-	100	-	100	
							22	590	410	1000	



	SEMESTER - III											
SI.	Course	Course Title	Category	Periods			Credits	Max. Marks				
No.	Code			L	1	Р		CAM	ESM	Total		
Thec	ory						_					
1	P23CSE1XX	Professional Elective – IV *	PE	3	0	0	3	40	60	100		
2	P23CSE1XX	Professional Elective – V *	PE	3	0	0	3	40	60	100		
3	P23CSE1XX	Professional Elective – VI *	PE	3	0	0	3	40	60	100		
Proje	ect Work		~=	•								
4	P23CSW301	Project Phase - I	PA	0	0	12	6	50	50	100		
5	P23CSW302	Internship	PA	0	0	0	2	100	-	100		
Abili	ty Enhanceme		•									
6	P23CSC301	NPTEL/SWAYAM/MOOC	AEC	0	0	0	-	100	-	100		
	17 370 230 600											

		S	EMESTER - IV				10 to	1-0-76		
SI.	Course	Course Title	Catagony	Р	eric	ds	Credits	Max. Marks		
No.	Code	Course Title	Category	Category L T	Р	Credits	CAM	ESM	Total	
Proje	ect Work									
1	P23CSW403	Project Phase - II	PA	0	0	24	12	50	50	100
	F	I II					12	50	50	100

^{*} Professional Elective Courses are to be selected from the list given in Annexure I # Ability Enhancement Courses are to be selected from the list given in Annexure II

** Audit Courses are to be selected from the list given in Annexure III

BS-Basic Sciences

PC - Professional Core

PE - Professional Elective

HS - Humanities and Social Sciences

PA - Professional Activity

CC- Common Course

AC- Audit Course

AEC - Ability Enhancement Course

CREDIT DISTRIBUTION

Semester	I	II	III	IV	Total
Credits	21	22	17	12	72

Total number of credits required to complete M.Tech in Computer Science and Engineering :

72 credits

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ANNEXURE- I

PROFESSIONAL ELECTIVE COURSES

SI. No.	Course Code	Course Title
	sional Elective-	
1	P23CSE101	Programming for Data Science
2	P23CSE102	Cyber Attacks Detection and Prevention Systems
3	P23CSE103	Bio-Inspired Computing
4	P23CSE104	Block Chain and Crypto currency
5	P23CSE105	IoT Applications Engineering
Profess	ional Elective-	
1	P23CSEC01	Information Visualization
2	P23CSE206	Malware Analysis
3	P23CSEC02	Soft Computing
4	P23BDEC01	Neural Networks
5	P23CSE207	Smart Sensing for IoT
Profess	ional Elective-l	
1	P23CSEC03	Text, Web and Social Media Analytics
2	P23CSEC04	Data Storage Technologies and Networks
3	P23CSE208	Reinforcement Learning
4	P23CSE209	Mobile Application and Development
5	P23CSE210	Wireless Sensor Networks and IoT
Profess	ional Elective-l	
1	P23BDEC03	Analytics of Things
2	P23CSE311	Cloud Security and Analytics
3	P23CSE312	Pattern Recognition
4	P23CSEC05	Game Design and Augmented Reality
5	P23CSE313	IoT Security and Trust
Profess	ional Elective-\	1
1	P23CSEC06	Image and Video Analytics
2	P23CSE314	Web Application Security
3	P23CSE315	Cognitive Science
4	P23CSE316	Cloud Application Development and Management
5	P23CSE317	Intelligent Internet of Things
Profess	ional Elective-V	/1
1	P23CSE318	Big Data Technologies
2	P23CSE319	Digital Forensics
3	P23CSE320	Knowledge Engineering and Expert Systems
4	P23BDTD01	NoSQL Databases
5	P23CSE321	Industrial IoT



ANNEXURE- II ABILITY ENHANCEMENT COURSES

SI. No.	Course Code	Course Title
1	P23XXCX01	Adobe Photoshop
2	P23XXCX02	Adobe Animate
3	P23XXCX03	Adobe Dreamweaver
4	P23XXCX04	Adobe After Effects
5	P23XXCX05	Adobe Illustrator
6	P23XXCX06	Adobe InDesign
7	P23XXCX07	Autodesk AutoCAD -ACU
8	P23XXCX08	Autodesk Inventor - ACU
9	P23XXCX09	Autodesk Revit - ACU
10	P23XXCX10	Autodesk Fusion 360 - ACU
11	P23XXCX11	Autodesk 3ds Max - ACU
12	P23XXCX12	Autodesk Maya - ACU
13	P23XXCX13	Cloud Security Foundations
14	P23XXCX14	Cloud Computing Architecture
15	P23XXCX15	Cloud Foundation
16	P23XXCX16	Cloud Practitioner
17	P23XXCX17	Cloud Solution Architect
18	P23XXCX18	Data Engineering
19	P23XXCX19	Machine Learning Foundation
20	P23XXCX20	Robotic Process Automation / Medical Robotics
21	P23XXCX21	Advance Programming Using C
22	P23XXCX22	Advance Programming Using C ++
23	P23XXCX23	C Programming
24	P23XXCX24	C++ Programming
25	P23XXCX25	CCNP Enterprise: Advanced Routing
26	P23XXCX26	CCNP Enterprise: Core Networking
27	P23XXCX27	Cisco Certified Network Associate - Level 2
28	P23XXCX28	Cisco Certified Network Associate- Level 1
29	P23XXCX29	Cisco Certified Network Associate- Level 3
30	P23XXCX30	Fundamentals Of Internet of Things
31	P23XXCX31	Internet Of Things / Solar and Smart Energy System with IoT
32	P23XXCX32	Java Script Programming
33	P23XXCX33	NGD Linux Essentials
34	P23XXCX34	NGD Linux I
35	P23XXCX35	NGD Linux II
36	P23XXCX36	Advance Java Programming



37	P23XXCX37	Android Programming / Android Medical App Development
38	P23XXCX38	Angular JS
39	P23XXCX39	Catia
40	P23XXCX40	Communication Skills for Business
41	P23XXCX41	Coral Draw
42	P23XXCX42	Data Science Using R
43	P23XXCX43	Digital Marketing
44	P23XXCX44	Embedded System Using C
45	P23XXCX45	Embedded System with IOT / Arduino
46	P23XXCX46	English For IT
47	P23XXCX47	Plaxis
48	P23XXCX48	Sketch Up
49	P23XXCX49	Financial Planning, Banking and Investment Management
50	P23XXCX50	Foundation Of Stock Market Investing
51	P23XXCX51	Machine Learning / Machine Learning for Medical Diagnosis
52	P23XXCX52	IOT Using Python
53	P23XXCX53	Creo (Modelling & Simulation)
54	P23XXCX54	Soft Skills, Verbal, Aptitude
55	P23XXCX55	Software Testing
56	P23XXCX56	MX-Road
57	P23XXCX57	CLO 3D
58	P23XXCX58	Solid works
59	P23XXCX59	Staad Pro
60	P23XXCX60	Total Station
61	P23XXCX61	Hydraulic Automation
62	P23XXCX62	Industrial Automation
63	P23XXCX63	Pneumatics Automation
64	P23XXCX64	Agile Methodologies
65	P23XXCX65	Block Chain
66	P23XXCX66	Devops
67	P23XXCX67	Artificial Intelligence
68	P23XXCX68	Cloud Computing
69	P23XXCX69	Computational Thinking
70	P23XXCX70	Cyber Security
71	P23XXCX71	Data Analytics
72	P23XXCX72	Databases
73	P23XXCX73	Java Programming
74	P23XXCX74	Networking
75	P23XXCX75	Python Programming

M.Tech. Computer Science and Engineering

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76	P23XXCX76	Web Application Development (HTML, CSS, JS)
77	P23XXCX77	Network Security
78	P23XXCX78	MATLAB
79	P23XXCX79	Azure Fundamentals
80	P23XXCX80	Azure AI (AI-900)
81	P23XXCX81	Azure Data (DP -900)
82	P23XXCX82	Microsoft 365 Fundamentals (SS-900)
83	P23XXCX83	Microsoft Security, Compliance and Identity (SC-900)
84	P23XXCX84	Microsoft Power Platform (Pl-900)
85	P23XXCX85	Microsoft Dynamics Fundamentals 365 – CRM
86	P23XXCX86	Microsoft Excel
87	P23XXCX87	Microsoft Excel Expert
88	P23XXCX88	Securities Market Foundation
89	P23XXCX89	Derivatives Equinity
90	P23XXCX90	Research Analyst
91	P23XXCX91	Portfolio Management Services
92	P23XXCX92	Cyber Security
93	P23XXCX93	Cloud Security
94	P23XXCX94	PMI – Ready
95	P23XXCX95	Tally - GST & TDS
96	P23XXCX96	Advance Tally
97	P23XXCX97	Associate Artist
98	P23XXCX98	Certified Unity Programming
99	P23XXCX99	VR Development



ANNEXURE-III

AUDIT COURSES

(Common to all M.Tech Programme)

SI. No.	Course Code	Course Title
· 1	P23ACTX01	English for Research Paper Writing
2	P23ACTX02	Disaster Management
3	P23ACTX03	Sanskrit for Technical Knowledge
4	P23ACTX04	Value Education
5	P23ACTX05	Constitution of India
6	P23ACTX06	Pedagogy Studies
7	P23ACTX07	Stress Management by Yoga
8	P23ACTX08	Personality Development Through Life Enlightenment Skills
9	P23ACTX09	Unnat Bharat Abhiyan

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Prerequisite Basic On co Course Outcomes CO2 CO3 CO4 CO5 UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinatifunctions - Injective, subjective in the propositions and logical operations. UNIT-III Mathe Propositions and logical operations. UNIT-IV Formation and grammars Context free languages. UNIT-V Finite Finite state automata - Detective Periods: 30 Fext Books David Makinson, "Sets, Inc. Grimaldi, R.P. and Rama Hopcroft J.E. and Ullman C.W. Evans, "Engineering Reference Books Kenneth H. Rosen, "Disc. Kenneth H. Rosen, "Disc.	matical Foundation of Formal	L 2 ents will b f, functions a ulus needed or defined p al language automata t values and	e able and relations to engineering the second relations to engine	to to to mputing s s. gineering	Credit C 3 cepts needed kill. areas like Cor	for mpiler roblems to	BT Mal (Highest K3 K3	pping Leve
Course Name Mathe Appro Prerequisite Basic On co Course Outcomes CO2 CO3 CO4 CO5 UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinate Functions - Injective, subject UNIT-III Mathe Propositions and logical operations - Injective, subject UNIT-IV Formation Basic Co5 Co5 Co6 CO2 CO3 CO4 CO5 CO5 CO6 CO7 CO8 CO9 CO9 CO9 CO9 CO9 CO9 CO9 CO9 CO9 CO1 CO1 CO2 CO3 CO4 CO5 CO4 CO5 CO4 CO5 CO4 CO5 CO5 CO6 CO7 CO7 CO8 CO9 CO9 CO9 CO9 CO1 CO1 CO1 CO1 CO1 CO1 CO2 CO3 CO4 CO5 CO6 CO6 CO6 CO6 CO7 CO7 CO6 CO6 CO6 CO6 CO6 CO7 CO7	matical Foundation of Formal ach Mathematics mpletion of the course, the stude Basic knowledge of matrix, Set theory designing and solving problems. Logical operations and predicate calcomological operations and set operations — Eigen Set Theory Igrams and set operations - Laws of set on — Relations - Properties of relations ctive and objective functions.	L 2 ents will b f, functions a ulus needed or defined p al language automata t values and	e able and rela I for corroblems s to eng	to ations con mputing s s. gineering	C 3 cepts needed kill. areas like Cor sign discrete p Periods: 9 Cayley - Hami	for mpiler roblems to	BT Ma (Highest K3 K3	pping Leve
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Course Outcomes CO2 CO3 CO4 CO5 UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinate Functions - Injective, subjective, subjective, subjective of the combinate of the comb	Basic knowledge of matrix, Set theory designing and solving problems. Logical operations and predicate calc. Design and solve Boolean functions for Apply the acquired knowledge of form Design. Apply the acquired knowledge of finite solve by Computers. Algebra C - Solving system of equations – Eigen Set Theory Agrams and set operations - Laws of secon – Relations - Properties of relations ctive and objective functions.	functions a ulus needed or defined p al language: a automata t values and	and relation for corroblems to engine theory a	mputing s s. gineering	kill. areas like Cor sign discrete p Periods: 9 Cayley - Hami	npiler roblems to	(Highest K2 K3 K3 K3	Leve 2 3 3
Course Outcomes CO2 CO3 CO4 CO5 UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Germutation and combinate functions - Injective, subjective in the propositions and logical operations. UNIT-III Mather formutation and combinate functions - Injective, subjective in the propositions and logical operations. UNIT-IV Formational functions - Venn diagonal operations and logical operations. UNIT-IV Formational functions - Venn diagonal functions - Injective, subjective in the propositions and logical operations. UNIT-IV Formational functions - Venn diagonal functions - Injective, subjective, subjectiv	Basic knowledge of matrix, Set theory designing and solving problems. Logical operations and predicate calcording and solve Boolean functions for Apply the acquired knowledge of form Design. Apply the acquired knowledge of finite solve by Computers. Algebra - Solving system of equations – Eigen Set Theory agrams and set operations - Laws of secon – Relations - Properties of relations ctive and objective functions.	functions a ulus needed or defined p al language: a automata t values and	and relation for corroblems to engine theory a	mputing s s. gineering	kill. areas like Cor sign discrete p Periods: 9 Cayley - Hami	npiler roblems to	(Highest K2 K3 K3 K3	Leve 2 3 3
Course Outcomes CO2 CO3 CO4 CO5 UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Cermutation and combinate Functions - Injective, subjective, subjective, subjective of the combinate of	designing and solving problems. Logical operations and predicate calcive Design and solve Boolean functions for Apply the acquired knowledge of form Design. Apply the acquired knowledge of finite solve by Computers. Algebra - Solving system of equations – Eigen Set Theory agrams and set operations - Laws of secon – Relations - Properties of relations ctive and objective functions.	ulus needed or defined p al language: automata t values and	I for corroblems to eng	mputing s s. gineering and to des	kill. areas like Cor sign discrete p Periods: 9 Cayley - Hami	npiler roblems to	K3 K3 K3	3 3 3 3 3
UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinate Functions - Injective, subjective, sub	Design and solve Boolean functions for Apply the acquired knowledge of form Design. Apply the acquired knowledge of finite solve by Computers. Algebra - Solving system of equations – Eiger Set Theory agrams and set operations - Laws of secon – Relations - Properties of relations ctive and objective functions.	or defined p al languages automata t values and	roblems s to eng heory a	s. gineering and to des	areas like Cor sign discrete p Periods: 9 Cayley - Hami	roblems to	K3 K3	3
UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinate Functions - Injective, subjective, subjectives - Injectives -	Apply the acquired knowledge of form Design. Apply the acquired knowledge of finite solve by Computers. Algebra - Solving system of equations – Eiger Set Theory agrams and set operations - Laws of set on – Relations - Properties of relations ctive and objective functions.	al languages automata t values and	heory a	gineering and to des	sign discrete p Periods: 9 Cayley - Hami	roblems to	K3	3
UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinate Functions - Injective, subjective, subjective, subjectives - Injective with the propositions and logical operations. UNIT-III Mather Propositions and logical operations - Injectives - Injecti	Design. Apply the acquired knowledge of finite solve by Computers. Algebra - Solving system of equations – Eigen Set Theory agrams and set operations - Laws of set on – Relations - Properties of relations ctive and objective functions.	automata t values and	heory a	and to des	sign discrete p Periods: 9 Cayley - Hami	roblems to	K3	3
UNIT-I Matrix Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinate Functions - Injective, subje UNIT-III Mathe Propositions and logical op Bome more connectives - Installation Compared and grammars Context free languages. UNIT-IV Format Anguages and grammars Context free languages. UNIT-V Finite Finite state automata - Det DFA and NFA - Equivalence DFA and NFA - Equivalence Compared and Makinson, "Sets, Inc. Compared and Ullman Compared and United and United and Ullman Compared and United a	solve by Computers. Algebra - Solving system of equations – Eiger Set Theory agrams and set operations - Laws of set on – Relations - Properties of relations ctive and objective functions.	values and	Eigenv		Periods: 9 Cayley - Hami		<u> </u>	
Matrices - Rank of a matrix of a matrix. UNIT-II Basic Basic definitions - Venn dia Permutation and combinate Functions - Injective, subjective, su	s - Solving system of equations – Eiger Set Theory agrams and set operations - Laws of set on – Relations - Properties of relations ctive and objective functions.	t theory - P		vectors - 0	Cayley - Hami	Iton theore	m - Inverse	CO1
Definitions - Venn diagramment of a matrix. UNIT-II Basic Basic definitions - Venn diagramment of unctions - Injective, subjective, subj	Set Theory agrams and set operations - Laws of se on – Relations - Properties of relations ctive and objective functions.	t theory - P		vectors - 0	***************************************	Iton theore	m - Inverse	CO1
Basic definitions - Venn dia Permutation and combinate Permutation and combinate Permutation and combinate Permutation and combinate Permutations - Injective, subject White-Injective, subject Wather Permutations and logical operations on the Permutation of the	agrams and set operations - Laws of se on – Relations - Properties of relations ctive and objective functions.	t theory - Pi - Matrices o	rinciple		Pariode: 0			
Permutation and combinate functions - Injective, subjective, subje	on – Relations - Properties of relations ctive and objective functions.	t theory - Pi - Matrices	rinciple					
Come more connectives - lealculus. UNIT-IV Forma anguages and grammars Context free languages. UNIT-V Finite Finite Finite Finite Finite Finite CFA and NFA - Equivalency Lecture Periods: 30 Fext Books David Makinson, "Sets, I Berrimaldi, R.P and Rama Hopcroft J.E and Ullman CW. Evans, "Engineering Reference Books Kenneth H. Rosen, "Disc	erators - Truth table - Propositions ger	erated by a	of relation	ons - Clos	Periods: 9	s on relatio	ons -	
anguages and grammars Context free languages. UNIT-V Finite Finite state automata - Det DFA and NFA - Equivalence Lecture Periods: 30 Text Books David Makinson, "Sets, I Grimaldi, R.P and Rama Hopcroft J.E and Ullman C W. Evans, "Engineerin Reference Books Kenneth H. Rosen, "Disc	Functionally complete set of connective	s - Normal	forms -	Proofs in	propositional	calculus - I	Predicate	COS
Context free languages. UNIT-V Finite Finite state automata - Det DFA and NFA - Equivalence Lecture Periods: 30 Fext Books David Makinson, "Sets, I Grimaldi, R.P and Rama B. Hopcroft J.E and Ullman C W. Evans, "Engineering Reference Books Kenneth H. Rosen, "Disc	I Languages				Periods: 9			.,
UNIT-V Finite Finite state automata - Det DFA and NFA - Equivalence Lecture Periods: 30 Fext Books David Makinson, "Sets, I Grimaldi, R.P and Rama Hopcroft J.E and Ullman C W. Evans, "Engineerin Reference Books Kenneth H. Rosen, "Disc	- Phrase structure grammar - Classific	ation of grar	nmars -	-Pumping	lemma for reg	gular langu	ages -	CO4
inite state automata - Det DFA and NFA - Equivalence Lecture Periods: 30 Text Books David Makinson, "Sets, I Berimaldi, R.P and Rama Hopcroft J.E and Ullman C W. Evans, "Engineering Reference Books Kenneth H. Rosen, "Disc	State Automata				Periods: 9			L
Lecture Periods: 30 Fext Books David Makinson, "Sets, I are and Rama B. Hopcroft J.E and Ullman C W. Evans, "Engineerin Reference Books Kenneth H. Rosen, "Disc	erministic finite state automata (DFA) - e of NFA and Regular Languages.	Non determ	ninistic f	inite state		FA) - Equiv	alence of	COS
Text Books . David Makinson, "Sets, I . Grimaldi, R.P and Rama 8. Hopcroft J.E and Ullman C W. Evans, "Engineerin Reference Books . Kenneth H. Rosen, "Disc	Tutorial Periods: 15	Practica	al Perio	ods: -	To	otal Perio	ds: 45	I
David Makinson, "Sets, I C. Grimaldi, R.P and Rama B. Hopcroft J.E and Ullman C W. Evans, "Engineerin Reference Books Kenneth H. Rosen, "Disc							***************************************	
. Kenneth H. Rosen, "Disc	Logic and Maths for Computing", Spring na, B.V. "Discrete and Combinatorial N ,J.D, "Introduction to Automata Theory g Mathematics", A Programmed Appro	Mathematics , Languages	", Pears and C	son Educ omputation	ation, Fifth Ed on", Narosa Pi	ition, 2006. ublishing H	ouse, Delh	i, 200:
. Kenneth H. Rosen, "Disc 2. Sengadir. T. "Discrete M								***************************************
B. Trembley, J.P. and Mand Delhi, 2007. B. Venkataraman, M.K., "E	crete Mathematics and Its Applications' athematics and Combinatorics' Pearson ohar, R, "Discrete Mathematical Structungineering Mathematics", Volume-II, Nathemating Mathematics - I", Meenakshi puneering Mathematics - I", M	on Education ures with Ap ational Publ	n, New liplication	Delhi, 200 ns to Con Company,	09. nputer Scienc Second Edition		:Graw Hill,	New
Veb References								
	estern.edu/~mlerma/courses/cs310-05	undations-fe	or-Com	puter-Sci	ence			

* TE - Theory Exam, LE - Lab Exam

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COs		Progra	m Out	Program Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PO6	PS01	PSO2	PSO3
1	2	1	-	-	-	1	1	2	1
2	3	2	1	1	-	1	2	2	1
3	3	2	1	1	-	1	2	2	1
4	3	2	1	1	-	-	2	2	1
5	3	2	1	1	-	-	2	2	. 1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	End	1.		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

JD'

Semester			Programme: M.Tech.								
	I	r eg - t.	Course	Catego	ry : PC	*End Se	*End Semester Exam Type: TE				
Course Code	P23C	STD01	Perio	Periods / Week			Credit Maximum				
	. 200	31501	L	T	Р	С	CAM	ESE	TM		
Course Name	1	nced Data Structures and	3	-	-	3	40	60	100		
	Algoi	rithms		1							
	D .										
Prerequisite		s of Data Structures and Algorith				V					
"	On co	ompletion of the course, the stud	ents will b	e able t	to			BT Ma			
~	CO1	***************************************	(Highest	**************							
Course	CO2	Demonstrate various algorithm notation Construct various applications based									
Outcomes	CO3							K2			
-		Experiment with the performance of v			ing opera	ations.	***************************************	K3			
Transcription of the Control of the	CO4	Apply graph data structures to the rea						K3	}		
	CO5	Illustrate the performance of the polyr		algorithm	1.		***************************************	K2	!		
UNIT-I		ithm Notations And Representati				Periods: 9			,		
natnematical indu Solving Recurrenc	ction - A	Asymptotic Notations – Algorithm Analy tions – Memory Representation of Multi	sis - NP-Hai -dimensiona	rd and N I Arravs	P-Comp	leteness – Re Space Tradeo	currence	Equations –	CO1		
UNIT-II		ng and Trees				Periods: 9			L		
		ppological sort - Sorting in Linear Time	– Elementar	v Data S	Structures	s – Hash Tah	les – Hash	Functions-	COS		
Binary Search Tre rees – Data Struc	es – A\	VL Trees – Red Black trees – Multi-wa	y Search Tr	ees –B-	Trees- F	ibonacci Hea	ps – van i	Emde Boas	002		
UNIT-III		Processing Operations				Periods: 9		***************************************			
Algorithm - Standai Problem (LCS) - A	rd Tries pplying	Operations - Brute-Force Pattern Mat - Compressed Tries - Suffix Tries - The I Dynamic Programming to the LCS Prot	Huffman Coo	Boyer- ding Algo	Moore A prithm - T	ligorithm - Ti he Longest C	ne Knuth- ommon Su	Morris-Pratt ibsequence	CO3		
UNIT-IV		n Algorithms				Periods: 9					
lementary graph . low - Multithreade	Algorith ed Algor	ms – Minimum Spanning Trees – Sing ithms – Matrix Operations.	le Source S	hortest F	Paths- Al	Il Pairs Shorte	est Paths -	- Maximum	CO4		
UNIT-V		nic Programming				Periods: 9		***************************************	***************************************		
inear programmin completeness – Ap	g – Pol oproxim	ynomials and Fast Fourier Transform – ation Algorithms.	Number Th	eoretic <i>P</i>	Algorithm	s – Computa	ional Geo	metry –NP-	CO5		
Lecture Period	s: 45	Tutorial Periods: -	Practica	l Perio	ds: -	To	tal Perio	ds: 45			
ext Books	***************************************		**************************************						**********		
. Mark Allen Weis	s, Data Otfried C	harles E. Leiserson, Ronald L. Rivest a Structures and Algorithm Analysis in C Cheong, Marc van Kreveld, Mark Overr	++, Pearson	Education	on, Seco	nd Edition, 20	004.	→ . '			
		ey D. Ullman, John E. Hopcroft, "Data S	tructures an	d Algorit	hms" Ar	dison Wesley	/ Fifth Edi	tion 2017			
Algorithms, Company, S	Data St ixth Edi	ructures, and Problem Solving with C++ tion, 2016.	-", Illustrated	l Edition	by Mark	Allen Weiss,	Addison-V	Vesley Publi	ishing		
4. E. Horowitz,	S.Sahr	nchi, Data Structures and algorithms ma ni and Dinesh Mehta, "Fundamentals of erto Tamassia, Algorithm Design, John	Data structu	ires in C	++". Univ		Fourth Ed	ition, 2007.			
leb References				Luillo	, 2002.	**************************************					
 https://www. https://www. 	studytoi tutorials	int.com/data-structure-tutorial/ night.com/data-structures/ spoint.com/data_structures_algorithms/ ols.in/data-structures-tutorial/intro/			***************************************						

5. https://www.geeksforgeeks.org/data-structures

* TE – Theory Exam, LE – Lab Exam

1 %

M.Tech Academic Curriculum and Syllabi R-2023

COs/POs/PSOs Mapping

COs	e Pariga	Progra	m Out)	Program Specific Outcomes (PSOs)				
	P01	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
.1	2	2	2	1	2	2	3	2	2
2	1	2	2	2	2	2	3	2	2
3	2	3	3	1	3	3	3	3	3
4	2	3	3	1	3	3	3	3	3
5	2	3	3	1	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

Department	Comp	outer Sc	ence and Engineering	Progran	nme: M	.Tech.				
Semester	I			Course	Catego	ry : PC	*End	d Semester E	xam Type	e: TE
Course Code	Dasc	ST102		Perio	ds / W	eek	Cred	it Ma	ximum Ma	arks
Course Code	1 230	01102		L	Т	Р	С	CAM	ESE	TM
Course Name	Clou	d and Bi	g Data Analytics	3	-	-	3	40	60	100
Prerequisite	Basics	of Cloud	d computing		<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
	On co	ompletio	n of the course, the stude	ents will b	e able	to			BT Ma (Highes	
Course	CO1	Explain	the core concepts of the cloud	d computing	paradig	ım.			K	
Course Outcomes	CO2	Apply fu	ndamental concepts in cloud	infrastructur	es.				K	
	CO3	Illustrate the fundamental concepts of network virtualization and geo-distributed cloud.							K	4
	CO4	Identify Big Data and its Business Implications.							K	
	CO5	i.	components of Hadoop and H ed File System.	ladoop Eco-	System	, Access	and Proce	ess Data on	K	4
UNIT-I	Introd	luction	ca r no oystom.				Periods	s: 9	_L	
			The Evolution of Cloud Compu ces - Cloud Service Administra					Software Evolu	ution –	CO1
UNIT-II	Cloud	l Infrastr	ucture	19		1-1	Periods	s: 9	******************************	
 Business Prod Technology – Virt 	cess Ex tualizatio valuatin	ecution lon Hype g Utility M	and Working Groups - Standa anguage – Interoperability : r Threading – Blade Servers - anagement Technology - Virtuata ta Center.	Standards Automated	for Data Provisio	a Center	Manager	ment - Utility I Automation -	Computing Application	9
UNIT-III			alization and Geo-Distrib	uted Clou	d		Periods	: 9	V V	-l
			lization-networking of virtual n nant data centers - VL2 - NVP					software defir	ed network	CO3
UNIT-IV			o Big Data and Hadoop				Periods			.,
	ing Data	a with Had	o Big Data - Big Data Analytic doop - Hadoop Streaming - Ha eets.							CO4
UNIT-V			p Distributed File System) and Map	Reduc	e	Periods	: 9	- is .	
Flume and Scoop	and Had Reduce	doop archi Job Run	pts - Command Line Interface ves - Hadoop I/O: Compressi – Failures - Job Scheduling -	on – Serializ	zation A	vro and I	File-Based	Data structur	es.	CO5
Lecture Period			Tutorial Periods: -	Practica	l Perio	ds: -		Total Perio	ds: 45	
Text Books										
2. Kai Hwang, Geo Fhings", Morgan K 3. Ritting house, Jo Reference Book	offrey C. aufmani ohn W., ss	Fox, Jack n Publishe and Jame	es F. Ransome, Cloud Compu	d Cloud Col ting: Implen	mputing, nentation	From P	arallel Pro	cessing to the	Internet of C Press, 2	017.
Francis Group, 2. Alfredo Mendoza 3. Bunker and Dari	Boca Ranger (Boca Ranger) Boca Ranger (Boca	aton Lond y Computi mson, "De he Definit	F. Ransome, "Cloud Computi on New York, 2010. ng Technologies, Standards, livering Utility Computing", Jo ive Guide", O'reily Media, Thii ', O'Reily, 2011	and Strateg	ies", Arte Sons Lte	ech Hou			C Press, Ta	iylor &
. www.digitalocean	/en/topio .com/co et.com/a	cs/cloud-co mmunity/t rticle/wha	echnology omputing/what-is-cloud-infrastri cutorials/an-introduction-to-big- t-is-cloud-computing-everything doop/hadoop_big_data_overvi	data-concept -you-need-to						

https://www.tutorialspoint.com/hadoop/hado * TE – Theory Exam, LE – Lab Exam

COs		Progra	m Out	comes	(POs)	Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	2	1	2	2	1	-	1	3		
2	1	1	2	2	1	2	1)=(3	
3	2	1	1	2	1	2	1	3	-	
4	3	1	2	1	-	1	-	3	1	
5	3	1	1	2	- ,	-	-	-	1	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous Ass	ses <mark>sment Mark</mark>	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

1 0%

Department	Com	puter Science and Engineering	Progran						
Semester	I		Course	Catego	ry :PC	k	End Semest	erExamTy	pe: TE
Course Code	P23C	STD02		ds/We	ek	Credi	CAM 40 AU AU AU AU AU AU AU AU AU A	ximumMar	ks
***************************************			L	T	Р	C		ESE	TM
Course Name	Speed	h and Language Processing	3	0	0	3	40	60	100
Prerequisite	No pr	rerequisite needed		<u> </u>		1			<u> </u>
	On c	ompletion of the course, the stude	ents will b	e able 1	to	***************************************	***************************************	BT Ma	pping
,							v.v.vaco/220380000000000000000000000000000000000	(Highes	t Leve
Course Outcomes		Understand the basics of NLP			1			K	3
Outcomes	CO2	Apply the basic ML and DL techniques	for NLP					K	3
	CO3	Understand and realize the advanced N	NLP Technic	ques.			***************************************	K	2
	CO4	Make use of Language understanding,	Generation	and Info	rmation	Retrieval		K	3
	CO5	Apply ethics to be followed while building	na NLP App	lications	and ho	w to use NI	P Libraries	K	
UNIT – I	***************************************	duction	J			Periods			
Phases of NLP, T	ext Prep	processing: Tokenization, Stemming and	Lemmatiza	ation, Po	s Taggii			ition. NLP	T
	ng, Wo	rd Count Vector, Word Sense Disambigu	uation			-			CO1
UNIT – II		uage Modelling				Periods			
N -gram Models, I ∟earning. Text Cla CNN for NLP.	Hidden I assificat	Markov Models, Maximum Likelihood Es ion and Sentiment Analysis, Topic Mode	stimation. Su elling and Cl	upervised ustering,	d, Unsu Word I	pervised an Embeddings	d Semi Super s, RNN & LST	vised Ms for NLP,	CO2
UNIT – III	Adva	nced NLP Techniques				Periods	:9	***************************************	_L
Sequence- to -Sec		Models, Attention Mechanisms, Transfo	rmer Archite	ecture: B	ERT, G	The state of the s		***************************************	CO3
UNIT – IV	Retrie					Periods			
Fext Generation, (Fext Indexing and	Question Search	n Answering, Dialogue Systems and Cha , Text Summarization.	atbots. Macl	hine Trai	nslation	, Cross Ling	gual Transfer I	_earning.	CO4
UNIT – V		Γools, Libraries, Applications, Eth				Periods			
Bias and Fairness Applications: Sent	in NLP, iment A	, Privacy Concerns in NLP Applications. nalysis, Named Entity Recognition in Re	NP libraries al World Da	s: NLTK ata Sets,	, Spacy Text Cl	Tensor Floor assification	ow, Pytorch. N for Various D	LP omains.	CO5
LecturePeriod	s:45	TutorialPeriods:0	Practica	lPerio	ds:-0		TotalPeriod	ls:45	
Text Books									
Cambridg	ge, Mass	lanning and Hinrich Schutze, " Foundation sachusetts London, England, 2018		-				ne MIT Pres	s
		and James H. Martin "Speech and Langu	-	•					
applying of	deep lea	m, Rajalingappa Shanmugamani "Hand arning architectures to your NLP applica					python: A prac	tical guide t	.0
Reference Book 1. NitinIndur		rod I Domorou "Handbook of Netural I	onavoao Da		" Cooo	nd Fd:#:an	CDC Dance O	040	
		red J. Damerau "Handbook of Natural L tural Language Understanding", Pearsor			5 (1)		CRC Press, 2	010.	**************
							ad adition MI	TD C	
MA, 2003		nd HinrichSchütze, "Foundations of Stati	Sucai Natur	ai Langu	age Pro	cessing, 2	nu eallon, Mi	ress can	ibriage
		le Howard, Hannes Hapke, "Natural lang	guage proce	ssing in	action"	MANNING	Publications.	2019.	·····
	r Clark,	Chris Fox, Shalom Lappin, "The Hand							essing"
Veb References				***************************************	***************************************	***************************************		7-5	
. https://www.ud	demy.co	om/course/chatbot/							************
. https://gtuema	terial.in	/natural-language-processing-3170723/		***************************************	******************		***********************		*************
. https://chatbot	smagaz	zine.com/understanding-the-need-for-nlp	-in-your-cha	atbot-78e	ef2651d	e84?gi=eco	a664b642a		
		ii/blog/ai-automation/how-nlp-text-based				***************************************	***************************************		***************************************
. https://www.ja	vatpoint	.com/nlp		*******************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	***************************************			
		m IE Ish Evan							

* TE – Theory Exam, LE – Lab Exam

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COs		Progra	m Out	comes	(POs	1 1	Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	2	2	2	3	3	2	2	2	2	
2	2	3	. 3	3	2	1	2	2	1	
3	2	3	3	2	1	-	2	2	1	
4	2	2	3	2	3	2	2	3	-1	
5	3	2	2	3	3	1	2	2	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

en van gebie	- or of Try	Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	Comp	outer Sc	ience and Engineering	Progran	nme: M	l.Tech.			3666		
Semester	I			Course	Catego	ory : HS	*End S	Semester E	xam Type	e: TE	
Course Code	D34H	STC01		Perio	ods / W	eek	Credit	Max	ximum Ma	arks	
Course Code	FZSH	31001		L	Т	Р	С	CAM CAM 40 an analysis. Technology 6 blem - errors 6 6 for researc 6 for researc 6 for researc 6 for researc 7 for r	ESE	TM	
Course Name	Rese	arch Me	thodology and IPR	2	-	-	2	40	60	100	
(Commo	n to all M	.Tech Courses)								
Prerequisite	No pre	requisite	needed								
	On co	mpletio	n of the course, the stude	ents will b	e able	to			BT Ma (Highes		
	CO1	Gain Kr	nowledge to formulate the rese	arch proble	m.				K		
Course	CO2	Underst	and the concepts to carry out	the literatur	e review	, ethics a	ind research	analysis.	K	2	
Outcomes	CO3		the way of writing technical pa						K	2	
	CO4		ounderstand that today's world prrow world will be ruled by ide				nformation ⁻	Гесhnology,	K	2	
A	CO5		understand about IPR and fil						K	3	
UNIT-I	Resea		blem Formulation				Periods:	6			
research probler	n - scop	e and ob		Approache	ristics of s of inve	a good restigation	esearch prob of solutions	lem - errors for researcl	in selecting n problem	CO1	
UNIT-II	Litera	cope and objectives of research problem. Approaches of investigation of solutions for research problems – interpretation - necessary instrumentations. rature Review es approaches – analysis – plagiarism and research ethics hnical Writing /Presentation g - how to write report – paper - developing a research proposal - format of research proposal - Prese									
ffective literature	studies	approach	nes – analysis – plagiarism and	research	ethics			***************************************		CO2	
UNIT-III	Techr	ical Wri	ting /Presentation				Periods: (3		***************************************	
Effective technical and assessment b				a research	proposa	al - format	of research	proposal - P	resentation	CO3	
UNIT-IV			To Intellectual Property Ri	ahts (IPR	}		Periods: 6	3		003	
	ial Prop	erty: Pate	ents – Designs - Trade and Co	pyright. Pr	ocess of	Patentin			chnologica	COA	
esearch – innova	tion - p	patenting	- development. International atenting under PCT.	Scenario:	Internati	ional coo	peration on	Intellectual	Property	004	
UNIT-V			operty Rights (IPR)		•	I	Periods: 6	3	***************************************		
atent Rights: Sco	pe of P	atent Rig	hts - Licensing and transfer of	technology	- Pater	nt informa	tion and dat	abases - Ge	eographica		
ndications - New I	Develop	ments in	IPR - Administration of Paten	t System -	IPR of E	Biological	Systems - 0	Computer Sc	oftware etc	CO5	
raditional knowled Lecture Period		e Studies	Tutorial Periods: -	Practica	al Perio	nde	1	otal Perio	de: 30	<u> </u>	
ext Books	0.00		***************************************	<u> </u>		/43.		Otal I CIIO	us. 50		
. Stuart Melville a 996. . Wayne Goddard . C.R. Kothari, Ga	and Stuurav Ga	uart Melvi	ard, "Research methodology: A ille, "Research Methodology: A earch Methodology: Methods a	n Introduct	ion", Lar	nsdowne	Publisher, S	econd Edition	on, 2001.	ublisher	
Reference Book											
Ranjit Kumar, "R Trochim, "Resea Fink A, "Conduc	tesearch Irch Met ting Res	n Methodo hods: The	operty", Taylor & Francis Limit ology: A Step by Step Guide fo e concise knowledge base", A erature Reviews: From the Inte	or beginners tomic Dog F	Publishir	ng, 2005.	J				
Veb References											
2. https://www.isica 3. https://www.wipo 4. https://lecturenot	al.ac.in/~ o.int/edo es.in/m/	palash/re cs/pubdo /21513-re	t/427419672/Research-Methor esearch-methodology/RM-lec9 cs/en/intproperty/958/wipo_pu esearch-methodology /MTECH-CAD.CAM-R18-RM-l	.pdf b_958_3.p	df		3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	\			

* TE - Theory Exam, LE - Lab Exam

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COs		Progra	m Out	comes	(POs	7	Program Specific Outcomes (PSOs)			
, i	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	3	2	1	1	2	1	3	3	2	
2	3	2	1	1	2	1	3	2	2	
3	3	2	1	1	2	1	3	2	2	
4	3	2	1	1	3	1.	3	2	3	
5	3	2	1	1	2	1	3	2	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

1.31.1		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department	Computer Science and Engineering	Progran	nme: M .	Tech.						
Semester	I	Course	Course Category : PC *End Seme					nester Exam Type: LE		
Course Code	P23CSP101	Perio	ds / We	eek	Credit	Credit Maximum M				
	F23C3F101	L	Т	Р	С	CAM	ESE	TM		
Course Name Advanced Data Structures ar Algorithms Laboratory		-	-	4	2	50	50	100		
7. 20 2. 50	OTT - INDEX . LANGEL									
Prerequisite	Knowledge about Data Structures and	Algorithms				/	***************************************			
	On completion of the course, the st	u dents w ill b	BT Mapping (Highest Level)							
Course	CO1 Evaluate the algorithm's / program	's efficiency in	terms of	time and	space comp	lexity.	P	(4		

Course Outcomes

CO3 Construct various applications based on sorting and tree data structure.

CO4 Apply graph data structures to solve real time applications such as network flow and linear programming.

CO5 Illustrate the performance of the polynomial time algorithm.

CO6 BT Mapping (Highest Level)

K4

CO7 Construct various applications based on sorting and tree data structure.

K3

CO8 Apply graph data structures to solve real time applications such as network flow and linear programming.

CO9 Illustrate the performance of the polynomial time algorithm.

List of Experiments:

- . 1. Implementation of the following Heap Structures.
 - a. Min Heap (Insertion, Delete Min, Delete Max)
 - b. Skew Heap(Priority Queue operations)
 - c. Fibonacci Heap (Priority Queue operations).
 - 2. Implementation of the following Search Structures
 - a. AVL Trees (Insertion, Deletion and Search)
 - b. Splay Trees (Insertion, Deletion and Search)
 - c. B-Trees (Insertion, Deletion and Search) d. Red- Black Trees.
 - 3. Implementation of Convex Hull.
 - 4. Implementation of Topological sort.
 - 5. Implementation of Graph search algorithms.
 - 6. Implementation of Randomized algorithms.
 - 7. Implementation and application of network flow and linear programming problems.
 - 8. Implementation of algorithms using the hill climbing and dynamic programming design techniques.
 - 9. Implementation of recursive backtracking algorithms.
 - 10. Implementation of Branch and Bound Algorithms.

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 45	Total Periods: 45
Peference Books			

- 1. E. Horowitz, S.Sahni and Dinesh Mehta, "Fundamentals of Data structures in C++", University Press, Fifth Edition, 2007.
- 2. T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, Introduction to Algorithms, PHI/Pearson Education, Third Edition, 2009.
- 3. Michael T. Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis and Internet Examples, Wiley India, Second Edition, 2006.
- 4. Thomas H. Coreman, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", PHI, Third Edition, 2016.
- 5. Michael T. Goodrich, Roberto Tamassia, David M. Mount," Data Structures and Algorithms in C++", Wiley, Second Edition, 2011.

Web References

- 1. https://www.javatpoint.com/data-structure-tutorial/
- 2. https://www.studytonight.com/data-structures/
- 3. https://www.tutorialspoint.com/data_structures_algorithms/
- 4. https://www.w3schools.in/data-structures-tutorial/intro/
- 5. https://www.geeksforgeeks.org/data-structures/
 - * TE Theory Exam, LE Lab Exam

COs/POs/PSOs Mapping

COs		Progra	m Out	comes	(POs))	Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	2	2	2	3	2	2	3	2	2	
2	1	2	2	2	2	2	3	2	2	
3	1	3	3	3	3	3	3	3	3	
4	2	3	3	3	3	3	3	3	3	
5	1	3	3	3	3	3	3	3	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

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Evaluation Method

	Co	ntinuous A	\ssess	ment Marks (CA	AM)		Total
Assessment	Performan cla	ce in pract isses	ical	Model	r s	End Semester	
	Conduction of practical	Record work	viva	Practical Examination	Attendance	Examination (ESE) Marks	Marks
Marks	15	5	5	15	10	50	100

7 2

Department	Com	outer Science and Engineering	Progran							~~~~~
Semester	I		Course						*********************	
Course Code	P23H	SPC01	Perio	ds / W	eek	Cre	dit	Max	kimum Ma	rks
			L	Т	P	С		CAM	BT Mapp (Highest Le K2 K3 K2 K3 K2 K2 Clarity of thou ce and clarity ed information pecific and of and national standard paperselection)	TM
Course Name	Tech	nical Report Writing and Seminar		-	4	2	2	100		100
(Co	mmon	to all M.Tech Programme)								
Prerequisite										
	On co	ompletion of the course, the stude	nts will b	e able	to					
Course	004	Select a subject, narrowing the subject	t into a topic							
Outcomes	CO1		······································		. /at laaat	15:200				
	CO3	State an objective and collecting the re Study the papers and understanding the								
	003	paper.	ie autiloi s	CONTRIBL	utions and critically analyzing				' '	3
	CO4	Prepare a working outline and linking the	ne papers a	and prep	paring a dr	aft of th	e pap	er.	K	2
	CO5	Prepare a working outline and linking t								
List of Experir			по рарого	and pro	paring a a		io pap			
		Instructions			Submi	ssion		lt'		
Activity		Instructions			week			luation	115	
Selection of are interest and To		Select an area of interest, topic ar objective	nd state an		2nd we	eek				
interest and 10	PIC	Objective					writ		nce and cla	arity in
Stating an Obje										
Collecting Information about area & to		List 1 Special Interest Groups of society 2. List 2 journals	r professio	nal	3rd we	ek				
about area & to	pic	3. List 2 conferences, symposia or	workshop	S		r r				
		4. List 1 thesis title						ndard)		-
		5. List 3 web presences (mailing li sites)	sts, forums	, news						
		6. List 3 authors who publish regul	larly in you	r area						
		7. Attach a call for papers (CFP) fi	om your ar	ea.						
Collection of Jo papers in the to		 provide a complete list of referer using- Based on your objective -Se 			4th we	ek				papers
context of the o				us			anu	reasonio	selection)	
collect 20 & the		When picking papers to read - tr	y to:		r					
		- Pick papers that are related to ea								
		ways and/or that are in the same f can write a meaningful survey out		you						
		- Favour papers from well-known j	ournals and							
		conferences, in the field (as indica	ted in othe	r		1				
		Favour more recent papers, - Pick a recent survey of the field s	so vou can		Y					
		quickly gain an overview, Find rela	itionships v	vith	1					
		respect to each other and to your t								
		area(classification scheme/catego - Mark in the hard copy of papers v		mplete	1					
		work or section/sections of the par								
Reading and no	too for	considered Reading Paper Process For each	nanor form	2						
first 5 papers	ies for	Table answering the following que		d						
		What is the main topic of the article.	cle?							
		What was/were the main issue(s) the autho	r said						
		they want to discuss? • Why did the author claim it was in	mportant?							
(140)		What simplifying assumptions do		nor			.	· - - · · · ·		4.
		claim to be making?								
		What did the author do?How did the author claim they we	ere anina ta	,	6th wee	ek				
		evaluate their work and compare it					base	ed on your	conclusion	
		What did the author say were the			-		abou	ut each pa	oer)	
		their research?								
		 What did the author say were the directions for future research? 	mportant							
		Conclude with limitations/issues in the conclude with limitations in the conclude with limitation with limitations in the conclude with limitation	not address	sed by	-					
		the paper (from the perspective of		-						

M.Tech Academic Curriculum and Syllabi R-2023

Reading and notes for next 5 papers	Repeat Reading Paper Proces	SS	7 th week	8% (the table given should indicate your understanding of
, nonce papero				the paper and the evaluation is based on your conclusions about each paper
Draft outline 1 and Linking papers	Prepare a draft Outline, your s with a classification / categoriz		8 th week	8% (this component will be evaluated based on the linking and classification among the papers)
Abstract	Prepare a draft abstract and g	ive a presentation	9 th week	6%(Clarity, purpose and conclusion) 6% Presentation & Viva Voce
Introduction Background	Write an introduction and back	ground sections	10th week	5% (clarity)
Sections of the paper	Write the sections of your paper classification / categorization of with the goals of your survey		11th week	10% (this component will be evaluated based on the linking and classification among the papers)
Conclusions	Write your conclusions and fut	ure work	12th week	5% (conclusions)
Final Draft	Complete the final draft of you	r paper	13th week	10% (formatting, English, Clarity and linking) 4% Plagiarism Check Repor
Seminar	A brief 15 slides on your paper		14th & 15th week	10% (based on presentation and Vivavoce)
Lecture Periods: -	Tutorial Periods: - P	ractical Periods: 4	5	Total Periods: 45

^{*} TE - Theory Exam, LE - Lab Exam

COs/POs/PSOs Mapping

COs		Progra	m Out)	Program Specific Outcomes (PSOs				
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	3	3	1	3	3	2	1	2
2	2	3	2	1	3	2	2	1	2
3	2	3	2	1.	3	2	2	1	2
4	2	3	2	1	3	2	2	1	2
5	2	3	2	1	3	2	2	1	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	Continu	uous Asses	sment Marks (C	AM)	End				
Assessment	Weekly Progress	Seminar	Record work	Viva	Attendance	Semester Examination (ESE) Marks	Total Marks		
Marks	40	30	10	10	10	-	100		



M.Tech Academic Curriculum and Syllabi R-2023

Computer Science and Engineering	Programme: M.Tech.					-		
	Course Category : AEC *End Semester Exam							
DOOCOCAVV	Periods / Week			Credit	Ma	ximum Marks		
P23C5C1XX	L	Т	Р	С	CAM		TM	
Ability Enhancement Courses	-	-	4	-	100	-	100	
F	P23CSC1XX	P23CSC1XX Course Perio	Course Categor Periods / We L T	Course Category : AE0	Course Category : AEC *E Periods / Week Credit	Course Category : AEC	Course Category : AEC *End Semester Exam	

Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.

Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.



Department	Comp	outer Sc	ience and Engineering	Progran	nme: N	l.Tech.				
Semester	II.			Course	Catego	ory : PC	*End Se	emester E	xam Type	: TE
Course Code	D23C	ST203		Perio	ds / W	eek	Credit	Ma	ximum Ma	rks
Course Code	F230	31203		L	Т	P	С	CAM	ESE	TM
Course Name	Adva Testii		ftware Engineering and	3	-	-	3	40	60	100
	1000	19			ļ	 				ļ
Prerequisite	Basics	of Softv	vare Engineering		İ	.L	/*************************************		<u> </u>	<u> </u>
Trerequisite		***************************************	n of the course, the stude	nte will h	o ahlo	to		***************************************	BT Map	oning
-	011 00	mpicuo	ii oi tiic coarse, tiic staac	into will b	c abic	10			(Highest	
	CO1	Illustrate	e Software Engineering Lifecyo	cle Models		***************************************		***************************************	K3	
Course	CO2	Perform	Project management and cos	t estimation			***************************************	***************************************	K3	
Outcomes	CO3		se of the System Analysis and			*************************	***************************************		K4	
	CO4		different testing techniques.	·····			***************************************	***************************************	K3	
	CO5	Make us	se of different levels of testing	in their soft	ware.	***************************************	***************************************		K4	
UNIT-I	Introd	luction				T	Periods: 9			
Software engine	ering co	ncepts - I	Development activities – Softw	are lifecycle	model	s - Classi	cal			CO1
			totyping - Evolutionary - Spira				ment – Projed	ct planning	-	
			anagement – Software configu	ration mana	gemen	<u>t</u>	D : 1 0	***************************************		<u> </u>
UNIT-II			uirement Specification		:. 0		Periods: 9			
system specifical	iiysis an	u specilic nite State	ation – Requirements gatherin Machines – Petrinets – Objec	ig and anaiy t modelling	usina U	oπware κ IMI – Use	equirement a	pecification	on – Formai agrams –	CO2
Interaction diagra	ams – A	ctivity diag	grams – State chart diagrams -	– Functiona	I model	ling – Dat	a Flow Diagra	am	agrains -	
UNIT-III			and Design				Periods: 9	***************************************	***************************************	***********
Software design	– Desigi	n process	- Design concepts - Coupling	g – Cohesio	n – Fun	ctional inc	dependence -	- Design p	atterns –	
			bscribe – Adapter – Command Pipe and filter User interface		– Obse	rver – Pro	xy – Facade	- Architec	tural styles	CO3
UNIT-IV			niques and Testing Tools				Periods: 9			
Testing Technique	es – Ve	rification '	vs Validation – Software Testir	ng Methodo	logies –	White Bo	x, Black Box	and Grey	Вох –	CO4
			Informal Reviews, Walkthrough ad Based Techniques. Testing				ection – Struc	tural Tech	niques,	
UNIT-V		of Test		10013. 0616	mam –		Periods: 9			
			ign – Building Test Cases – Te	est data min	ina – To	1		porting – F	unctional	
Testing - Unit, In	tegration	n, System	, Acceptance, Regression, Re	test – Non f	unction	nal Testing				CO5
		Security,	Cookie, Session, Recovery, A	· · · · · · · · · · · · · · · · · · ·				***************************************		
Lecture Period	ls: 45		Tutorial Periods: -	Practica	l Perio	ods: -	To	tal Perio	ds: 45	
Text Books										***************************************
Rajib Mall, "F	undame	entals of S	ler, Tom Badgett," The Art of Software Engineering", PHI Leagineering", Pearson Education	arning, 3rd E	Edition,	2013.	Edition 2015			
Reference Book		itwaie Ell	gineering , i earson Education	i, our Euldoi	1, 2000.	•		***************************************		
		Dutoit C	bject-Oriented Software Engir	ooring 2nd	odition	Poarcon	Education 3	0004		
			ino Mandrioli, Fundamentals o						t. Ltd., 2010).
3. Craig Larman,	Applying	UML and	d Patterns, 3rd ed, Pearson Ed	ducation, 20	05.	-		_	1.	
			g Zhu, —DevOps: A Software		Perspe	ctivell, Pe	arson Educat	tion, 2016		
Stephen SchaoVeb References		/are Engir	neering 7th ed, McGraw-Hill, 2	007						
https://nptel.ac.		00/106/10	05/106105150/							
			noc19_cs71/preview							
https://www.cou	ırsera.o	g/lecture/	introduction-software-testing/s				cess-UMOp	е		
			s/introduction-to-software-engine		eo-lectu	ires/	1			
nttps://freevided	plectures	s.com/cou	irse/2318/software-engineering	3						

* TE – Theory Exam, LE – Lab Exam

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COs		Progra	m Out		Prog Outco	ecific SOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	3	3	3	2	-	-	3	1	1
2	3	3	3	2	-	-	3	1	1
3	3	3	3	2	2	-	3	1	1
4	3	3	3	2	2	-	3	1	1
5	3	3	3	2	2	-	3	1	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



	I	outer Science and Engineering	Progran						
Semester	11		Course	Catego	y : PC	*End	Semester	Exam Typ	e: TE
Course Code	P23C	ST204	Perio	ds / We	ek	Credit		ximum Ma	
-			L	T	Р	С	CAM	ESE	TN
Course Name	Adho	c and Wireless Sensor Networks	3	-	-	3	40	60	100
Prerequisite	Basics	of Wireless Network		<u> </u>		***************************************			
		empletion of the course, the stude	nte will b	o ablo t		***************************************		DT 14	
	011 00	mpleation of the course, the stude	illo will b	e able t	O			BT Map	
~	CO1	Identify different issues in wireless ad h	oc and ser	nsor netv	vorks.			(Highest	
Course	CO2	Analyze protocols developed for ad hoo				······································		K4	
Outcomes	CO3	Identify and understand security issues				orke		K1	
	CO4	Build the routing mechanism and impro-	ving QoS.	una scrie	or netwo	JING.			
İ	CO5	Apply Channel allocation strategy to im	_	connectiv	ity in ∆d	-Hoc Netw	orke	K3	***********
UNIT-I		luction	prove the t	orm cour	ity iii Au	Periods:		i No	
undamentals of	Wireless	Communication Technology - The Ele	ectromagne	etic Spec	ctrum –	Radio pro	agation Mo	chanieme _	CO
Characteristics of t	ne vvire	less Channel - mobile ad hoc networks (I of Ad Hoc and Sensor networks. Design	MANFTs) a	and wirele	ess sens	or network	e (MSNe) co	ncepts and	CO
UNIT-II	MAC	Protocols for Ad Hoc Wireless Net	works	14		Periods:	9		
ssues in designing vith Reservation N	g a MAC Iechanis	Protocol - Classification of MAC Protoc m - Contention based protocols with Sch	ols - Conte	ention ba	sed prot	ocols - Cor ti channel I	tention base	d protocols	CO2
UNIT-III		ng Protocols Transport Layer in Ad							
	a routin	ng and Transport Layer protocol for Ad h	a noc net	works	41.12.22.1	Periods:	9		
ybrid routing - Cla	ssificati	on of Transport Layer solutions -TCP over	er Ad hoc v	s - proac vireles s l	tive rout Networks	ing, reactiv 3.	e routing (on	-demand) -	CO3
UNIT-IV		ss Sensor Networks (WSNS) and				Periods:	9	<u>-</u>	COS
Single node archite	ecture: h	ardware and software components of a s	sensor nod	e – WSN	Networ	k architectu	re: typical n	etwork	CO4
ircnitectures-data i	802.15	and aggregation strategies - MAC layer 4.	protocols:	seir-orga		Tybrid TDIVI	AVEDIVIA and	CSMA	
ased MAC - IEEE	802.15	4.	protocols:	seir-orga			***************************************	CSMA	
Dased MAC - IEEE UNIT-V ssues in WSN rout	WSN F ting - O	4. Routing, Localization and QOS LSR - Localization – Indoor and Sensor I	Vetwork I o	calizatio	n - absol	Periods:	9		CO5
rentectures-data in passed MAC - IEEE UNIT-V ssues in WSN routeriangulation - QOS	WSN F ting – O in WSN	4. Routing, Localization and QOS LSR - Localization – Indoor and Sensor I I - Energy Efficient Design – Synchroniza	Network Lo ation - Tran	calizatio sport La	n - absol yer issue	Periods: ute and rel	9 ative localiza	ition,	CO5
ircnitectures-data in passed MAC - IEEE UNIT-V ssues in WSN routeriangulation - QOS Lecture Periods	WSN F ting – O in WSN	4. Routing, Localization and QOS LSR - Localization – Indoor and Sensor I	Vetwork I o	calizatio sport La	n - absol yer issue	Periods: ute and rel	9	ition,	CO5
contectures-data in passed MAC - IEEE UNIT-V ssues in WSN routeriangulation - QOS Lecture Periods ext Books C. Siva Ram Muran Reference, Third Ed. Thomas Krag and	WSN F ting - O in WSN s: 45 rthy, and dition, 2 d Sebas	4. Routing, Localization and QOS LSR - Localization – Indoor and Sensor I I - Energy Efficient Design – Synchroniza Tutorial Periods: -	Network Lo ation - Tran Practical s: Architec	calizatio isport La I Perioc tures and	n - absol yer issue ls: -	Periods: ute and reles ols ", Prent	9 ative localiza Fotal Perio ice Hall Profe	ds: 45	
irchitectures-data in ased MAC - IEEE UNIT-V issues in WSN routingulation - QOS Lecture Periodiext Books C. Siva Ram Muleference, Third Ed. Thomas Krag and Al-Sakib Khan Pa	WSN Fing - O in WSN s: 45 rthy, and dition, 2 d Sebas athan, S	A. Routing, Localization and QOS LSR - Localization – Indoor and Sensor I I - Energy Efficient Design – Synchroniza Tutorial Periods: - I B. S. Manoj, "Ad Hoc Wireless Network 2008. It in Buettrich, "Wireless Mesh Networking 2008.	Network Lo ation - Tran Practical s: Architec	calizatio isport La I Perioc tures and	n - absol yer issue ls: -	Periods: ute and reles ols ", Prent	9 ative localiza Fotal Perio ice Hall Profe	ds: 45	chnica
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COs	Outc								ram Specific omes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3		
1	2	2		-	-	-	-	-	-		
2	3	2	3	3	-	1	-	2	-		
3	3	1	3	3	-	1	2	2	'-		
4	1	1	2	3	3	1.	-	2			
5	2	1	2	3	2	3	2	-	-		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

28

Department	Comp	uter Science and Engineering	Programme: M.Tech.								
Semester	II		Course	Catego	ry : PC	*E	nd Semeste	r Exam Ty	pe: TE		
Course Code	P23C	ST205	Peri	ods / We	eek	7					
300130 000e	1 230	51200	L	T	Р	C redit Maximum M C CAM ESE 3 40 60 BT M (Higher and Seystems. Internal source. nternal source. Internal source internal source. Internal source internal source. Internal source internal sourc	ESE	TM			
Course Name	Adva	nced Operating Systems	3	-	-	3	40	60	100		
Prerequisite	Basics	of Operating Systems		<u> </u>					<u></u>		
. roroquiono		mpletion of the course, the stud	ents will h	e able i	to			BT Ma	nnina		
	011 00	inpleation of the course, the state	CIILO WIII L	e able							
-	CO1	Explain the functionality of an operati	ng system b	y reading	g its inte	rnal source).	K			
Course	CO2	Revise any algorithm present in an in						K'			
Outcomes	CO3	Describe the implementation of inter						K			
11	CO4	Modify and use the data structures of	the window	s operati	ng syste	m.		K			
	CO5	Identify the different features of real t						K			
UNIT-I		uction to Kernel	ino ana mo	one open	ating Sys		• q)		
Introduction to Ke			em - System	concept	s - Data			e: Buffer	CO1		
header - Structur	e of Buf	er pool - Reading and writing disk bloc	ks. Files IN	ODES - S	Structure	of a regul	ar file - Direct	ories-	001		
Super block- Inoc											
UNIT-II		n Calls						**************************************			
System calls: OP Layout the syster	EN-Rea n memo	d – Close – Write – Create – CHMOD ry – Context - Process control - proces	CHOWN -creation -	- Pipes - · signals ·	Mountir Proces -	ng and Unn ss scheduli	nounting. Pro ng – time - clo	cess: ock.	CO2		
UNIT-III		Process Communications			I			***************************************	.1		
Inter-Process Co	mmunic	ations: Process tracing- System V IPC-	-Shared Mei	nory - Se	emapho	res. Netwo	k Communic	ations:	I		
Socket programn	ning – S	ockets - descriptors - Connections - S	ocket eleme	nts - Stre	eam and	l Datagram	Sockets.		CO3		
UNIT-IV	Windo	ws Operating System			- 1	Periods	9	***************************************	l		
Windows Operati	ng syste	m: versions - Concepts and tools - Win	idows intern	als - Syst	tem Arch	nitecture - F	Requirements	and design	CO4		
goals - Operating	systen	mode I- Architecture overview - Key	system cor	nponents	s. Syste	m mechan	isms: Trap d	ispatching -			
UNIT-V		ime and Mobile Operating Syste		i flags - L	ocal pro			ent tracing.			
				mo Svoto	ma D						
Resource Sharing	a - Mobil	e Operating Systems - Micro Kernel De	esian - Clien	ne Syste t Server	Resourc	eai rime ra ce Access :	SK Scheduling Processes a	g - Handling Ind Threads	CO5		
-Memory Manage	ment - F	ile system – TinyOS – Architecture - A	Applications		rtooourt	007100000	1 10003303 0	na micaus			
Lecture Period	s: 45	Tutorial Periods: -	Practica	al Perio	ds: -		Total Perio	ds: 45			
ext Books	***************************************				***************************************				***************************************		
1. Maurice J. Bac	h, "The	Design of the Unix Operating System",	Prentice Ha	II of India	a, First E	dition 199	1.	***************************************			
2. Brian Catlin, Ja	amie Ha	nrahan, Mark E. Russinovich, David A	. Solomon a	and Alex	Ionescu	ı "Windows	Internals, Bo	ook 1 – Use	r Mode		
	eterenc		2014				tion 2010				
7ed (Developer R	s "One	e)", Microsoft Press, Seventh Edition, 2	rinciples" F	oarcon E	ducatio	n Eifth Edi		***************************************	***************************************		
William Stalling	s, "Oper	ating Systems: Internals and Design F	rinciples", P	earson E	ducatio	n, Fifth Edi	11011, 2019.				
3. William Stalling teference Book	s, "Opei s	ating Systems: Internals and Design F	rinciples", P					27 CO 10 Co	***********		
 William Stalling Reference Book Daniel P. Bove 	s, "Opei s t and Ma	ating Systems: Internals and Design F	rinciples", F	eilly Pub	lications	, Third Edi	ion. 2005.	Universities	Press		
3. William Stalling eference Book 1. Daniel P. Bove 2. Harold Abelsor Second Edition, 2	s, "Ope s t and Ma i, Gerald 013.	ating Systems: Internals and Design F rco Cesati, "Understanding the Linux I I Jay Sussman and Julie Sussman, "S	Principles", P Kernel", O'R Structure and	eilly Pub I Interpre	lications tation o	, Third Edi f Compute	ion, 2005. Programs",				
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3. William Stalling teference Book 1. Daniel P. Bove 2. Harold Abelsor Second Edition, 23. Michael Beck, Faird Edition, 2014. Robert Love, "L. Robert Love, "L. Abraham Silber 2018.	s, "Oper s t and Ma i, Gerald 013. Harald Bi 7. Linux Ke schatz,	ating Systems: Internals and Design Forco Cesati, "Understanding the Linux I Jay Sussman and Julie Sussman, "Sohme, MirkoDziadzka, Ulrich Kunitz, Ro	Principles", F Kernel", O'R Structure and Obert Magnu	eilly Pub I Interpre s, Dirk Ve 2010.	lications station o	, Third Edi f Compute r, "Linux Ke	ion, 2005. Programs", rnel Internals	", Addison-V	Vesley		
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3. William Stalling Reference Book 1. Daniel P. Bove 2. Harold Abelsor Second Edition, 23. Michael Beck, F. Third Edition, 2014. Robert Love, "L. Abraham Silber 2018. Web References 1. http://www.softp.	s, "Open s t and Ma n, Gerald 013. Harald Br 7. Linux Ke schatz,	ating Systems: Internals and Design Forco Cesati, "Understanding the Linux I Jay Sussman and Julie Sussman, "Sohme, MirkoDziadzka, Ulrich Kunitz, Romel Development", Addison-Wesley, Teter Baer Galvin, Greg Gagne, Opera	Reinciples", F Kernel", O'R Structure and Obert Magnu Third Edition, ting System	eilly Pub I Interpre s, Dirk Ve 2010. concepts	lications station o erworner	, Third Edi f Compute r, "Linux Ke Viley & Sor	ion, 2005. Programs", rnel Internals	", Addison-V	Vesley		
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3. William Stalling teference Book 1. Daniel P. Bove 2. Harold Abelsor Second Edition, 23. Michael Beck, F. Third Edition, 2014. Robert Love, "L. Abraham Silber 2018. Jeb References 1. http://www.softp. https://www.brit 2. https://www.brit 1. https://www.brit 2. htt	s, "Oper s t and Ma n, Gerald 013. Harald Br 7. Linux Ke schatz, panoramemy.com annica.com	ating Systems: Internals and Design Forco Cesati, "Understanding the Linux I Jay Sussman and Julie Sussman, "Sohme, MirkoDziadzka, Ulrich Kunitz, Romel Development", Addison-Wesley, Teter Baer Galvin, Greg Gagne, Opera a.org/Internals/index.shtml //course/understanding-the-internals-oom/technology/Windows-OS	Reinciples", F Kernel", O'R Structure and Obert Magnu Third Edition, ting System	eilly Pub I Interpre s, Dirk Ve 2010. concepts	lications station o erworner	, Third Edi f Compute r, "Linux Ke Viley & Sor	ion, 2005. Programs", rnel Internals	", Addison-V	Vesley		
3. William Stalling eference Book 1. Daniel P. Bove 2. Harold Abelsor Second Edition, 2 3. Michael Beck, F Third Edition, 201 4. Robert Love, "L 5. Abraham Silber 2018. /eb References 1. http://www.softp 2. https://www.brit 4. https://www.tuto	s, "Oper s t and Ma I, Gerald 013. Harald Br 7. Linux Ke schatz, panoram emy.com annica.corialspoi	ating Systems: Internals and Design Forco Cesati, "Understanding the Linux I Jay Sussman and Julie Sussman, "Sohme, MirkoDziadzka, Ulrich Kunitz, Romel Development", Addison-Wesley, Teter Baer Galvin, Greg Gagne, Opera	Reinciples", F Kernel", O'R Structure and Obert Magnu Third Edition, ting System	eilly Pub I Interpre s, Dirk Ve 2010. concepts	lications station o erworner	, Third Edi f Compute r, "Linux Ke Viley & Sor	ion, 2005. Programs", rnel Internals	", Addison-V	Vesley		

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COs		Progra	m Out	comes	(POs		Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3		
1	2	2	-	-	-	-	2	3	2		
2	2	2	3	3	2	-	3	3	2		
3	2	2	3	3	2	-	2	1	1		
4	2	2	3	3	2	-	1	1	2		
5	2 .	2	3	3	2	3	2	1	2		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

J V

Department	Com	puter Sc	ience and Engineering	Progran	nme: M	.Tech.				
Semester	11			Course	Catego	ry : PC	*End Se	mester E	xam Type	: TE
Course Code	P23C	ST206		Perio	ds / W	eek	Credit			
Course Couc	1 230	01200		L	Т	Р	С	lethod Overriding - sociation and Containers - ations ueries - Fetching Data Requests - ic Files and Media rotal Periods: 45 arch Press, 2nd Edition ons with Tkinter", Pack on, 2014. on, 2021. s Inc., 3rd Edition, 2016 erful Python language", es with tkinter and PyQues	TM	
Course Name	Adva	inced P	ython Programming	3	-	-	3		4	100
Prerequisite	Rasic	s of Dyth	on Programming		<u> </u>					
rierequisite										
-		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	on of the course, the stude		e able	to 				
0	CO1	Interpre	t Object Oriented Concepts us	sing Pyth on .						
Course Outcome	CO2	Implem	ent Graphical User Interface u	sing Tkinter	Packag	e.	un lyska	29	K	3
s	CO3		rase Python and MySQL conne		manipul	ations.			K	2
3	CO4	Demons	trate Network Programming w	ith Python.						
	CO5	Impleme	ent Web Application Developm	nent using D	jango.					
UNIT-I	OOPS	in Pyth	ion		X		Periods: 9			
Classes and Objection Operator Overload	ects - Co	onstructor tatic Meth	r - Encapsulation - Inheritance ods and Class Methods - Abs	. Polymorph traction - Co	ism: Me	thod Ove	rloading - M	ethod Over	riding -	CO1
UNIT-II	************************		ı (TKINTER)				Periods: 9		***************************************	
Introduction to Tk	inter: C	anvas - V	Vidgets - Layout Management	- Dialogs ar	d Mess	age Boxe	s - Frames a	and Contain	ners -	CO2
Menus. Event Ha	ndling:	Event-driv	ven Programming. Customizin	g Widgets -	Building	Multi-wir	ndow Applica	ations		002
UNIT-III			ase Connectivity				Periods: 9			***************************************
Installing MySQL - Transactions - 0	Connec CRUD P	ctor - Con rocesses	necting to MySQL Database -	Prepared S	tatemen	its - Parai	meterized Q	ueries - Fe	tching Data	CO3
UNIT-IV	Netwo	ork Prog	ramming				Periods: 9			1000
Socket Programn WebSocket Progr	ning - N amming	etworking g - Netwo	with Sockets - TCP/IP Commrking Protocols - DNS Resolution	unicatio <mark>n - l</mark> ion - Networ	JDP Cor	mmunica oring.	tion - HTTP	Requests -	**	CO4
UNIT-V	Web A	Applicati	ion Development (DJANG	O)		T	Periods: 9		***	
Django Basics - F Handling - Middle	orms ar ware - \	nd Form I Norking v	Handling - Django Admin - Use vith APIs - Session Manageme	er Authentica	ation and	d Authori	zation - Stati	c Files and	Media	CO5
Lecture Period			Tutorial Periods: -	Practica	I Perio	ds: -	T	otal Perio	ds: 45	1
ext Books					****************					
2. Alan D. Moore, Publishing, 1st Ec 3. Brandon Rhode 4. William S. Vinc	"Pythor lition, 20 es and J ent, "Dja	n GUI Pro 018. Iohn Goei	urse: A Hands-On, Project-Bas ogramming with Tkinter: Develor rzen, "Foundations of Python N Beginners: Build websites with	op resp onsiv Network Pro	e and p arammii	owerful C	GUI applications.	ons with Tk	2nd Editior inter", Pacl	n, 2019 kt
eference Book	-						***************************************			
Albert Lukaszer	wski, "W	IySQL for	ogramming: An Introduction to Python", Packt Publishing, 1s	t Edition, 20	10.				000	
Publishing, 2nd E	dition, 2	017.								
4. Burkhard Meier	,"Pytho	GUI Pro	gramming Cookbook: Develop	functional	and resp	onsive u	ser interface	s with tkint	er and PyQ	t5",
Packt Publishing,	1st Edit	ion, 2019	• 3							4
eb References	iriiiig P	ython. Po	werful Object-Oriented Progra	mming", O'F	kellly Me	edia, 5th l	=aition, 2013	5.	***************************************	· ·
		tutorial/al-	acce html							
nttps://docs.pytho nttps://www.tutoria	i.org/3/1	.utoriai/cla	asses.ntmi on3/python_gui_programming	htm						
nttps://dev.mysql.d	com/doc	c/connecto	or-python/en/	arun						
nttps://www.tutoria nttps://docs.django			on3/python_networking.htm							

https://docs.djangoproject.com/

* TE – Theory Exam, LE – Lab Exam

COs		Progra	m Out	comes	(POs		Program Specific Outcomes (PSOs				
, , , , ,	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3		
1	3	3	3	3	2	3	3	3	2		
2	3	2	2	2	1	2	2	2	1		
3	3	1	1	1	2	1	1	1	2		
4	3	1	1	2	2	1	2	1	2		
5	3	2	2	2	3	2	2	2	3		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	dje	Contin	uous As	sessment Mark	s (CAM)	End	2
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department	Com	puter Science and Engineering	Progran	nme: M.	Tech.				***************************************	
Semester			Course	Catego	ry : PC	*End Sen	nester Exa	m Type:	LE	
Course Code	P23C	P23CSP202		ods / We	eek	Credit	Max	ximum Ma	arks	
	Advanced Python Programming		L	Т	P.	C	CAM	ESE	TM	
Course Name	4	2	50	50	100					
	,									
Prerequisite	uisite Basics of Python Programming									
	On completion of the course, the students will be able to							BT Mapping (Highest Level)		
Course	CO1	Interpret Object Oriented Concepts	using Python.		***************************************	**************************			(2	
Outcomes	CO2	Implement Graphical User Interface	using Tkinter	Package	e.	***************************************	***************************************	ľ	(3	
	CO3	Paraphrase Python and MySQL con	nectivity and	manipula	ations.		***************************************	r	K2	
	CO4								(3	
	CO5	Implement Web Application Development using Django.							K4	

List of Experiments:

- Create classes for BankAccount, SavingsAccount, and CheckingAccount and implement methods for deposit, withdrawal, balance inquiry, and interest calculation.
- 2. Create classes for Employee, Payroll, and Salary and implement methods for calculating employee salaries, generating pay slips and managing payroll records using Inheritance.
- 3. Create a graphical calculator with buttons for numeric input, arithmetic operations, and a display to show the result.
- 4. Develop a GUI-based to-do list application where users can add, delete, and manage their tasks.
- 5. Develop a Python program to fetch the records from a table in MySQL and display in python console.
- 6. Develop a CRUD program using Python-MySql connectivity.
- 7. Create a client-server based chat application where multiple clients can connect to a server and exchange messages,
- Build a network port scanner program that scans a given IP address or range of IP addresses to detect open ports on remote machines.
- Create a fully functional blogging platform where users can register, create blog posts, add comments, and browse through published posts.
- Develop an e-commerce store application with features like product listings, user authentication, shopping cart management, and secure payment integration.

Lecture Periods: - Tutorial Periods: - Practical Periods: 45 Total Periods: 45

Reference Books

- Eric Matthes, "Python Crash Course: A Hands-On, Project-Based Introduction to Programming", No Starch Press, 2nd Edition, 2019.
 Alan D. Moore, "Python GUI Programming with Tkinter: Develop responsive and powerful GUI applications with Tkinter", Packt Publishing, 1st Edition, 2018.
- 3. Brandon Rhodes and John Goerzen, "Foundations of Python Network Programming", Apress, 3rd Edition, 2014...
- 4. Burkhard Meier, "Python GUI Programming Cookbook: Develop functional and responsive user interfaces with tkinter and PyQt5", Packt Publishing, 1st Edition, 2019.
- 5. Mark Lutz, "Learning Python: Powerful Object-Oriented Programming", O'Reilly Media, 5th Edition, 2013.

Web References

https://docs.python.org/3/tutorial/classes.html

https://www.tutorialspoint.com/python3/python_gui_programming.htm

https://dev.mysql.com/doc/connector-python/en/

https://www.tutorialspoint.com/python3/python_networking.htm

https://docs.djangoproject.com/

* TE - Theory Exam, LE - Lab Exam

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COs	ļ	Progra	m Out	comes	(POs		Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3		
1	3	3	3	3	2	3	3	3	2		
2	3	2	2	2	1	2	2	2	1		
3	3	1	1	1	2	1	1	1	2		
4	3	1	1	2	2	1	2	1	2		
5	3	2	2	2	3	2	2	2	3		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

Assessment	Co	ntinuous A	Assess	ment Marks (CA	AM)	7 1	
	Performance in practical classes Model		End Semester	Total			
	Conduction of practical	Record work	viva	Practical Examination	Attendance	Examination (ESE) Marks	Marks
Marks	15	5	5	15	10	50	100

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Department	Com	outer Science and Engineering	Program	nme: M.	Tech.				***************************************			
Semester	II		Course Category : HS *End Semester					xam Type: LE				
Course Code	P23H	P23HSPC02		ds / We	eek	Credit	Maximum Marks		arks			
	1 2011			Т	#P-	С	CAM	ESE	TM			
Course Name	Semi	nar on ICT: A Hands-On Approach	-	-	4	2	100	-	100			
(Co	ommon	to all M.Tech Programmes)						=# g,ō				
Prerequisite	No Pr	erequisite needed	equisite needed									
	On co	ompletion of the course, the studer	nts will be	e able t	to			BT Mapping (Highest Level				
Course	CO1	Select a topic, narrowing the topic into p	presentatio	n.					(2			
Outcomes	CO2	State an objective and use the relevant	ICT tools t	to make	the prese	ntation effe	ctive.	ŀ	K3			
	CO3	Study the topic and understanding the o	ontribution	ns and p	repare rep	oort.	/	ŀ	K2			
,	CO4	Prepare a working demo.			**************************************			P	(3			
~	CO5	Prepare conclusions based on the reading of the topic and giving final Presentation.							K4			

List of Experiments:

The methodology used is "learning by doing", a hands-on approach, enabling the students to follow their own pace. The teacher, after explaining the project, became a tutor, answering questions and helping students on their learning experience.

ICT skills

- Understand ICT workflow in the respective domain choosed.
- · Manage multitasking.
- Deal with main issues using tech in class.
- Record, edit and deliver audio and video.
- · Automate assessments and results.

Scope

- Perspective in order to design activities in class.
- Understand the process of creating audiovisuals.

Teaching tools

- Different ways to create audiovisual activities.
- Handle audiovisual editors.
- · Collaborative working.
- Individualize learning experience.
- · Get instant feedback from students.

Each one of the students will be assigned an ICT Topic and the student has to conduct a detailed study on the assigned topic and prepare a report, running to 30 or 40 pages for which a demo to be performed followed by a brief question and answer session. The demo will be evaluated by the internal assessment committee (comprising of the Head of the Department and two faculty members) for a total of 100 marks.

		` <u>`</u>			
Lecture Periods: - Practical Periods: 45 Total Periods: 45	Lecture Periods: -	Tutorial Periods: -	Practical Periods: 45	Total Periods: 45	

^{*} TE - Theory Exam, LE - Lab Exam

COs/POs/PSOs Mapping

CO3/	F U3/F	SUS IVI	apping	y					
COs		Program Outcomes (POs) Program Spec Outcomes (PS							
	P01	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	-	3	1	1	3	3	3	2	1
2	-	3	1	1	3	2	3	2	1
3	-	3	1	1	3	2	3	2	1.
4	-	3	1	1	3	2	3	2	1
5	-	3	1	1	3	2	3	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

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M.Tech. Computer Science and Engineering

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Evaluation Method

: ¿	Continu	** ** **	Total Marks				
Assessment	Performance in practical classes				End Semester Examination		
7,000001110111	Presentation using ICT	Report	viva	Attendance	(ESE) Marks	Marks	
Marks	50	30	10	10	- f	100	

1 0

Department	Computer Science and Engineering	Programme: M.Tech.									
Semester	II	End Semester Exam Type: -									
Course Code	P23CSC2XX	Perio	ds / W	eek	Credit	t Maximum Mar					
Course Code	F230302AA	L	Т	Р	С	CAM	ES E	TM			
Course Name	Ability Enhancement Courses	-	-	4	-	100	-	100			

Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.

Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.



Department	Comp	outer Science and Engineering	Progran	nme: M	Tech.					
Semester	ı		Course	Catego	ry : PE	*End Se	emester Ex	am Type:	TE	
Oarrage Oada			}	ods / We		Credit		ximum Ma		
Course Code	P23C	SE101	L	T	Р	С	CAM	ESE	TM	
Course Name	Progr	ramming for Data Science	3	-	-	3	40	60	100	
Prerequisite	Basics	of Data Science		<u> L</u>	<u> </u>			<u> </u>	<u> </u>	
TTOTOGUICILO		ompletion of the course, the stude	nts will h	e able i	to ·			BT Ma	oning	
	000	improduction of the obtained, the obtained	THE WIN E	o abic				(Highest		
Course	CO1	Identify the need for data science and types and their methods.	ence and solve basic problems using Python built-in data							
Outcomes	CO2	Employ efficient storage and data ope	rations usir	ng NumP	y arrays.			K3	3	
	CO3	Apply powerful data manipulations usi	ng Pandas					K3		
	CO4	Identify and execute basic syntax and						K2		
	CO5	Exploit the graph using ggplot2						K3		
UNIT-I		luction to Data Science and Pytho	n Progra	mmina	T	Periods: 9	}	1		
Name and the same of the same		nce - Why Python? - Essential Python						Reserved	CO1	
words, Indentation	ı, Comn on Maki	nents, Built-in Data types and their Met ng- Looping- Loop Control statement-	hods: Strin	gs, List,	Tuples,	Dictionary, S	Set - Type C	Conversion-		
UNIT-II		luction to NumPy				Periods: 9				
with NumPy Arrays	s- Basic	d Vectorized Computation- The NumPy of Indexing and Slicing - Boolean Indexing Functions- Mathematical and Statistical	g-Transpos	ing Array	s and Sv	vapping Axe	s. Universa	- Arithmetic I Functions:	CO2	
UNIT-III		Manipulation with Pandas				Periods: 9		***************************************	I	
Filtering- Function	Applica	uta Structures: Series, DataFrame, Esso ation and Mapping- Sorting and Rankin Membership. Reading and Writing Dat	g. Su mma ı	rizing an	Dropping d Compu	g Entries -In ıting Descrip	dexing, Sel otive Statist	ection, and ics- Unique	CO3	
UNIT-IV	Introd	luction to Data Science and R Pro	gram min	g		Periods: 9)	***************************************		
R for Basic Math- A	Arithmet	ic- Logarithms and ExponentialsE-Notatengths- Subsetting and Element Extracti	ion- A ssign	ing Obje	cts- Vect	ors- Creating	a Vector- S	Sequences,	CO4	
UNIT-V		Plotting	011 100101	<u> </u>		Periods: 9				
Using plot with C		te Vectors-Graphical Parameters-Auto	matic Plot	Types-T				and Point		
Appearances-Plott	ing Reg	ion Limits-Adding Points, Lines, and T	ext to an E	xisting F	Plot-ggplo	t2 Package	-Quick Plot	with qplot-	CO5	
Setting Appearance	e Cons	tants with Geoms READING AND Ware Files- Writing Out Data Files and Plots- A	RITING F	ILES- R-	Ready D	oata Sets- C	Contributed	Data Sets-		
Lecture Period		Tutorial Periods: -	Practica				otal Perio	ds: 45		
Text Books	J. 10	1.4.011411 011043.	1					ag. 70		
1. Tilman M.Davies 2. Bruce, Peter, an	d Andre R Progra	Book of R - A First Programming and States Bruce. Practical statistics for data scienting for Beginners", CreateSpace Inc.	entists: 50 e	essential	concepts	s. " O'Reilly			5.	
		amming for Data Science"Lean Publishi	na 2016			-	***************************************			
2. Hadley Wickham 3. Kun Ren ,"Learn	n, Garre ing R P	tt Grolemund," R for Data Science",ORE rogramming", Packt Publishing,2016	ILLY Publi)17					
		atistical data analysis and inference. Elsert Y. Kim. Statistical Inference via Data			Dive into	o R and the	Tidvverse (CRC Press	2019	
Web References		Value of the following of the batta	20.01.00.7							
		utorial/classes.html				***************************************			***************************************	
nttps://www.tutorial https://dev.mysql.co	spoint.com/doc/	com/python3/python_gui_programming.h connector-python/en/	ntm							
		com/python3/python_networking.htm				***************************************				

* TE - Theory Exam, LE - Lab Exam

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COs/POs/PSOs Mapping

COs	1 -	Progra	m Out	comes	(POs		Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	3	3	3	3	2	3	3	3	2	
2	3	2	2	2	1	2	2	2	1	
3	3	1	1	1	2	1	1	1	2	
4	3	1	1	2	2	1	2	1	2	
5	3	2	2	2	3	2	2	2	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assig nme nt*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	Comp	outer Science and Engineering	Progran	nme: M	.Tech.						
Semester	I		Course	Catego	ry : PE	*End	Semester	Exam Typ	e: TE		
Course Code	D23C	SE102	Perio	ds / We	eek	Credit	Ma	ximum Ma	ırks		
Course Code	F230	36102	L	Т	P	С	CAM	ESE	TN		
Course Name	-	r Attack Detection and ntion Systems	3		-	3	40	60	100		
Descripto					Ll			L	1		
Prerequisite	On co	ompletion of the course, the stude	ents will b	e able	to			BT Ma (Highest			
	CO1	Understand Intrusion Detection and P	revention S	ystem			,	K	2		
Course	CO2	Illustrate Network Intrusion Detection	and Preven	tion Sys	tem			K	3		
Outcomes	CO3	Make use of Network behavior analys	is					K3			
		CO4 Exploit SNORT IDS									
		CO5 Make use of IDPS Technologies									
UNIT-I		luction to IDPS				Periods: 9)	K			
IDPS Technologi	es, Con	ponents and Architecture Implementati				ies, Key Fun	ctions, Com	imon	CO		
Detection Method	dologies	Signature, Anomaly and Stateful Proto	col Analysis	s, Types	of IDPS						
UNIT-II		and Network IDPS				Periods: 9			·		
Internet Control I	Message oofing, [etwork and Hardware Layer attacks, Sr e Protocol Redirect, DDoS, Dangers and Defense- in-Depth Approach, Port Secu	d defenses	with Mar	n-in the N	/liddle, Secur	re Socket L	ayer	CO		
UNIT-III		ork Behaviour Analysis				Periods: 9			Ţ		
		ture Typical, Network Architecture, Sensision Detection, Network Traffic Capture							co		
UNIT-IV		ing with Snort IDS	5, WOINTOIN	9 011 1110	DOX, OC.	Periods: 9		THOM THE	CO.		
ntroduction to Sno	ort, Snor	t Alert Modes and Format, Working with gins, Preprocessors and Output Module						t	CO		
UNIT-V		ole IDPS Technologies				Periods: 9					
Honeypots, IPS us Components, Thre	sing IP T eats aga	chnologies, Integrating Different IDPS 1 race back - Probabilistic and De- termir inst WLANs, 802.11 Wireless Infrastruc onal Digital Assistance and OtherHybric	nistic Packe - ture Attac	t Markin ks,WEP	g, Markir Attacks,	ng WLAN Sta Wireless Cli	andards, WI	_AN	CO		
Lecture Perioc		Tutorial Periods: -	Practica				otal Perio	ds: 45	.l		
Text Books		LLL									
Bradd Lhotsky, "	OOSEC /irtualiza ngress,2	nial of Service Attack and Defense", Sp Host based Intrusion detection", PACK tion for Security: Including Sandboxing, 2009.	T Publication	on, 2013	, High Av	ailability, Fo	rensic Analy	/sis, and	ř ľ		
. Karen Scarfone	and Pe	ter Mell, "Guide to Intrusion Detection a	nd Preventi	on Syste	ems (IDP	S)", NIST Sp	ecial Public	ation 800-9	94, 200		
. Padmavathi Ga . Mano Paul P, R . Yuri Diogenes, I	napathi avi R, D Erdal Oz	,"Cyber Security: Fundamentals, Attack iana Jeba Jingle," Prevention of Cyber ekaya, Dr. Erdal Ozkaya," Cybersecurity ds-On Artificial Intelligence for Cybersec	ks and Thre Attacks Usi	ats, İntru ng Email ıd Defen	usion Det I Spam D	tection and Footenant Potential (Control of Control of	revention S	ystems",20	21		
Veb Reference		To the state of th									
ttps://www.simplil ttps://www.mygre ttps://cybersecuri	learn.co atlearni tyguide.	s.org/cyber-security-tutorial/ m/tutorials/cyber-security-tutorial/types- ng.com/blog/types-of-cyber-attacks/ org/resources/coding-for-cybersecurity/		acks	11						
ttps://www.coding	gninjas.c	org/resources/coding-tor-cybersecurity/ com/studio/library/cyber-attacks-and-the m, LE – Lab Exam									

COs	152	Progra	m Out	comes	(POs		Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	2	2	, - '	-	-		2	3	2	
2	2	2	3	3	2	-	3	3	2	
3	2	2	3	3	2	-	2	1	1	
4	2 .	2	3	3	2	-	1	1	2	
5	2	2	3	3	2	3	2	1	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	1	Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	Com	puter Science and Engineering	Prograi	nme: M.	Tech.				***************************************
Semester	I			Catego		*End S	Semester I	Exam Tvr	e· TF
Course Code	P23C	SE103		ods / We		Credit		ximum Ma	
			L	T	Р	С	CAM	ESE	TM
Course Name	Bio-l	nspired Computing	3	-	-	3	40	60	100
Prerequisite	No Pre	erequisite needed			<u>l</u>				
		ompletion of the course, the stude	nts will h	a ahla t		***************************************	***************************************	T DE M	
	***************************************				0			BT Ma (Highest	pping
0	CO1	Understand basic concepts of evolutio				***************************************		K	
Course Outcomes	CO2	Understand the basic features of neural model.	al and imm	une syste	ms and	able to build	the neural	K	2
disomes	CO3	Make use of complex and functional hi interactions.	gh-level ph	enomena	a can em	erge from lov	w-level	K	
	CO4	Illustrate computational processes deriv	ved from ne	eural mod	dels.		***************************************	100	
	CO5	Implement simple bio-inspired algorithm				Swarm Optim	ization	K2 K3	
UNIT-I	Introd	luction to Evolutionary Algorithm				Periods: 9)
Evolutionary algo	rithm. c	omponents of evolutionary algorithm rep	resentation	(definition		.:	luation fund	ction	CO1
cellular systems, systems.	other ce	ation, parent selection Mechanism, Varia Condition, evolutionary algorithm case sellular systems, computation with cellular	stuav C.euu	IAP CVICTOR	ne callul	ar automoto	mandalina.	:41-	
UNIT-II	Neura	l Systems				Periods: 9			L
unsupervised lear study	ıs syste rning, sı	ems, artificial neural networks, neuror upervised learning, reinforcement learni	n models, ng, evolution	architect on of neu	ure, sigr ıral netw	nal encoding orks, hybrid	synaptic, neural syst	plasticity, ems, case	CO2
UNIT-III C	Develo	omental and Immune Systems		***************************************		Periods: 9			
Rewriting system biological immune algorithm, clonal s	, System	esis of developmental system, evolution ns, lessons for artificial immune systems n algorithm	ary rewritii , algorithm	ng systen s and app		A: I	elopmental ce, negative	programs, e selection	CO3
UNIT-IV	Behav	ioral Systems				Periods: 9			***************************************
reproduction, simu	olution (nce, behavior in AI, behavior based roboti of behavioral systems, learning in behav nd reality	cs, biologio vioral syste	al inspira ms, co-e	tion for r	shoto roboto	as biologic control, tow	al models, ards self-	CO4
		c Algorithms			F	Periods: 9	***************************************	I	************
Representation of Application: Solvin	Individu g a Job	ials, Mutation, Recombination, Population Shop Scheduling Problem	n Models,	Parent S	election,	Survivor Sel	ection, Exa	mple	CO5
Lecture Periods	s: 45	Tutorial Periods: -	Practica	Period	s: -	To	tal Period	s: 45	
ext Books				***************************************					***************************************
2. Tao Song, Pan 2 3. F. Neumann and Springer, 2010. eference Books	Zheng, I d C. Wit	ttiussi, "Bio-Inspired Artificial Intelligence Mou Ling Dennis Wong, Xun Wang, "Bio t, "Bioinspired Computation in combinato	-Inspired C orial optimi: 	computing zation: Al	gorithms	and their cor	mputational 	scientific, 2 complexit	2019 y",
I. D. E. Goldberg,	"Geneti	c algorithms in search, optimization, and	d machine	learning".	Addison	- Weslev. 19	189.		
B. M. Dorigo and T	i, iveur Stutzle	al Networks and Learning Machines", The, "Ant Colony Optimization". A Bradford	nird Edition	Prentice	Hall, 20	08.			
. Xin-She Yang,Zh	าihua Cเ	Intelligence", Morgan Kaufmann, 2001. Ji Renbin Xiao Amir HosseinGandomi M on, Elsevier, 2013.	ehmet Kara	amanoglu	ı "Swarm	Intelligence	and Bio-Ins	spired	
eb References	J					***************************************			
ttps://pythonhoste	d.org/ins	oired-computing-approach-in-artificial-int spyred/	elligence/		***************************************	***************************************	***************************************	Marian 1107/200 Hall Incal 1111/200	
ttps://pdfs.semanti ttps://www.frontier	sin.org/i	ır.org > research-topics/25088/bio-inspired-comp p/source/1398722893	outation-an	d-its-appl	ications				

*TE – Theory Exam, LE – Lab Exam

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COs/POs/PSOs Mapping

COs	1 % 1	Progra	m Out	comes	(POs		Program Specific Outcomes (PSOs)			
- 1	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	2	2	, = "	-		-	2	3	2	
2	2	2	3	3	2	-	3	3	2	
3	2	2	3	3	2	-	2	1	1	
4	2	2	3	3	2		1	1	2	
5	2	2	3	3	2	3	2	1	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

1.7	1	Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	Comp	outer Sc	ience and Engineering	Progran	nme: M	.Tech.					
Semester	I	y		Course	Catego	ry: PE	*End	Semester E	Exam Type	: TE	
O O-d-	Dasc	CE404		Perio	ods / We	eek	Credit	Ma	ximum Ma	rks	
Course Code	P230	SE104		L	T	Р	С	CAM	ESE	TM	
Course Name	Block	k Chain	and Crypto Currency	3	-	-	3	40	60	100	
	D!-	- f O				7			1	<u> </u>	
Prerequisite			tography						DTM		
	On co	•	n of the course, the stud		7				BT Ma _l (Highest	Leve	
_	CO1	Underst	and the Design principles of E	Bitcoin and E	Ethereun	n.			K2	2	
Course Outcomes	CO2	Make us	se of the Simplified Payment \	Verification p	orotocol.	***************************************			K3		
Cutodinos	CO3	Underst	and about Cryptocurrency						K3	3	
	CO4	Illustrate	the Cryptocurrency Regulation	on					K3	3	
	CO5	Impleme	ent Blockchain Applications						K3	 }	
UNIT-I		luction				T.	Periods:	9			
Distributed Datak Distributed Hash Hard Algorithm, 2	Table, A	ASIC resis	al Problem, Byzantine Genera stance, Turing Complete. Cryl Proof.	il problem a ptography: I	nd Fault Hash fun	Tolerand ction, Dig	e, Hadoop gital Signatu	Distributed I ire - ECDSA	ile System, , Memory	CO	
UNIT-II	Block				301.3441043411411111111		Periods:	9			
UNIT-III History, Distribute	Crypted Ledge	ocurren er, Bitcoir	ate and Public blockchain. cy n protocols - Mining strategy a dechain, Namecoin.	and rewards	Ethereu	um - Con	Periods: struction, D		Contract,	co:	
UNIT-IV			cy Regulation			T	Periods:	9	d an hay a a a a a a a d d d d d d d d d d d d	CO.	
Stakeholders, Ro	oots of B	it coin, Le	egal Aspects-Crypto currency I Management System, Doma	Exchange, l	Black Ma	arket and d future o	Global Eco	nomy. Appl	ications:	CO	
UNIT-V	,		pplications				Periods:			[
			Management System, Doma	in Name Se	rvice an	d future o	of Blockcha	n.		CO	
Lecture Period			Tutorial Periods: -	Practic				Total Perio	ods: 45	L	
ext Books	ert Stinso	ing Blocks	aura Paterson, "Cryptography chain: Deeper insights into dec	entralization	n, crypto	graphy", l	Packet Pub	ishing Ltd, k	Kindle Edition	n, 201 ogies:	
Imran Bashir,Narayanan,Comprehensi	Joseph E ive Introd	Bonneau,	Edward Felten, Andrew Mille Princeton University Press, Ki	er and Steve ndle Edition	en Goldf , 2016.	eder, "Bi	tcoin and C	***********************			
 Imran Bashir, Narayanan, Comprehensi Reference Book	Joseph E ive Introd ks	Bonneau, duction", l	Edward Felten, Andrew Mille Princeton University Press, Ki	ndle Edition	, 2016.						
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COs/POs/PSOs Mapping

COs	_			comes)	Prog Outco	ram Spe omes (P	ecific (SOs)
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1.	1	1	3	3	3	3	3	3	3
2	2	2	2	2	-	2	2	2	_
3	3	3	3	3	3	3	3	3	3
4	2	2	2	2	-	2	2	2	
5	2	2	2	2	-	2	2	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	End			
Assessment					Attendance	Semester	
Marks	1	0	15	40		(LOL) Walks	
···········		U	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	Comp	uter Science and Engineering	Prograr	nme: M	.Tech.				
Semester	1		Course	Catego	ry : PE	*End S	emester E	xam Type	: TE
0	Dago	SE40E	Perio	ds / W	eek	Credit	Ma	ximum Ma	arks
Course Code	P23C	SE105	L	Т	Р	С	CAM	ESE	TM
Course Name	IOT A	pplications Engineering	3	-	-	3	40	60	100
	,			<u> </u>	<u> </u>	***************************************		<u> </u>	<u></u>
Prerequisite		cs of IoT		***************************************					
	On co	empletion of the course, the stud						BT Ma (Highest	t Leve
	CO1	Identify the IoT networking componer	its with resp	ect to C	SI layer			K	2
Course Outcomes	CO2	-	K	3					
Outcomes	CO3		K	3					
	CO4	Illustrate IoT Security						K	3
	CO5	Make use of IoT Applications						K	3
UNIT-I	Introduction Periods: 9								J
Characteristics lo	oT sense source	or nodes, Edge computer, cloud and pe hardwares, Examples of IoT infrastruct	eripheral clo ture,	ud, singl	e board				CO
UNIT-II		rotocols and Softwares				Periods: 9			
MQTT, UDP, MO Pattern, IoT prote WiDi	QTT brok ocol Arc	kers, publish subscribe modes, HTTP, (hitecture, Selection of Wireless technol	COAP,XMP ogies -6LoV	o and ga VPAN, Z	ateway p Zigbee, V	rotocols, IoT (/IFI, BT, BLE,	Communic SIG,NFC,	ation LORA, LiFi	CO
UNIT-III	Cloud	l Computation and BigData Anal	vtics			Periods: 9		JJulius	
Evolution of Clou	id Comp	outation, Commercial clouds and their fo ards, Introduction to big data analytics a	eatures, ope	n sourc	e IoT				co
UNIT-IV		ecurity				Periods: 9		***************************************	
Need for encrypt	ion, star	ndard encryption protocol, light weight o	cryptography	, Quadr	uple Tru	st			CO
	,	Analysis and model for IoT-A, Cloud se	curity			Periods: 9			
Case studies: Io		pplications art cities, health care, agriculture, smar	t meters.M2	M. Web	of things				T
Case studies. 10 Cellular IoT, Indu							***************************************		CO
Lecture Period	ds: 45	Tutorial Periods: -	Practic	al Perio	ods: -	T	otal Peri	ods: 45	
Text Books			JALU-1900-3000-0000-000-000-000-000-000-000-00					Ŋ	1
"Enabling thir Dan Holler, VI Internet of Th LuYan, Yan Z	ngs to ta asios Ts ings", El 'hang, L	artin Bauer, Martin Fiedler, Thorsten Kralk – Designing IoT solutions with the Iosiatsis, Catherine Mulligan, Stamatis Kalsevier Publications, 2014 aurence T. Yang, Huansheng Ning, Tholications, March,2008.	T Architectu arnouskos, S	re Refer Stefan Av	ence Mo vesand,	del", Springe David Boyle, '	r Open, 20 From Mac	116. hine to Mad	
Reference Boo		olications, Maich, 2000.			· · · · · · · · · · · · · · · · · · ·	***************************************			***************************************
. Vijay Madiset	ti , Arsh	deep Bahga, Adrian McEwen (Author),	Hakim Cas	simally "	Internet	of Things A H	ands-on-A	oproach" Ai	shdee
Bahga & Vija	y Madise kder and	etti, 2014. d Roopa R Yavagal, "Mobile Computinç	g," Tata Mc0						
B. Barrie Sosins Ronaldi Kru	ky, "Clo	ud Computing Bible", Wiley-India, 2010 ell Dean Vines,Cloud Security: A Comp signing for Emerging - UX for Genomic) orehensive (Suide to	Secure	Cloud Compu of Things Ted	ting,Wiley- chnologies'	India, 2010 ', O'Reilly, 2	2014.
Web References									
		rticle/internet-of-things-what-is-explaine	ed-iot						And the second second
	200	alintarnat of things/what is the ist/							

https://www.i-scoop.eu/internet-of-things-guide/edge-computing-iot/https://digimat.in/nptel/courses/video/106105166/L02.html

* TE – Theory Exam, LE – Lab Exam

https://www.geeksforgeeks.org/edge-computing/

https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/

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COs	10 10s	Progra	m Out		Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	1	2	1	2	2	3	. 3	1	3
2	1	2	1	2	2	3	3	3	2
3	1	2	1	2	2	3	2	1	3
4	2	2	2	3	2	3	-1	1	2
5	3	1	2	3	2	3	2	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	s (CAM)	End	3	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

1 1

Department	Comp	outer Science and Engineering	Prograr	nme: M	.Tech.					
Semester	II		Course	Catego	ry : PE	*End S	emester E	xam Type	: TE	
Course Code	P23C	SEC01	Perio	ods / We	eek	Credit	Ma	ximum Ma	rks	
Course Coue	1 200	02001	L	Т	Р	С	CAM	ESE	TM	
Course Name	Infor	nation Visualization	3	-	-	3	40	60	100	
	- N- D			<u> </u>		#381.0132-0112121111112-01110000				
Prerequisite		rerequisite needed								
	On co	ompletion of the course, the stude	ents will b	e able 1	to			BT May (Highest		
	CO1	Analyze the different data types, visua	alization type	es to brir	ng out the	insight.		K3	}	
Course	CO2	Make use of Visualization Techniques	Jul 344 -	29.5.	1 -11 - 1	T KEIL I		K3		
Outcomes	CO3 Illustrate different Visual Analytics							K2		
	CO4 Make use of Data Visualization Tools							K3	,	
	CO5 Demonstrate Visualization dashboard creations									
UNIT-I		luction				Periods: 9				
Validation. Statistic Scatter plot - Regre	cal char ession o		tion - Dimer Chart - Hist	nsions ar ogram -	Pie chart	- Frequency	is:Four Lev Polygon - E	vels for Box plot -	CO1	
UNIT-II		lization Techniques		- 1		Periods: 9				
Introduction to va techniques - visu	arious da alizing o	ata visualization tools - Scalar and point cluster analysis – K-means and Hierard	t techniques hical Cluste	s - vector r techniq	visualiza ues.	ation techniqu	ies -multid	imensional	CO2	
UNIT-III	Data \	/isualization and Visual Analytics	and gave po	***************************************	T	Periods: 9		· · · · · · · · · · · · · · · · · · ·		
Time Series data	visualia	zation – Text data visualization – Spatia		alization			- Heat Ma	n Troo		
Map - Map Color projection technic box - Trellis displ	and Ot ques - Io ay - Par		l Data Visua Attributes -	Multivar	- Network	ks and Trees visualization	- Geomet	ric	соз	
Map - Map Color projection technic box - Trellis displ UNIT-IV	and Ot ques - Id ay - Par Data \	her Channels Manipulate View – Visual con-based techniques - Pixel-oriented te rallel coordinates /isualization Tools	I Data Visua Attributes - echniques -	Multivar Hierarch	- Network riate data nical tech	ks and Trees visualization niques - Scat Periods: 9	– Geomet terplot ma	ric rix - Hyper	CO3	
Map - Map Color projection technic box - Trellis displ UNIT-IV	and Ot ques - Id ay - Par Data \	her Channels Manipulate View – Visual con-based techniques - Pixel-oriented te allel coordinates	I Data Visua Attributes - echniques -	Multivar Hierarch	- Network riate data nical tech	ks and Trees visualization niques - Scat Periods: 9	– Geomet terplot ma	ric rix - Hyper		
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Map - Map Color projection technic box - Trellis displement of the projection technic box - Trellis displement of the projection technic displement of the project of the p	and Ottques - Iday - Pair Nation - Iday - Id	her Channels Manipulate View – Visual con-based techniques - Pixel-oriented terallel coordinates //isualization Tools gics: Marks and Channels-Arrange Tab //ization Dashboard Creations mies- User Interaction- Organizational I Protection and common mistakes. Dash //ithcare Tutorial Periods: - ization Analysis and Design, 1st edition //imann, Jeffrey Camm, James Cochran, //ining, 2021 V. K. Hardle, A. Unwin, Handbook of Data a, 1st edition, O'Reilly Media, United Statok of R for multivariate analysis, 1st er //isualization Perception for Design,2 nd //ction to Information Visualization,1st Ed //tals of Data Visualization,O'Reilly Media	I Data Visua Attributes - echniques - les- Arrange Functions-D hboard crea Practica , CRC Pres Data Visua ata Visualiza ates, 2008. edition, Weld Edition, Els itionSpringe	Multivar Hierarch e Spatial Dashboartion usin al Perio s, Unitedization: ution, 1st	- Network interest of the state	ks and Trees visualization niques - Scar Periods: 9 acets into mu Periods: 9 - Workshee zation tool us To 2015. g and Explain Springer puble er Institute, U	- Geomet terplot man diple views ts - Workbe e cases: F otal Perio ing with Da ication, Ge	cric crix - Hyper cooks – inance- ds: 45 ata, South-	CO4	
Map - Map Color projection technic box - Trellis displement of the projection technic box - Trellis displement of the projection technic box - Trellis displement of the project of the pr	and Ottques - Iday - Pair Nation - Iday - Id	her Channels Manipulate View – Visual con-based techniques - Pixel-oriented tecallel coordinates //isualization Tools gics: Marks and Channels-Arrange Tab lization Dashboard Creations mies- User Interaction- Organizational I Protection and common mistakes. Dash thcare Tutorial Periods: - ization Analysis and Design, 1st edition Imann, Jeffrey Camm, James Cochran, hing, 2021 V. K. Hardle, A. Unwin, Handbook of Data, 1st edition, O'Reilly Media, United States of R for multivariate analysis, 1st edition to Information Visualization, 1st Editals of Data Visualization, O'Reilly Media	I Data Visua Attributes - echniques - les- Arrange Functions-D hboard crea Practica , CRC Pres Data Visua Ita Visualiza ates, 2008. edition, Welc Edition, Els itionSpringe	Multivar Hierarch e Spatial Pashboar tion usin al Perio s, United lization: tion, 1st	- Network interest of the state	ks and Trees visualization niques - Scar Periods: 9 acets into mu Periods: 9 - Workshee zation tool us To 2015. g and Explain Springer puble er Institute, U	- Geomet terplot man diple views ts - Workbe e cases: F otal Perio ing with Da ication, Ge	cric crix - Hyper cooks – inance- ds: 45 ata, South-	CO4	
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Map - Map Color projection technic box - Trellis displement of the projection technic box - Trellis displement of the projection technic box - Trellis displement of the project of the pr	and Ottques - Iday - Pair Visual Taxono zation - Idae - Id	her Channels Manipulate View – Visual con-based techniques - Pixel-oriented tecallel coordinates //isualization Tools gics: Marks and Channels-Arrange Tab lization Dashboard Creations mies- User Interaction- Organizational I Protection and common mistakes. Dash thcare Tutorial Periods: - ization Analysis and Design, 1st edition Imann, Jeffrey Camm, James Cochran, hing, 2021 V. K. Hardle, A. Unwin, Handbook of Data, 1st edition, O'Reilly Media, United States of R for multivariate analysis, 1st edition to Information Visualization, 1st Editals of Data Visualization, O'Reilly Media	I Data Visual Attributes - echniques - ech	Multivar Hierarch e Spatial Pashboar tion usin al Perio s, United lization: tion, 1st	- Network interest of the state	ks and Trees visualization niques - Scar Periods: 9 acets into mu Periods: 9 - Workshee zation tool us To 2015. g and Explain Springer puble er Institute, U	- Geomet terplot man diple views ts - Workbe e cases: F otal Perio ing with Da ication, Ge	cric crix - Hyper cooks – inance- ds: 45 ata, South-	CO4	

* TE – Theory Exam, LE – Lab Exam

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COs/POs/PSOs Mapping

COs	.1.	Progra	m Out		Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	1	2	1	2	2	3	. 3	1	3
2	1	2	1	2	2	3	3	3	2
3	1	2	1	2	2	3	2	1	3
4	2	2	2	3	2	3	1	1	2
5	3	1	2	3	2	3	2	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	As may	Contin	uous As	s (CAM)	End		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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/	Comp	uter Science and Engineering	Flogran	nine. IVI.	Tech.			1	
Semester	II		Course	Catego	ry : PE	*En	d Semester	Exam Typ	e: TE
Course Code	P23C	SE206	Perio	ds / We	eek	Cred		aximum Ma	
Course Code	F230.	3E200	L	Т	Р	С	CAM	ESE	TM
Course Name	Malwa	are Analysis	3	-	-	3	40	60	100
					-	¥		-	
Prerequisite	No Pre	erequisite needed		-4				-1	-1
	On co	mpletion of the course, the stud	ents will b	e able 1	io.			BT Ma (Highest	
,	CO1	Understand basics of Malware					VAUVARIA I VANTA BURNA DE LA CONTRACTION DE LA C	K	
Course	CO2	Make use of Basic Analysis	1 1					K	3
Outcomes	Illustrate Static and Dynamic Analysis							K	3
	CO4 Apply Malware functionalities							K	1
	CO5 Illustrate Anti reverse Engineering							K	
UNIT-I Malware Basics Periods: 9									-
Seneral Aspect of	Comput	er infection program , Non Self Reprodent Malware Case Studies	ducing Malw	are, How	does V			menclature	, co
		ınalysis			1	Periods	. 9		
		sassembly, Hashing, Finding Strings,	Packed Mal	ware, PE	File Fo			& Functions	CO
PE Header File &	Section					,			
		ed Static and Dynamic Analysis				Periods			
		C code constructs, Analyzing ma		ndows	progran	n, Debug	ging, OllyD	bg, Kerne	
		, Malware Focused Network Signa	tures						CO3
		e Functionalities				Periods	: 9		
		Malware Launch, Data Encoding, Shel	lcode Analys	sis					CO4
UNIT-V	Anti-Re	verse Engineering				Periods	9		
			s. Packers	and Unp	acking				COS
\nti-Disassembly,		ougging, Anti-virtual machine technique							
nti-Disassembly, Lecture Period		Tutorial Periods: -	Practica		ds: -		Total Perio	ods: 45	
Anti-Disassembly, Lecture Period Text Books	ls: 45	Tutorial Periods: -	Practica	l Perio	***************************************		200 d V had V d Wassers Is had as h. V to 11 place of 200 left		
Anti-Disassembly, Lecture Period Text Books . Michael Sikorski . Monnappa K A " Malware" 2018 . Alexey Kleymen Goffware, APT, Cyl	is: 45 i, Andrev Learning ov and A bercrime		Practica The Hands-Cepts, Tools, a	I Perio On Guide and Tech	to Diss	to Analyze	cious Softwar and Investiga	re", 2012 ate Window	
Anti-Disassembly, Lecture Period Fext Books . Michael Sikorski . Monnappa K A " Malware" 2018 . Alexey Kleymen Goftware, APT, Cyl Reference Book	is: 45 i, Andrev Learning ov and A bercrime	Tutorial Periods: - y Honig, "Practical Malware Analysis: 7 g Malware Analysis: Explore the Conce mr Thabet," Mastering Malware Analy e, and IoT Attacks",2019	Practica The Hands-Cepts, Tools, a sis: The Cor	I Perio On Guide and Tech	to Dissaniques	to Analyze Analyst's G	cious Softwar and Investiga uide to Comb	re", 2012 ate Window pating Malic	
Anti-Disassembly, Lecture Period Text Books . Michael Sikorski . Monnappa K A " Malware" 2018 . Alexey Kleymen Software, APT, Cyl Reference Book . Dylan Barker, "N . Abhijit Mohanta . Michael Ligh, Bla ighting Malicious . Victor Marak, "W . Mihai Christodor	is: 45 i, Andrev Learning ov and A berorime s Malware and Ano alware ake Hart Code"20 indows M	Tutorial Periods: - w Honig, "Practical Malware Analysis: To Malware Analysis: Explore the Concession of The Concession of Tablet," Mastering Malware Analysis, and IoT Attacks",2019 Analysis Techniques: Tricks for the tria op Saldanha, "Malware Analysis and Express, 2020 stein, Steven Adair, Matthew Richard,	Practica The Hands-Cepts, Tools, a sis: The Cor ge of advers Detection En	on Guide and Tech inplete M sarial sof gineering	to Dissiniques dalware Atware", I	to Analyze Analyst's G Packt Publ nprehensiv k and DVD	cious Softwar and Investiga suide to Comb shing, Limite e Approach t	re", 2012 ate Window pating Malic d, 2021. o Detect an	d for
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Lecture Period Ext Books Michael Sikorski Monnappa K A "falware" 2018 Alexey Kleymen oftware, APT, Cyl Reference Book Dylan Barker, "N Abhijit Mohanta nalyze Modern M Michael Ligh, Bla ighting Malicious Victor Marak, "Wi Mihai Christodor Ideb References	is: 45 i, Andreve Learning ov and Abercrime is Malware Aand Ano alware Tode 20 indows Nescu, Sc	Tutorial Periods: - W Honig, "Practical Malware Analysis: To Malware Analysis: Explore the Concessor Thabet," Mastering Malware Analysis, and IoT Attacks",2019 Analysis Techniques: Tricks for the tria op Saldanha, "Malware Analysis and Express, 2020 stein, Steven Adair, Matthew Richard, 10 Malware Analysis Essentials", 2015 omesh Jha, Douglas Maughan, Dawn Stephen Malware Analysis Essentials", 2015 omesh Jha, Douglas Maughan, Dawn Stephen Malware Analysis Essentials", 2015	Practica The Hands-Cepts, Tools, a sis: The Cor ge of advers Detection En	on Guide and Tech inplete M sarial sof gineering	to Dissiniques dalware Atware", I	to Analyze Analyst's G Packt Publ nprehensiv k and DVD	cious Softwar and Investiga suide to Comb shing, Limite e Approach t	re", 2012 ate Window pating Malic d, 2021. o Detect an	d for
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Anti-Disassembly, Lecture Period Fext Books Michael Sikorski Monnappa K A "Malware" 2018 Alexey Kleymen Software, APT, Cyl Reference Book Dylan Barker, "N Abhijit Mohanta Malyze Modern M Michael Ligh, Bla ighting Malicious Victor Marak, "W Mihai Christodor Media, 2007. Web References http://www.malwan http://resources.in http://www.remux.	is: 45 i, Andrev Learning ov and A bercrime is Allware A and Ano alware A ake Hart Code"20 indows N escu, So re-analyz fosecins org	Tutorial Periods: - W Honig, "Practical Malware Analysis: To Malware Analysis: Explore the Concessor That t	Practica The Hands-Cepts, Tools, a sis: The Cor ge of advers Detection En "Malware Ar Gong, Cliff W	I Perio On Guide and Tech mplete M sarial sof gineering nalyst's C	to Dissiniques dalware Atware", I	to Analyze Analyst's G Packt Publ nprehensiv k and DVD	cious Softwar and Investiga suide to Comb shing, Limite e Approach t	re", 2012 ate Window pating Malic d, 2021. o Detect an	d for
Lecture Period Ext Books Michael Sikorski Monnappa K A "Malware" 2018 Alexey Kleymen oftware, APT, Cyl Reference Book Dylan Barker, "N Abhijit Mohanta nalyze Modern M Michael Ligh, Bla ighting Malicious Victor Marak,"Wi Mihai Christodor ledia, 2007. Web References http://www.malwan http://resources.in http://www.remux. https://www.youtul	is: 45 i, Andrev Learning ov and A bercrime is Alware A and Ano alware A ake Hart Code"20 indows N escu, So re-analyz fosecins org be.com/N	Tutorial Periods: - W Honig, "Practical Malware Analysis: To Malware Analysis: Explore the Concessor That t	Practica The Hands-Cepts, Tools, a sis: The Cor ge of advers Detection En "Malware Ar Gong, Cliff Wa amic-technic	In Perion On Guide and Technology of the Month of the Mon	to Dissiniques dalware /	to Analyze Analyst's G Packt Publ nprehensiv k and DVD Detection",	cious Softwar and Investiga suide to Comb shing, Limite e Approach t c: Tools and T	re", 2012 ate Window pating Malic d, 2021. o Detect an	d for

COs	11-16	Progra	m Out	comes		Program Specific Outcomes (PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	1	2	1	2	2	3	3	1	3
2	1	2	1	2	2	3	3	3	2
3	1	2	1	2	2	3	2	1	3
4	2	2	2	3	2	3	1	1	2
5	3	1	2	3	2	3	2	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

1		Contin	uous As	End	T		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	Com	puter S	cience and Engineering	Prograi	mme: M.	Tech.				
Semester	II				Catego		*End S	emester E	xam Type	· TF
Course Code	D23C	SEC02			ods / We		Credit		ximum Ma	
Course oode	1 250	OLOUZ		L	Т	Р	С	CAM	ESE	TM
Course Name	Soft	Compu	ting	3		-	3	40	60	100
Prerequisite	No Pr	ereguis	ite needed		<u> </u>					
Trerequisite			on of the course, the stude	nto will b	a abla 4					
	On co	ompieu	on or the course, the stude	ants will t	e abie t	0			BT Ma	
Course	CO1	Apply for sol	neural networks, bidirectional as ving different engineering probl	sociative m	emories	and ada	ptive resonan	cetheory	K2	
Outcomes	CO2		and describe soft computing to		ind build	supervis	ed learning a	nd	K3	······
		unsup	ervised learning networks				nam la			
	CO3	engine	fuzzy logic and reasoning to har eringproblems.				ious		K2	2
	CO4	Apply g	enetic algorithms to combinator	ial optimiza	tion probl	ems.		***************************************	K2	?
	CO5	Evalua	te and compare solutions by va	rious soft co	omputing	approac	hes for a give	n problem	K3	
UNIT-I		luction	to Soft Computing	a i maya			Periods: 9		.1	
Soft computing vs. basics of machine	hard co learning	mputing g.	, evolution of soft computing, fea	tures and ty	pes of so	ftcompu	ting, applicati	ons of soft	computing,	CO1
UNIT-II	Neura	I Netwo	orks and Back Propagations, Model of Artificial Neuron, Ne	Networks			Periods: 9			ļ
UNIT-III Auto correlators, h Character Recogni	Association	iative I	etwork architectures, Application rameter selection, Variations of Memory Networks s: Kosko's discrete Bi-direction	Back propa	gation Al	gorithms	Periods: 9	***************************************		
UNIT-IV	Unsup	pervise	d Learning: Adaptive Res	onance T	heory		Periods: 9	***************************************	***************************************	***************************************
Adaptive Resonand ART1 and ART2 m	ce Theo odel, R	ry (ART) elated A), Classical ART Networks, Simplications	plifies ART	Architect	ure, Fea	tures, algorith	nms and Illu	ustration of	CO4
UNIT-V	Fuzzy	Sets a	nd Fuzzy Relations				Periods: 9	***************************************	I	
Fuzzy versus Crisp Fuzzy relations – F	, Crisp s uzzv Ca	Sets, Fu artesian	zzy sets, Membership functions, product, Operations of Fuzzy R	fuzzy set o	perations	s, proper	ties of Fuzzy	sets, Crisp	Relations,	CO5
Lecture Period			Tutorial Periods: -	Practica	l Perioc	ls: -	To	tal Period	de: 45	
Text Books								tur i criot	43. 70	
2. Timothy J. Ross, 3. S.N. Sivanandam Reference Book	"Fuzzy 1& S.N.	2017 Logic wi Deepa, '	shmiPai, "Neural Networks, Fuz th Engineering Applications", Jo 'Principles of Soft Computing", \	hn Wiley ar Viley Public	nd Sons, ations, 3	3 rd ed, 20 ^d ed,201	011. 3.	Markettan and a state of the st		W-1-11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-
and machine in	itelligen	ce" Pea	-Tsai Sun, and EijiMizutani. "Ne rson, 1997.							
			d Fuzzy Systems: A Dynamical Fuzzy Logic: Theory and Applica				ne Intelligence	e, PHI Pub	lication, 19	94.
			telligence, McGraw Hill Education			2010	V40-141111111111111111111111111111111111			
. Haykin, "Neural	Networ	ks and L	earning Machines", Pearson Ed	lucation Inc	., 3 rd Ed 2	2008.		***************************************	***************************************	
Veb References										
https://www.inc	ludehel	p.com/so		plications-a	and-techr	niques/			***************************************	
https://nptel.ac.	in/cours	ses/1061								
* TF ~ Theo			n?v=a63JT0OFeys							

* TE – Theory Exam, LE – Lab Exam

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COs	n k - 1	Progra	m Out)	Program Specific Outcomes (PSOs)				
1	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	
1	1	2	1	2	2	3	3	1	3
2	1	2	1	2	2	3	3	3	2
3	1	2	1	2	2	3	2	1	3
4	2	2	2	3	2	3	- 1	1	2
5	3 .	1	2	3	2	3	2	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

1		Contin	uous As	s (CAM)	End		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	10		15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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* TE – Theory Exam, LE – Lab Exam

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COs	ing Total	Progra	m Out	comes	(POs)		Program Specific Outcomes (PSOs)			
	P01	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	3	3	2	1				1	3	
2	3	3	2	1			-	1	3	
3	3	3	2	1			_	1	3	
4	3	3	2	1		7 mil (1)	Paras.	11	3	
5	3	3	2	1			· •	1	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department	Com	puter Sc	ience and Engineering	Program	nme: M	l.Tech.			F 62 - X-	
Semester	II			Course	Catego	ry : PE	*End	Semester	Exam Ty	pe: TE
Course Code	Dago	SE207		Perio	ds / W	eek	Credit	Ma	ximum M	arks
Course Code	P230	3E207		L	Т	P	С	CAM	ESE	TM
Course Name	Smar	t Sensir	g for IOT	3	-	-	3	40	60	100
Prerequisite	Basic	s of sens	or and IoT		<u> </u>	<u> </u>			<u> </u>	
	On co	ompletio	n of the course, the stud	ents will b	e able	to		BT M (Highe		
Course	CO1 Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved									1
Outcome	CO2	Make use of IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, RF and sensing								
	CO3	Market	forecast for IoT devices with a	focus on se	ensors				K	2
	CO4	. K3								
	CO5	CO5 Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi								
UNIT-I	Intro	duction			aledř.	80	Periods: 9	R. H. L.	***************************************	
Internet of Things	s Promi	ses-Defir	ition– Scope–Sensors for IoT	Application	s–Struct	ure of IoT	– IoT Map D	evice	V44-64-0-64-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0	CO1
UNIT-II	Seve	n Genera	ations of IOT Sensors to	Appear	t, i =	e e	Periods: 9	i etet et f		
Description & C	haractei Sensors	ristics-Int	& Characteristics–First Gener egrated IoT Sensors – Desc – Description & Characteris	ription & C	naracter	istics-Po	lytronics Sys	stems - De	escription	
UNIT-III	Techi	nologica	l Analysis		0-00-100-110011		Periods: 9)		
Wireless Sensor	Structu	re-Energy	Storage Module-Power Man	agement M	odule-R	F Module	-Sensing M	odule		CO3
UNIT-IV	IOT D	evelopn	nent Examples				Periods: 9)		
ACOEM Eagle –	EnOcea	an Push E	utton – NEST Sensor – Ninja	Blocks -Foo	us on V	Vearable	Electronics			CO4
UNIT-V	IOT P	rojects					Periods: 9			
the hardware- Int sensor data - Cro values - Parsing t Pi - Interfacing th	ternal re eating the sensor of he hard	epresenta ne actuato data - Cal ware - Cr	aring Raspberry Pi - Clayster tion of sensor values - Persis or project- Hardware - Interfac culating control states - Creatin eating persistent default setti Initializing the camera	ting data - I cing the har ng a camera	External dware - ı - Hardv	represen Creating vare -Acc	tation of ser a controller essing the s	isor values - Represen erial port or	- Exporting ting senso Raspberr	CO5
Lecture Period			Tutorial Periods: -	Practica	al Perio	ds: -	T	otal Perio	ds: 45	
ext Books	***************************************								.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
1. Dr. Guillau	ume Gii	rardin . A	ntoine Bonnabel, Dr. Eric M	ounier, 'Teo	hnologi	es & Sei	nsors for the	Internet of	f Things	

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- OvidiuVermesan Peter Friess, Internet of Things From Research and Innovation to Market Deployment', River Publishers, 2014

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- 1. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014
- 2. Charalampos Doukas, "Building Internet of Things with the Arduino", Create space Publishers, 2012.
- 3. Donald Norris, "The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and Beagle Bone Black", Mc.Graw Hill, First Edition, 2015.
- 4. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Thing – Introduction to a New Age of Intelligence", Elsevier, 2014.
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- 4. https://www.i-scoop.eu/internet-of-things-guide/edge-computing-iot
- 5. https://www.techtarget.com/iotagenda/definition/smart-sensor
 - * TE Theory Exam, LE Lab Exam

11

COs/POs/PSOs Mapping

COs		Progra	m Out	comes	(POs)			ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	2	-	-	1	-	1	1	1
2	2	2	2	3	2		1	2	1
3	1	1	2	2	-	-	1	2	1
4	1	1	-	3	2		. 1	2	1
5	3	2	2	2	2	3	1	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

LD

Department	Computer Science and Engineering Programme: M.Tech.									
Semester	11	eat roga ear	Course Category : PE *End Semes					ter Exam Type: TE		
Course Code	P23C	SEC03	Perio	ds / W	eek	Credit	Ma	ximum Ma	arks	
Course code	1 200	27-1	L	T	P	С	CAM	ESE	TM	
Course Name	Text,	Web and Social Media Analytics	3		-	3	40	60	100	
Prerequisite			L	L	<u> </u>			<u> </u>	<u> </u>	
-	On co	empletion of the course, the stude	nts will b	e able	to			BT Ma (Highest		
	CO1	Understand Text Mining						K	2	
Course	CO2	D2 Illustrate Web Mining K3								
Outcomes	CO3	Make use of Social Network Analysis						K	2	
A	CO4	Exploit Social Media Mining				1 6		K	3	
	CO5	Make use of Sentimental Mining						K	3	
UNIT-I		luction to Text Mining				Periods: 9				
		nization, stemming, stop words, TF-IDF tion, Topic Modeling-LDA,HDP	, Feature V	ector R	epresenta	ation, NER, N	N-gram mo	deling. Tex	t CO1	
UNIT-II		uction to Web-Mining an queries. PLSI, Query optimization, pa	lest to 1			Periods: 9				
Patterns, Predictio UNIT-III Social Network Pe of Networks: One-	ns base Funda rspective Mode, T	aluation, Session & visitor Analysis, Visid on web user transactions. Immentals of Social Network Analyse, Fundamentals concepts in Network Awo-Mode, Affiliation, Ego-centered and Social Network Data: Graphs, Directed, Si	s is nalysis: So Special Dy	ciogram adic Net	, Sociome	Periods: 9 etry. Social Network Data,	letwork Da Measurem	ta: Types	СОЗ	
UNIT-IV		Media Mining		<u>9</u> ,		Periods: 9			.l	
		a Network Essentials of Social graphs, s, Influence and Homophily, Recommen				formation Dif	fusion in S	ocial	CO4	
UNIT-V	Sentin	nental Mining				Periods: 9				
Sentiment classific	ation fea	ature based opinion mining, comparative	sentence	and rela	itional mir	ning, Opinion	spam		CO5	
Lecture Period	s: 45	Tutorial Periods: -	Practica	l Perio	ds: -	To	otal Perio	ds: 45		
2. Reza Zafarani, N B.Bing Liu, "Sentim Reference Book Nitin Indurkhya Matthew A.Ru: Veb References 1. https://machine	Iohamm nent Ana S a, Fred S ssell, "M S elearning	ing-Exploring Hyperlinks, Contents, and ad Ali Abbasi and Huan Liu, "Social Medlysis and Opinion Mining", Morgan & Clay Damerau, "Handbook of Natural Langulining the social web", 2nd edition- O'Reiggeek.com/text-analytics-for-beginners-	dia Mining - aypool Pub age Proce illy Media, 2 using-pytho	- An Intr lishers, ss", 2nd 2013.	oduction" 2012. Edition, (, Cambridge	University	Press, 201	4.	
 https://www.tu https://www.tu 	torialspo torialspo	ence.com/a-guide-text-analysis-text-anal pint.com/web_analytics/index.html pint.com/social_media_marketing/social_ n.com/web-analytics-guide-for-newbies-a	_media_ana	Ŭ,		747	· - 1			

* TE – Theory Exam, LE – Lab Exam

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COs/POs/PSOs Mapping

COs		Progra	m Out	comes	(POs)	Program Speci Outcomes (PSC				
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2			
1	2	2	-	-	1	-	1	1	1		
2	2	2	2	3	2		1	2	1		
3	1	1	2	2	-	-	1	2	1		
4	1	1	<u>V</u>	3	2		1	2	1		
5	3	2	2	2	2	3	1	2	1		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	5	Contin	uous As	s (CAM)	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks	
Marks	10		15	10	5	60	100	

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

1 %

Department	Comp	puter Sci	ence and Engineering	Progran	nme: M	.Tech.				
Semester	II			Course	Catego	ry : PE	*End	Semester E	xam Type	: TE
Course Code	P23C	SEC04		Perio	ds / W	eek	Credit	Ma	ximum Ma	arks
Course Code	1 230	3L004		L	T	P	С	CAM	ESE	TM
Course Name	Data Netw	_	Technologies and	3	-	-	3	40	60	100
Prerequisite						<u> </u>			<u> </u>	1
Trerequisite	On co	ompletion	n of the course, the stud	ents will b	e able	to			BT Ma	ppina
			, , , , , , , , , , , , , , , , , , , ,						(Highest	
	CO1	Understa	and the basic concepts of Sto	rage Techn	ologies.	(K2)			K	1
Course	CO2	Identify t	he Storage Items and its Ope	erations. (K2	!)				K	3
Outcomes	CO3	.,	and the Networked Storage li						K	4
CO4 Learn the concepts related to Information Availability. (K3)								K	3	
	CO5	Ability to	describe Storage Security a	nd Virtualiza	tion. (K3	3)			K	3
UNIT-I			o Storage Technology alue of data with time and us				Periods:		1	
/lanagement cond UNIT-II	ept - Da	ata Catego	riew of Storage Infrastructurization within an Enterprise STEMS ARCHITECTURE w - Contrast of integrated v	- Storage ar	nd Regul	lations.	Periods:	9		
subsystems - Disk RAID and parity a aching properties	c physic lgorithm s and al	al structur ns - hot sp lgorithms -	e components – properties - aring - Physical vs. logical di - Front end connectivity and of file systems with storage -	· performand isk organiza I queuing pr	e and s tion - pr operties	pecification a otection a - Front	ons - Logic and back e end to hos	al partitionir nd manager	ng of disks nent - Array	-
UNIT-III			STORAGE			····-	Periods:	9		
connectivity proto	cols (NF ples - se	FS, CIFS, ecurity and	nagement principles. Network FTP) and management principles. Cor ples.	nciples - IP	SAN el	ements - torage (C	Standards AS): eleme	iSCSI, FC	IP, iFCP)	
UNIT-IV			AVAILABILITY				Periods:		*******************	1
Disaster Recove omponent) - Indu thresholds, availa configuration char	ery prince stry mar bility, ca nge plan	ciples and nagement s apacity, se nning - Prol	covery Basics - Local busines techniques Managing and standards (SNMP, SMI-S, CII curity, performance) - Metric blem reporting - prioritization	Monitoring I M) - Standar Analysis Mo and handlin	Managei d framev ethodolo g techni	ment phil work appli ogies and ques.	osophies (cations - K Trend Ana	holistic vs. ey Managen alysis - Provi	system and nent Metrics	
			ORAGE AND STORAGE				Periods:			T
model and securi	ty exten	sions - De	itical security attributes for in fine storage security domains - Describe block-level and fil	s - List and a	nalyze t	he comm	on threats i	n each doma	red storage ain - Identify	COS
Lecture Period	ls: 45		Tutorial Periods: -	Practica	l Perio	ds: -		Total Perio	ds: 45	
2. EMC, Hopkinto Wiley, 2008.	on and M	Massachus	Storage Networks", Tata Mcg etts, "Information Storage an rks: The Complete Referenc	d Managem	ent Stor	-	aging, and	Protecting D	igital Inform	ation",
. Gerald J Kowals . Thejendra BS, " . Barb Goldworm, . Meeta Gupta, "S . John Chirillo, Sc	ski, Mark Disaster , Anne S Storage / cott Blau	r Recovery Skamarock Area Netw	ry, "Information Storage and & Business Continuity", Shro , "Blade Servers & Virtualizat ork Fundamentals", Pearson Security Protecting SANs, N	off Publisher tion", Wiley I Education L	s & Dist ndia. .imited, :	ributors, 2 2006.		entation", BS	Publication	ns, 200
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. https://www.igi-g . https://searchsto	global.co orage.teo	m/dictiona	ary/information-availability/14 om/definition/storage-virtualiz	353				-	***************************************	

* TE – Theory Exam, LE – Lab Exam

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COs	- 4	Progra	m Out	comes	(POs)).		ram Spe omes (P	
7	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	2	2	3	2	2	3	2	2
2	3	2	2	2	2	2	3	2	2
3	3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	_ 1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

2 %

Department	Com	puter Science and Engineering	Prograi	mme: M	.Tech.					
Semester	II		Course	Catego	ry : PE	*End	Semester	Exam Ty	pe: TI	
Course Code	P23C	SE208	Peri	ods / We	eek	Credit		ximum Ma		
	1 200		L	T	Р	C	CAM	ESE	TM	
Course Name	Rein	forcement Learning	3	-	-	3	40	60	100	
	,		1							
Prerequisite		erequisite needed								
	On co	ompletion of the course, the stu						BT Ma (Highest		
	CO1	Implement in-code common algorit	hms following	code sta	ndards a	nd libraries u	sed in RL	K3		
Course Outcomes	CO2	Understand and work with approxing	nate solutions					K1		
Outcomes	CO3		K3	3						
	CO4	value functions.								
	CO5	Understand and work with tabular n	nethods to sol	ve classi	cal contro	ol problems.		K3	}	
UNIT-I		orcement Learning Primitives			I	Periods: 9			***************************************	
-unction, Probabili	ty Dens	RL, Defining RL Framework, Probabi ity Function, CumulativeDistribution F hing, Logical Agents.	lity Basics: Pro unction and E	pbability expectation	Axioms,R on. Introd	andom Varia luction to Age	bles, Proba ents, Intellig	ability Mass Jent Agents	CO1	
UNIT-II	Marko	ov Decision Process and Dynan Chains, Markov Reward Process (M	nic Progran	nming	T	Periods: 9		***********************	I	
UNIT-III Monte Carlo: Pred	mming Monte iction, E	Iteration, ValueIteration), Asynchrono e Carlo Methods and Temporal estimation of Action Values, Control	Difference L	earning	g	Periods: 9	icy Control	Temporal		
Difference Prediction	on: I D(0), SARSA: On-Policy Tcontrol, Q-Lea	rning: Off-Poli	cy TD co	ntrol, Gar	nes, Aftersta	tes, and Otl	ner Special	CO3	
UNIT-IV	Deep	Reinforcement Learning		***************************************		Periods: 9				
a introduction to	Policy	Deep-Q Networks(DQN, DDQN, Du v-based Methods, Vanilla Policy G and Asynchronous Advantage Actor-	iradient. REIN	NFORCE	Algorith	m andStoch	astic Polic	v Search	CO4	
UNIT-V	Multi A	Agent in RL				Periods: 9				
Iulti-Agent Learnii roblems.	ng, Met	a-learning, Partially Observable Mar	kov Decision	Process	, Ethics i	inRL, Applyir	ng RL for F	Real-World	CO5	
Lecture Period	s: 45	Tutorial Periods: -	Practica	l Perio	ds: -	To	tal Perio	ds: 45	·	
ext Books Richard S. Suttor	and Ar	ndrew G. Barto, "Reinforcement learn eter Norvig. "Artificial intelligence: a m	ing: An Introd	uction". §	Second E	dition. MIT P	ress 2019			
Michael Wooldrid	ge, "An	Introduction to Multi Agent Systems"	, John Wiley, 2	2002.	AISOII LUI	Joanon Limit	u, 2010.			
eference Book	s		unuccumudatu-dhaanan o funicat		***************************************				**********	
Marco Wiering, M ALO, volume 12 Keng, Wah Loor Data & Analytics Francois Chollet, RagavVenkatesa	Martijn v , Spring , Graes Series "Deep l in, Baox	ser, Laura, "Foundations of Deep Re	ing, State-of-ti einforcement I ications. 2018	he-Art, A _earning:	daptation : Theory	and Practice				
leb References		(a i a f								
ips.//www.javaipo	1116.00111/	/reinforcement-learning n/tutorials/machine-learning-tutorial/re								

* TE - Theory Exam, LE - Lab Exam

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COs/POs/PSOs Mapping

COs		Progra	m Out	comes			ram Spo omes (P		
	P01	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	2		-	1	-	1	1	1
2	2	2	2	3	2	-	1	2	1
3	1	1	2	2	-	-	1	2	1
4	1	1	-	3	2	-	1	2	1
5	3 -	2	2	2	2	3	1	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

2 V

	00	ter Science and Engineering		nme: M							
Semester	11		Course	Catego	ry : PE	*End	Semester	Exam Ty	pe: TE		
Oarrag Cada	Daace	=200	Perio	ods / We	eek	Credit	Ma	ximum Ma	arks		
Course Code	P23CSI	E209	L	Т	P	С	CAM	ESE	TM		
Course Name	Mobile A	Application and Development	3	-	-	3	40	60	100		
Prerequisite	No Prer	equisite required		<u> </u>	<u> </u>				<u></u>		
Terequisite	1	ppletion of the course, the stude	ents will b	e able	to			BT Ma	ppina		
	011 0011	ipicalon of the obtained, the state						(Highest			
	CO1	Identify the requirements for mobile a	pplications	developr	nent.			K	2		
Course	CO2	Illustrate the challenges in mobile app	lication inte	rface an	d develo	oment.		K	3		
Outcomes	j	Extend the concept of web componer					pment.	K4			
	CO5										
UNIT-I		ation Foundation and Interfaces				Periods: 9)				
ntroduction to mo	bile applic	ations - Importance of mobile strategi	es - Cost o	f develor	oment – N	Nobile myths	- Market a	nd busines	s CO1		
Irivers for mobile - Mobile user ir	application	ns – Mobile web presence – Mobile ap esign – Understanding mobile app orms – Using the tools of mobile interf	oplications - lication use	 Benefit 	s of a mo	bile app – In	troduction t	 Interface 	S		
UNIT-II		omponents				Periods: 9	9				
Choosing a mobile	e web opti	on – Adaptive mobile websites – Ded	icated mobi	le websi	tes – Mol	ile web app	s with HTM	L5 – Desig	n CO2		
		ons – Advanced web service techniqu	ies for mob	ile device	es.	uriz nortanite	<u> </u>		<u> </u>		
UNIT-III		d Software Development	/			Periods: 9			7		
rerspective - Eclipting and Perspective - Ecliptical Perspective - Ecli	pse and A	droid - components of an Android App ndroid - Effective java for Android Bui	Iding a Vie	v - Fragr	nents an	d Multiplatfor	rm Support	Drawing	cos		
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						Pariods: 0	3		<u>.l</u>		
UNIT-IV	Platfor	m Integration	Common i	nteractio	ns – Offli	Periods: 9		- Debuggin	CO4		
UNIT-IV Development prac	Platfor	<mark>m Integration</mark> ndroid fundamentals – Android SDK –	Common i	nteractio	ns – Offli			- Debuggin	g CO4		
UNIT-IV Development prac OS apps – Objec UNIT-V	Platforatices – Arative - C ba	m Integration ndroid fundamentals – Android SDK – sics – iOS features. ation Development	321211122111111222V			ne storage -	- iossdk -		<u> </u>		
UNIT-IV Development practors apps – Objectors UNIT-V Jsing google ma	Platforactices – Aretive - C ba Applica ps – GPS	m Integration ndroid fundamentals – Android SDK – isics – iOS features. ation Development – Wi-Fi and WiMAX – Integration w	321211122111111222V			ne storage -	- iossdk -		d		
UNIT-IV Development practors apps – Objectors UNIT-V Using google mattorage – Mobile of	Platforictices – Arctive - C ba Applica ps – GPS commerce	m Integration ndroid fundamentals – Android SDK – isics – iOS features. ation Development – Wi-Fi and WiMAX – Integration w	321211122111111222V	nedia ap	plications	ne storage - Periods: 9 - Foldable	- iossdk -	Centralize	d		
UNIT-IV Development practors OS apps – Objector UNIT-V Jsing google magetorage – Mobile of Lecture Period	Platforictices – Arctive - C ba Applica ps – GPS commerce	m Integration ndroid fundamentals – Android SDK – isics – iOS features. ation Development – Wi-Fi and WiMAX – Integration w	ith social n	nedia ap	plications	ne storage - Periods: 9 - Foldable	- iOSSDK – <b>)</b> displays –	Centralize	<u> </u>		
UNIT-IV Development practors apps – Objection UNIT-V Jsing google manutorage – Mobile of Lecture Period Ext Books 1. Jeff McWherte 2. Charlie Collins, 3. James Dovey a	Platfornotices – Artive - C bat Application ps – GPS commerce ds: 45  er and Scott Michael Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Ash Fundal Cand Cand Cand Cand Cand Cand Cand Cand	m Integration ndroid fundamentals – Android SDK – isics – iOS features. ation Development – Wi-Fi and WiMAX – Integration w	Practic	nedia ap	plications  ods: -	Periods: 9 - Foldable	- iOSSDK – <b>)</b> displays –	Centralize	d		
UNIT-IV Development practors apps – Objective UNIT-V Using google may torage – Mobile of Lecture Period Ext Books 1. Jeff McWherte Charlie Collins, James Dovey are Reference Books	Platfornotices – Artive - C ba Applica ps – GPS commerce ds: 45  er and Scot Michael C and Ash Fu	m Integration Indroid fundamentals – Android SDK – Isics – iOS features. Integration Development  - Wi-Fi and WiMAX – Integration with the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec	Practice ation Devel in Practice s, 2012.	nedia ap al Perio opment", Dream	plications  ods: -  Wrox, 20 Tech, 20	Periods: 9 - Foldable 1012.	- iOSSDK – 9 displays – Fotal Perio	Centralize	d co		
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		Progra			(POs)	, i	Program Specific Outcomes (PSOs)			
COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	2	1	1	-	2	1	1	2	2	
2	2	1	1	2	2	1	1	2	2	
3	2	2	2	2	1	1	1	2	1	
4	2	3	1	_	-	1	1	2	1	
5	2	2	3	-	3	1	- 1	2	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

# **Evaluation Method**

	Contin	uous Ass	End	Total		
CAT 1	CAT 2	77.00	Assignment*	Attendance		Marks
- 1		15	10	5	60	100
			CAT CAT Model	CAT CAT Model Exam Assignment*	1 2 Exam	CAT CAT Model Exam Assignment* Attendance Examination (ESE) Marks

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

1 %

Course Code  Course Name  Prerequisite  Course Outcomes  () () () () () () () () () () () () ()	P23CSE210  Vireless Sensor Networks and IOT  No Prerequisite needed  On completion of the course, the stude  CO1 Understand basic sensor network conce  CO2 Know physical layer issues, understand  CO3 Comprehend network and transport layer  conventional protocols  CO4 Understand the network management a  CO5 Analyze Middleware and Security issues  undamentals of Sensor Networks  outer and wireless sensor networks and Overvice  sing and sensors-challenges and constraints-  faces- prototypes, Application of Wireless sensor  Communication Characteristics  Mechanisms  sion Technology and systems-Radio Technology  the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and the Synchronization Clock and Clock and Clock Clock and Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock Clock	Period L 3 ents will beepts and analyzer character and Middlew s ew of the s node archit sors- Introd And	ze Mediui ristics and vare servi yare servi yare servi yare servi yare servi yare servi yare servi yare servi yare servi yare servi	m Acced protocolices  Motivations of Tiny O	ss Control I cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important cols and important	Protocols plement  9 twork of Wirel processor su ming and TOS	BT Ma (Highest K1 K2 K3	pping Leve
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	MAC Layer	PHILOSOPPHICA (************************************			Periods:	0		l
	Mac Protocols-Characteristics of MAC proto	cole in So	neor not	hvorko			Destant	
Analysis of MAC pla JNIT-IV R Design Issues in W	-Access with signaling, Sensor MAC-Timeout ayer protocol in TinyOS. Routing in Wireless Sensor Networks ISN routing- Data Dissemination and Gathering fusion, Hierarchical Routing- LEACH, PEGA	g-Routing C	Challenge	es in W	<b>Periods:</b> SN - Floodin	9 ng-Flat Based	d Routing –	CO4
Seographical Base Protocols.Case stud	ed Routing- Transport layer- Transport pr dy-Implementation and analysis of Routing pro	otocol Des	sign issu	ues- P	erformance	of Transpo	ort Control	
	liddleware and Security Issues		ı		Periods:			***************************************
erformance and tra	orinciples-Middleware architecture-Existing mi affic management - Fundamentals of network tudy- Handling attacks in Tiny OS	ddleware - security-ch	operatin nallenges	g syste and at	ems for wir tacks - Pro	eless sensor tocols and me	networks- echanisms	CO5
ecture Periods:	45 Tutorial Periods: -	Practical	l Period	s: -		Total Period	ds: 45	
wireless Commun Kazem Sohraby, I Publications 2010 Bhaskar Krishnan	ie, Christian Poellabauer , "Fundamentals of W ication and Mobile Computing, 2011 Daniel manoli , "Wireless Sensor networks- Te 0. nachari , " Networking Wireless Sensors", Can	chnology, F	Protocols	and Ap	Theory and oplications",	Practice", Wil	ley Series	on
ference Books								
Jun Zheng, Abbas brahiem M. M. El E Robert Faludi," Buil A Swami," Wireles	Krishna M.Sivalingam, Taiebznati, "Wireless Jamalipour," Wireless Sensor Networks: A Ne Emary, S. Ramakrishnan,"Wireless Sensor Ne Iding Wireless Sensor Networks", O'Reilly Med s Sensor Networks - Signal Processing and C	tworking Pe tworks: Fro lia, Inc. 201	erspective m Theory IO.	e", Wile y to App	y-IEEE Pre plications", 2	ss 2009		
b References	1 8	A						
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* TE – Theory Exam, LE – Lab Exam

M.Tech. Computer Science and Engineering

2. A. 3. 175

COs		Progra	Se			Prog Outc	ram Spo omes (P	am Specific mes (PSOs)	
-	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	
1	2	2	-	-	1	-	1	1	1
2	2	2	2	3	2	1	.v. 11	2	-1
3	1	1	2	2	-	-	1	2	1
4	1	1	-	3	2	-	1	2	1
5	3	2	2	2	2	3	1	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

### **Evaluation Method**

		Contin	uous As	s (CAM)	End		
Assessment		CAT 2	Model Exam			Semester	Total Marks
Marks	1	^	4.5	10		(LOL) Warks	
Marks		U	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

J V

Department	Com	puter Sc	ience and Engineering	Progran	nme: M	.Tech.	·			
Semester				Course	Catego	ry : AC	*E	nd Semeste	er Exam Ty	pe: TE
Course Code	Ρ23Δ	CTX01		Perio	ds / W	eek	Cred	it M	aximum Ma	arks
				L	T	P	С	CAM	ESE	TM
Course Name	Engli	sh for R	esearch Paper Writing	2	-	-	-	100	-	100
	***************************************	***************************************		on to all M	Tech F	rogram	ime)	***************************************		
Prerequisite	No P	rerequis	te		***************************************					
		-	n of the course, the stude	-					BT Ma (Highes	
_	CO1	Understa	nd that how to improve your wr	iting skills	and leve	el of read	ability.		K	2
Course Outcomes	CO2	Learn ab	out what to write in each sectio	n.	***************************************			***********************	K	1
Outcomes	CO3	Understa	nd the skills needed when writi	ng a Title.			-	464-924891264000000000000000000000000000000000000	K	2
	CO4	Understa	nd the skills needed when writi	ng the Con	clusion.	***************************************		***************************************	K	2
	CO5	Ensure th	ne good quality of paper at very	first-time s	submissi	ion.		***************************************	K	3
UNIT-I	Introdu	uction to	Research Paper Writing				Periods	: 6		
Planning and Prep Removing Redund	aration, dancy, A	, Word Or voiding A	der, Breaking up long sentence mbiguity and Vagueness.	s, Structur	ing Para	agraphs a	and Sente	nces, Being (	Concise and	CO1
UNIT-II	Prese	ntation	Skills				Periods	: 6		.1
Clarifying Who Did Abstracts, Introduc	l What, ction.	Highlighti	ng Your Findings, Hedging and	Criticizing	, Paraph	rasing a	nd Plagiar	ism, Sections	of a Paper	CO2
UNIT-III	Title \	Writing S	Skills	***************************************			Periods	: 6	***************************************	.L
Key skills are need not not not not not not not not not not	ded whe needed	n writing when wri	a Title, key skills are needed wl ting a Review of the Literature,	hen writing Methods,	an Absi Results,	tract, key Discuss	skills are ion, Concl	needed whe usions, The I	n writing an Final Check.	CO3
UNIT-IV		lt Writing					Periods			
Discussion, skills a	are need	ded when	Methods, skills needed when wo writing the Conclusions.	riting the R	esults, s	skills are	needed w	hen writing th	ie	CO4
UNIT-V		cation S					Periods			
		Plagiarisn	n, how to ensure paper is as go	·			ne first- tin			CO5
Lecture Period			Tutorial Periods: -	Practica	al Perio	ds: -		Total Peri	ods: 30	
Reference Book			C B LB LA					***************************************		
. Day R, "How to b. Goldbort R, "Wr	Write ar iting for	nd Publish Science",	ting Research Papers", Springe n a Scientific Paper", Cambridge Yale University Press (Availab g for the Mathematical Sciences	e University le on Goog	y Press, gle Book	2006. s), 2006.		ondon, 2011.		

# **Evaluation Method**

Assessment	Cor	Continuous Assessment Marks (CAM)							
	Assignment 1	Assignment 2	Test 1	Test 2	Attendance				
Marks	20	20	25	25	10	-	100		



2. A.3. 178

Department	Compute	r Science and Engineering	Programme: M.Tech.							
Semester			Course Category : AC			*End Semester Exam Type: <b>TE</b>				
Course Code	P23ACTX	Periods / Week			Credit Maximum Marks			arks		
01W3 W6.WW4.WW4.WA WA.XA 46444 WANNESS ST.		L	T	P	С	CAM	ESE	TM		
Course Name	Disaster	2	-	-	-	100	-	100		
		(Comm	on to all M	Tech I	Program	me)				
Prerequisite										
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level		
	CO1 Ability to summarize basics of disaster.							K1		
	Ability to explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.							K2		
	CO3 Ability to illustrate disaster risk reduction and humanitarian responsifrom multiple perspectives.							K	К3	
	CO4 Ability to describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.						K3			
		ility to develop the strengths and weaknesses of disaster management approaches.						K3		
UNIT-I	Introduct					Periods: 6			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Difference, Nature	n, Factors ar e, Types and	d Significance; Difference between Magnitude.	Hazard An	d Disas	ter; Natui	al and Manma	ade Disast	ers:	CO1	
UNIT-II	Repercussions of Disasters and Hazards					Periods: 6				
Cyclones, Tsunam	nis, Floods, D	luman and Animal Life, Destruction Proughts and Famines, Landslides a and Spills, Outbreaks Of Disease A	ind Avalancl	nes, Ma	n-made d	lisaster: Nucle	nquakes, \ear Reacto	/olcanisms r Meltdown	CO2	
UNIT-III	Disaster Prone Areas in India					Periods: 6				
		Prone To Floods and Droughts, La e To Tsunami; Post-Disaster Disea				eas Prone To	Cyclonic a	and Coasta	CO3	
UNIT-IV	Disaster I				Periods: 6					
Preparedness: Mo Data from Meteoro	onitoring Of I ological And	Phenomena Triggering a Disaster Other Agencies, Media Reports: Go	or Hazard; overnmental	Evaluati and Co	ion of Ris	k: Application Preparednes	of Remots.	te Sensing	CO4	
UNIT-V	Risk Assessment Periods						**************************************		Limita	
Disaster Risk: Cor Assessment, Glob Burvival	ncept and Ele al Co-Opera	ements, Disaster Risk Reduction, C tion in Risk Assessment and Wari	Blobal and National People	lational e's Parti	Disaster icipation	Risk Situation in Risk Asses	n. Techniq sment. Str	ues of Risk rategies for	CO5	
Lecture Period	ls: 30	Tutorial Periods: -	Practica	I Perio	ds: -	To	tal Perio	ds: 30		
Reference Bool	(S							***************************************		
. NishithaRai, Sin	gh AK, "Disa	stration And Management Text And ester Management in India: Perspec ester Mitigation Experiences And Re	ctives, issue	s and st	trategies"	, New Royal b	ook Comp			

# **Evaluation Method**

	Conti	End					
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100

JV.

Department	Com	puter Sc	ience and Engineering	Progran	nme: M	.Tech.				
Semester				Course	Catego	ry : AC	*E	nd Semeste	r Exam Ty	pe: TE
Course Code	D23 V	CTX03		Perio	ds / W	eek	Credi	t Ma	aximum Ma	arks
Course Code	FZJA	10 1 X 0 3		L	Т	P	С	CAM	ESE	TM
Course Name	Sans	krit for T	ecnical Knowledge	2	-	-	-	100		100
			(Comm	on to all M	.Tech F	rogram	ıme)			
Prerequisite										
	On co	ompletio	n of the course, the stud	ents will b	e able	to		ą	BT Ma (Highes	
	CO1	Understa	nding basic Sanskrit language	9.					K	2
Course Outcomes	CO2	O2 Write sentences K2								
Odicomes	CO3	Know the order and roots of Sanskrit.								3
	CO4	Know abo	out technical information abou	ıt Sanskrit lit	erature			***************************************	К	3
	CO5	Understa	nd the technical concepts of E	Engineering.					K	2
UNIT-I	Alph	abets					Periods	: 6		
Alphabets in Sans	krit.									CO1
UNIT-II	Tens	es and S	entences				Periods	: 6		
Past/Present/Futu	re Tens	e - Simple	Sentences.							CO2
UNIT-III	Orde	r and Ro	ots				Periods	: 6	***************************************	
Order - Introductio	n of roc	ots of Engi	neering-Electrical, Mechanica	I, Architectu	re, Math	nematics	•			CO3
UNIT-IV	Sans	krit Liter	ature				Periods	: 6	***************************************	
Technical informat	tion abo	ut Sanskr	it Literature.							CO4
UNIT-V	Techi	nical Co	ncepts of Engineering				Periods	: 6	*************************	
rechnical concept	S									CO5
Lecture Period	ls: 30	-	Tutorial Periods: -	Practica	al Perio	ods: -		Total Peri	ods: 30	1
Reference Bool							L		*****************	***************************************
2. Prathama Deek	sha, Ve	mpati Kut	Samskrita-Bharti Publication, umbshastri, Rashtriya Sanskr ientific Tradition", Ocean bool	it Sansthana			self Sanski	rit", New Delh	i Publicatio	n.

	Conti	nuous Assess	ment N	/larks (	CAM)	End	e v
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100



M.Tech. Computer Science and Engineering

Department	Com	puter Sc	ience and Engineering	Prograr	nme: M	.Tech.					
Semester				Course	Catego	ory : AC	*End Se	emester Ex	cam Type:	TE	
Course Code	P23A	CTX04		Perio	ods / W	eek	Credit	Ma	ximum Ma	ırks	
Oddisc Odde	1 257	01704		L	T	Р	С	CAM	ESE	TM	
Course Name	Value	e Educat	ion	2	-	-	-	100	-	100	
			(Comm	on to all M	l.Tech F	rogram	me)		***************************************		
Prerequisite							***************************************		***************************************		
	On co	ompletic	on of the course, the stud	ents will b	e able	to	- U-VAN - VI., VI., IV. VII. VII. LVII VII. VII.		BT Ma (Highest		
_	CO1	Knowled	ge of self-development.						K	2	
Course Outcomes	CO2	Learn the	arn the importance of Human values.								
Outcomes	CO3	Developi	ng the overall personality.	•			***************************************	***************************************	K	3	
	CO4	CO4 Developing Character and Competence							K	3	
UNIT-I	Value	es and S	elf Development				Periods: 6	<b></b>		The section of the section of	
moral valuation. S control. Honesty,	tandard Studying	s and prir	······································				message. M	lind your M		CO1	
UNIT-II .	000 1000 0000	vation of					Periods: 6			T====	
			Sense of duty. Devotion, Self- National Unity. Patriotism. Lov				ntration. Tru	thfulness, C	leanliness.	CO2	
UNIT-III	Perso	nality D	evelopment				Periods: 6				
and Kindness. Av	oid fault	Thinking.	nent-Soul and Scientific attitud Free from anger, Dignity of la love for truth. Aware of self-de	bour. Unive	rsal brot	her hood	and religious	s tolerance.	True	СОЗ	
UNIT-IV	Chara	acter De	velopment				Periods: 6				
Character and Co Nonviolence, Hum	mpeten	ce-Holy b	ooks vs Blind faith. Self-mana	gement and	l Good h	ealth. Sc	ience of rein	carnation. I	Equality,	CO4	
Lecture Perio	ds: 30		Tutorial Periods: -	Practic	al Perio	ods: -	Ī	otal Perio	ds: 30		
Reference Boo	ks	P									
06-16	V "\/alı	oc and E	thics for organizations Theory	and practice	o" Ovfor	rd Univer	sity Proce N	ow Dolhi			

1	Conti	nuous Assess	CAM)	End			
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100



Department	Com	mputer Science and Engineering Programme: M.Tech.								
Semester				Course	Catego	ry : AC		emester Exa		
Course Code	DOOA	CTX05		Perio	ds / W	eek	Credit	t Max	kimum Ma	arks
Course Code	FZJA	CIXUS		L	T	Р	С	CAM	ESE	TM
Course Name	Cons	titution o		2	-	-	* *	100	-	100
			(Comm	on to all M	Tech F	Program	me)			
Prerequisite										
			n of the course, the stude					-	BT Mapp (Highest L	
Course	CO1	arrival of	ne growth of the demand for c Gandhi in Indian politics.						K	3
Outcomes	CO2	conceptua	ne intellectual origins of the fra alization of social reforms lead	ding to revol	ution in	India.			K	
	CO3	O3 Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections.								
	CO4	Discuss tl	ne passage of the Hindu Code	e Bill of 1956	3.				K3	
	CO5	Discuss th	ne administration and Election	commissio	n				K	3
UNIT-I	Histor	y of Maki	ng of The Indian Constitu	ution			Periods	: 6		
listory, Drafting C			osition & Working).							CO1
UNIT-II	Philo	sophy of	The Indian Constitution				Periods	: 6		
Preamble, Salient										CO2
UNIT-III	Cont	ours of C	onstitutional Rights and	Duties			Periods			
undamental Right ducational Rights	its, Righ s, Right	nt to Equal to Constit	ity, Right to Freedom, Right a utional Remedies, Directive P	gainst Explo rinciples of	oitation, State Po	Right to blicy, Fur	Freedom o idamental I	f Religion, Cul Duties.	tural and	CO3
UNIT-IV	Orga	ns of Go	vernance				Periods			
Parliament, Comp Ministers, Judiciar	osition, y, Appo	Qualificati intment ar	ons and Disqualifications, Pound Transfer of Judges, Qualific	wers and Fucations, Pov	inctions, ers and	Executi Functio	ve, Preside ns.	ent, Governor,	Council of	CO4
UNIT-V			stration and Election Con			-	Periods			
Municipal Corpora and role. Block le mportance of gra	tion. Pa vel: Or ss root	nchayati raj ganization democrat	and Importance, Municipalitie : Introduction, PRI: Zila Pacha al Hierarchy (Different depar by. Election Commission: Rol as for the welfare of SC/ST/OI	yat. Elected tments), Vil le and Fund 3C and won	l officials lage lev ctioning. nen.	and the el: Role Chief E	ir roles, CE of Elected	O Zila Pachay and Appoint mmissioner a	at: Position ed officials nd Election	n COS
Lecture Period			Tutorial Periods: -	Practica	al Perio	ods: -		Total Perio	ds: 30	
Reference Bool	KS									
2. Dr.S.N.Busi, Dr. 3. M.P. Jain, India 4. D.D. Basu, Intro	.B. R.Ai n Consi	mbedkar fr titution Lav to the Co	Bare Act), Government Publica aming of Indian Constitution, v, 7th Edition, Lexis Nexis, 20 Institution of India, Lexis Nexis ientific Tradition" Ocean book	1 st Edition, 14. s, 2015.		ni, 2017.				

Assessm	Con	tinuous Asses	AM)	End Semester Examination (ESE) Marks	Total Marks		
ent	Assignment 1	Assignmen t 2	Test 1	Test 2	Attendance		
Marks	20	20	25	25	10	-	100

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Department	Computer S	Science and Engineering	Progran	nme: M	.Tech.						
Semester			Course	Catego	ry : AC	*End S	emester Exa	ım Type:	TE		
Course Code	P23ACTX06		Perio	ds/We	eek	Credit	Max	ximum Ma	arks		
Course Code	PZSACIAU	)	L	Т	Р	С	CAM	ESE	TM		
Course Name	Pedagogy (	Studies	2	-	-	4.	100	-	100		
		(Comm	on to all M	.Tech F	rogram	me)		*******************************			
Prerequisite						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
	On comple	tion of the course, the stude	ents will b	e able	to			BT Ma			
	A A A AMbat	pedagogical practices are being u	rood by too	shore inf	formal an	d informal	classrooms in	(Highes			
Course		ping countries?	ised by lead	JIEIS IIII	Official aff	u illiolillai	Classi OUIIIS II	' N	2		
Outcomes	CO2 What i	s the evidence on the effectivene		pedago	gical pra	ctices, in w	hat	K	2		
	conditi	ons, and with what population of	learners?	um) and	the coh	nol ourrioul	um and	<del> </del>	^		
	CO3 How c	O3 How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?									
	CO4 Illustra	O4 Illustrate Professional development K3									
	CO5 Identify Research gaps and Future Directions								3		
UNIT-I	Introduction and Methodology Periods: 6										
Aims and rationale	e, Policy backg	round, Conceptual framework an	d terminolo	gy - The	ories of I	earning, C	urriculum, Tea	acher	CO1		
education - Conce	ptual framewo	rk, Research questions – Overvie	ew of metho	dology a	and Sear	ching.					
UNIT-II	Thematic O					Periods	N STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR				
Pedagogical pract Feacher education	ices are being n.	used by teachers in formal and in	ntormal clas	srooms	in develo	ping count	ries - Curricul	um,	CO2		
UNIT-III		n The Effectiveness of Peda				Periods					
oracticum) and the and nature of the	e school curricution of evidence	ge: quality assessment of include ulum and guidance materials bes be for effective pedagogical pract and Pedagogic strategies	t support eff	ective p	edagogy	? - Theory	of change - S	trength	CO3		
UNIT-IV		al Development			ľ	Periods	6				
Professional develoacher and the co	lopment: alignr ommunity - Cur	nent with classroom practices an riculum and assessment - Barrie	d follows up rs to learnin	suppor g: limite	t – Peer d resourc	support - S ces and lar	upport from tl ge class sizes	ne head s	CO4		
UNIT-V	Research G	Saps and Future Directions		***************************************	T	Periods	6		L		
		edagogy - Teacher education - C	urriculum a	nd asses	ssment -	Dissemina	tion and resea	arch	COS		
mpact.	1 20	Tutorial Periods: -	Practica	J Poric	.do:		Total Perio	de: 30	1000		
Lecture Period		Tutoriai Periods: -	Practice	ai Peric	)us		TOTAL PERIO	us. 30			
Reference Boo		oom interaction in Kenyan primar	v schools (	Compare	a". 31(2):	245- 261	2001.	3			
2. Agrawal M, "Cu 3. Akyeampong K London, DFID, 4. Akyeampong K preparation co	rricular reform , "Teacher train 2003. , Lussier K, Pry unt?". Internatio	in schools: The importance of eving in Ghana-does it count? Multon for J, Westbrook J, "Improving tectoral Journal Educational Develop dagogy: International compariso	aluation, Jo ti-site teach aching and oment, 33(3	urnal of er educa learning ): 272–2	Curriculuation rese of basic 282, 2013	m Studies arch proje maths and	r, 36(3):361-3 ct (MUSTER) reading in Af	country re			
. Chavan M, "Re	ad India: Amas	dagogy. International companisons s scale, rapid, 'learning to read' o urce%20working%20paper%202	campaign", 2	2003.				, 20011			

	Conti	nuous Assess	CAM)	End			
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100

J V

M.Tech. Computer Science and Engineering

	Com	Computer Science and Engineering Programme: M.Tech.								
Semester			Course	Catego	ory : AC	*End Ser	nester Ex	am Type:	TE	
Course Code	P23A	CTX07	Perio	ods / W	eek	Credit	Ma	ximum Ma	arks	
	1 207	1701	L	Т	Р	С	CAM	ESE	TM	
Course Name	Stres	s Management by Yoga	2	-	-	(**-	100	-	100	
		(Comi	mon to all M	I.Tech F	^o rogram	me)	***************************************	***************************************		
Prerequisite .										
	On c	ompletion of the course, the stud						BT Ma (Highest		
-	CO1	Develop healthy mind in a healthy boo	dy thus impro	ving so	cial health	n also		K	2	
Course Outcomes	CO2									
	CO3	CO3 Understand Asan and Pranayam								
	CO4	Apply Asanas				***************************************		K4	1	
	CO5	CO5 Apply Pranayam								
UNIT-I		duction				Periods: 6				
Definitions of Eig	ht parts of	of yoga. (Ashtanga).							CO1	
_	Samuel Market Control	, - g - (							COI	
		and Don't's in Life				Periods: 6			001	
UNIT-II	Do`s 1 - Do`s a	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast	heya, bramha	acharya	and apar			, astheya,		
UNIT-II Yam and Niyan	Do`s 1 - Do`s a and apari	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast	heya, bramha	acharya	and apar		insa, satya	, astheya,	CO2	
UNIT-II Yam and Niyam bramhacharya a UNIT-III asan and Prana	Do`s n - Do`s a and apari Asan yam - Va	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast graha. and Pranayam rious yoga poses and their benefits fo				igraha, ii) Ah	insa, satya		CO2	
UNIT-II Yam and Niyam bramhacharya a UNIT-III san and Prana ffects-Types of	Do`s n - Do`s a and apari Asan yam - Va pranayan	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast graha. and Pranayam rious yoga poses and their benefits fo				igraha, ii) Ah <b>Periods:</b> 6 on of breathi	insa, satya			
UNIT-II Yam and Niyam bramhacharya a UNIT-III san and Prana ffects-Types of UNIT-IV	Do`s n - Do`s a and apari Asan yam - Va pranayan Asan	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast graha. and Pranayam rious yoga poses and their benefits fo a. Practices				igraha, ii) Ah	insa, satya		CO2	
UNIT-II Yam and Niyam bramhacharya a UNIT-III san and Prana ffects-Types of	Do`s n - Do`s a and apari Asan yam - Va pranayan Asan	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast graha. and Pranayam rious yoga poses and their benefits fo a. Practices				igraha, ii) Ah <b>Periods:</b> 6 on of breathi	insa, satya		CO2	
UNIT-II Yam and Niyam bramhacharya a UNIT-III Isan and Prana ffects-Types of UNIT-IV Practice on Vario	Do`s a and apari Asan yam - Va pranayan Asan us yoga	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast graha. and Pranayam rious yoga poses and their benefits for a. Practices poses			gularizatio	igraha, ii) Ah <b>Periods:</b> 6 on of breathi	insa, satya		CO2	
UNIT-II Yam and Niyam bramhacharya a UNIT-III san and Prana ffects-Types of UNIT-IV	Do`s a and apari Asan yam - Va pranayan Asan us yoga	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast graha. and Pranayam rious yoga poses and their benefits for a. Practices poses			gularizatio	igraha, ii) Ah Periods: 6 n of breathii Periods: 6	insa, satya		CO2	
UNIT-II Yam and Niyam bramhacharya a UNIT-III Isan and Prana ffects-Types of UNIT-IV Practice on Vario	Do`s and apari Asan yam - Va pranayan Asan us yoga Prana	and Don't's in Life and Don't's in life - i) Ahinsa, satya, ast graha. and Pranayam rious yoga poses and their benefits for a. Practices poses		dy - Reg	gularizatio	igraha, ii) Ah Periods: 6 pn of breathii Periods: 6 Periods: 6	insa, satya	ues and its	CO2	

	Conti	nuous Assess	CAM)	End			
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	- f	100



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<b>Depart</b> ment	Computer Sc	ience and Engineering	ce and Engineering Programme: M.Tech.								
Semester			Course	Catego	ry : AC	*End S	emester Exa	am Type:	TE		
Course Code	P23ACTX08		Perio	ds/W	eek	Credit Ma:		ximum Marks			
	1 20/10 1/100		L	Т	Р	С	CAM	ESE	TM		
	Personality D Enlightenmen	evelopment through Life t Skills	2	-	-	, i -	100	-	100		
		(Commo	n to all M	Tech F	rogram	me)					
Prerequisite						***************************************	************************				
		on of the course, the stude						BT Ma (Highest			
Course	CO1 Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.										
Outcomes	prosperit							K1	I		
	CO3 Study of	Neet is hatakam will help in dev	eloping ve	rsatile p	ersonalit	y of studen	ts.	K3	3		
UNIT-I				***************************************		Periods:					
<b>Neetisa</b> takam-holi <b>26,28,63</b> ,65 (virtue	stic development e) - Verses- 52,53	of personality - Verses- 19,20,2 3,59 (dont's) - Verses- 71,73,75,	1,22 (wisd 78 (do's) 4	om) - V -Verses	erses- 29 18, 38,3	9,31,32 (pri 39 Chapter	de & heroism 18 – Verses3	) – Verses- 7,38,63.	CO1		
UNIT-II	90000000000000000000000000000000000000					Periods:	12	***************************************	.1		
Approach to day to 35 Chapter 6-Vers Chapter 3-Verses	es 5,13,17,23, 35	uties - Shrimad Bhagwad Geeta 5 - Chapter 18-Verses 45, 46, 48 er.	: Chapter 2 3.model – s	2-Verses hrimad	s 41, 47, bhagwa	48 - Chapte d geeta - C	er 3- Verses 1 hapter2- Vers	13, 21, 27, ses 17,	CO2		
UNIT-III			7			Periods:	12				
Statements of basi Personality of role	ic knowledge – S e.	hrimad Bhagwad Geeta: Chapte	er2-Verses	56, 62,	68 Chap	ter12 -Vers	ses 13, 14, 15	5, 16,17, 18	CO3		
Lecture Period	ls: 30	Tutorial Periods: -	Practica	l Perio	ds: -		Total Perio	ds: 30	l		
<b>Refere</b> nce Book	(S				***************************************	1	•••••••••••••••••	***************************************			
i. <mark>Gopina</mark> th, Rasht 2. <b>Swa</b> mi Swarupa	triya Sanskrit <mark>Sar</mark> Inanda, Srimad B	sthanam P, "Bhartrihari's Three hagavad Gita, Advaita Ashram,	Satakam, Publicatio	Niti-srir Depar	ngar- vaii tment, K	ragya", New olkata, 201	v Delhi,2010. 6				

	Conti	nuous Assess	ment N	larks (	CAM)	End	
Asse <b>ss</b> ment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100



Department	Comp	oute <b>r Sc</b>	ience and Engineering	Progran	nme: <b>N</b>	1.Tech.			***************************************	
Semester				Course	Catego	ory : AC	*End S	*End Semester Ex		TE
Course Code	P23A	CTX09		Perio	ds / W	eek	Credit	Ma	ximum Ma	arks
				L	Т	Р	С	CAM	ESE	TM
Course Name	Unna	t Bharat	h Abhiyan	2	-	-	100			
	•		(Commo	on to all M	Tech l	Program	me)			.4
<b>Prere</b> quisite										
		•	n of the course, the stude						BT Ma (Highest	
	CO1	Gain an ι	understanding of rural life, cultu	ire and soc	ial reali	ties			K	3
Course Outcomes	CO2	Develop	a sense of empathy and bonds	of mutualit	y with l	ocal com	nunity	************************	K [']	1
Outcomes	CO3	Apprecia	te significant contributions of lo	cal commu	nities to	Indian s	ociety and e	conomy	K	3
	CO4	Learn to value the local knowledge and wisdom of the community							K	3
	CO5	O5 Identify opportunities for contributing to community's socio-economic improvements.							К3	
UNIT-I	Appred	ciation o	f Rural Society				Periods:	6		
Rural life style, rur elaboration of "sou	al socie Il of Indi	ty, caste a a lies in v	and gender relations, rural valu illages' (Gandhi), rural infrastru	ies with res ucture.	pect to	communi	ty, nature ar	nd resources	,	CO1
UNIT-II	Unde	rstan <mark>din</mark>	g Rural Economy and Liv	elihood			Periods:	6		
Agriculture, farmi entrepreneurs, rur			nip, water management, ani	mal husba	indry,	non-farm	livelihoods	and artis	ans, rural	CO2
UNIT-III			TUTIONS				Periods:			
Traditional rural of Committees), local	organiza I civil so	ations, Se ciety, loca	elf-help Groups, Panchayati al administration.	raj instituti	ons (G	Gram Sat	ha, Gram	Panchayat,	Standing	CO3
UNIT-IV			LOPMENT PROGRAMME				Periods:			
			, current national programmes: S Yojana, Skill India, Gram Pan							CO4
UNIT-V			PRACTICAL ACTIVITIES				Periods:	•		
with local leaders,	Panch	ayat func	chh Bharat project sites, Condu tionaries, Visit Rural Schools Gram Sabha meetings, Visit loo	/ mid-day	meal co	entres, st	udy Acader	nic and infra	astructural	CO5
<b>Lectur</b> e Period	s:30		Tutorial Periods: -	Practica	l Perio	ods: -		Total Perio	ds: 30	N.
<b>Refere</b> nce Book										
<ol> <li>A Hand book on</li> <li>United Nations,</li> </ol>	Village "Sustair	Panchaya able Dev	t : Principles, Policies and Mar at Administration, Rajiv Gandh elopment Goals", 2015. tural Development", Shanlax P	i Chair for F	anchay					

	Conti	nuous Assess	ment N	larks (	CAM)	End	
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100



M.Tech. Computer Science and Engineering

# Annexure VI Computer Science Engineering (Big Data Analytics)

2. 4.3.196



## SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

(As per UGC - 2018 Regulations and Affiliated to Pondicherry University)

PUDUCHERRY - 605107

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M.TECH.

COMPUTER SCIENCE ENGINEERING (BIG DATA ANALYTICS)

(REGULATIONS - 2023)

**CURRICULUM AND SYLLABI** 



#### **COLLEGE VISION AND MISSION**

#### VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

#### MISSION

M1: Quality Education

: To provide comprehensive academic system that amalgamates

the cutting edge technologies with best practices.

M2: Research and Innovation : To foster value-based research and innovation in collaboration

with industries and institutions globally for creating

intellectuals with new avenues.

M3: Employability and

Entrepreneurship

: To inculcate the employability and entrepreneurial skills

through value and skill based training.

M4: Ethical Values

: To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth

of society.

#### **DEPARTMENT VISION AND MISSION**

#### VISION

To create a productive learning and research environment for graduates to become highly dynamic, competent, ethically responsible, professionally knowledgeable in the field of computer science and engineering to meet the industrial needs on par with global standards.

#### MISSION

M1: Quality Education: Empowering the students with the necessary technical skills through quality education to grow professionally.

M2: Innovative Research: Advocating the innovative research ideas by incorporating with industries for developing products and services.

M3: Placement and Entrepreneurship: Advancing the education by strengthening the Industry-academic relationship through hands-on training to seek placement in the top most industries or to develop a startups.

M4: Ethics and Social Responsibilities: Stimulating professional behaviour and good ethical values to improve the leadership skills and social responsibilities.

#### PROGRAMME OUTCOMES (POs)

#### PO1: Exploration of Research:

An ability to independently carry out research/investigation and development work to solve practical problems.

#### PO2: Technical Skill:

An ability to write and present a substantial technical report/document.

#### PO3: Expertise in Academics:

Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

#### PO4: Problem solving:

An ability to discriminate, analyzes, evaluate and synthesize the technologies to provide solution for multidimensional engineering problems.

#### PO5: Usage of Modern Tools:

Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations..

#### PO6: Ethical Practices and Social Responsibility:

Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

#### PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

**PEO1: Technical Knowledge**: To acquire a comprehensive knowledge in computer science engineering concepts and apply them for the investigation of real world problems.

**PEO2: Research and Development:** To prepare graduates who will demonstrate analytical, research, design and implementation skills offering techno-commercially feasible and socially acceptable solutions.

**PEO3:** Leadership: To prepare graduates who will demonstrate analytical, research, design and implementation skills offering techno-commercially feasible and socially acceptable solutions

**PEO4: Professional Behavior:** To deliver graduates to design and implement solutions for rapidly changing computing problems and information system environments to adapt innovation.

#### PROGRAM SPECIFIC OUTCOMES (PSOs)

**PSO1: Technical Knowledge in Computer Science and Engineering:** Graduates with the ability to apply basic knowledge of Computer Science in solving the critical problems.

**PSO2: Multidisciplinary Competency:** Ability to convert innovative ideas into research or society oriented projects through current trending technologies.

**PSO3: Employability:** Acquire placement in highly reputed industries or accomplish new technical business skills with the contemporary trends in the industry.

#### STRUCTURE FOR POST GRADUATE ENGINEERING PROGRAM

SI.No	Course Category	Breakdown of Credits
1	Humanities and Social Sciences (HS)	6
2	Basic Sciences (BS)	3
3 Engineering Sciences (ES)		-
4	Professional Core (PC)	25
5	Professional Electives (PE)	18
6	Open Electives (OE)	· · · · · · · · · · · · · · · · · · ·
7	Project Work and Internship (PA)	20
8	Ability Enhancement Courses (AEC)	a the second
9	Mandatory courses (MC)	
	Total	72

#### SCHEME OF CREDIT DISTRIBUTION - SUMMARY

SI.No	Course Category		Credits per Semester				
	- Canada Catagory	1	II	III	IV	Credits	
1	Humanities and Social Sciences (HS)	4	2	-	<del>  -</del>	6	
2	Basic Sciences(BS) 3					3	
3	Engineering Sciences (ES)					7 2	
4	Professional Core (PC)	11	14	-	-	25	
5	Professional Electives (PE)	3	6	9	-	18	
6	Open Electives (OE)	-	už		-	-	
7	Project Work and Internship(PA)			8	12	20	
8	Ability Enhancement Courses (AEC)*	-	-	-	-	-	
9	Mandatory Courses (MC)*	-	-	-	-	-	
	Total	21	22	17	12	72	

^{*} AEC, MC Credits are not included for CGPA calculation

#### **CURRICULUM**

4.30		SEM	ESTER - I				Bar (5.4)			
SI. No.	Course Code	Course Title	Category	P	erio		Credits		ax. Ma	rks
The			- anogory	L	T	P	Orcuits	CAM	ESM	Total
1	P23MAT104	Mathematical Foundations for Data Analytics	BS	3	0	0	3	40	60	100
2	P23BDT101	Big Data Acquisition	PC	3	0	0	3	40	60	100
3	P23BDT102	Exploratory Data Analysis	PC	3	0	0	3	40	60	100
4	P23BDT103	Big Data Frameworks	PC	3	0	0	3	40	60	100
5	P23HSTC01	Research Methodology and IPR	HS	2	0	0	2	40	60	100
6	P23BDE1XX	Professional Elective - I *	PE	3	0	0	3	40	60	100
Prac	tical									
7	P23BDP101	Big Data Computing Laboratory	PC	0	0	4	2	50	50	100
8	P23HSPC01	Technical Report Writing and Seminar	HS	0	0	4	2	100	-	100
Abili	ty Enhanceme	nt Course						profession in		A Sec.
9	P23CSC1XX	Certification Course-I #	AEC	0	0	4	_	100	- 1	100
10	P23ACT10X	Audit Course-I**	AEC	0	0	2	-	100		100
			11				21	590	410	1000

		SEM	ESTER - II						A SE	2000
SI.	Course	Course Title	Category	Р	erio	ds	Cradita	М	ax. Mai	rks
No.	Code	Couloc Title	Category	L	T	P	Credits	CAM	ESM	Total
The										4.3.30
1	P23BDT204	Mining Massive Data	PC	3	0	0	3	40	60	100
2	P23BDT205	Streaming Data Analytics	PC	3	0	0	3	40	60	100
3	P23BDT206	Big Data SQL with Hive	PC	3	0	0	3	40	60	100
4	P23BDTD01	No SQL Databases	PC	3	0	0	3	40	60	100
5	P23BDE2XX	Professional Elective - II*	PE	3	0	0	3	40	60	100
6	P23BDE2XX	Professional Elective - III*	PE	3	0	0	3	40	60	100
Prac	tical									
7	P23BDP202	Big Data SQL with Hive Laboratory	PC	0	0	4	2	50	50	100
8	P23HSPC02	Seminar on ICT a hands on approach	HS	0	0	4	2	100	- ;	100
Abili	ty Enhanceme	nt Course								
9	P23CSC2XX	Certification Course-II #	AEC	0	0	4	_	100		100
10	P23ACT20X	Audit Course-II**	AEC	0	0	2		100	-	100
		1 1 2					22	590	410	1000



		SEM	ESTER - III					and the second	- 6.3	
SI. No.	Course Code	Course Title	Category	Р	eric		Credits	Max. Marks		
The			3,	L	T	P	Orcuits	CAM	ESM	Total
THE	Jiy									
1	P23CSE3XX	Professional Elective – IV *	PE	3	0	0	3	40	60	100
2	P23CSE3XX	Professional Elective – V *	PE	3	0	0	3	40	60	100
3	P23CSE3XX	Professional Elective – VI *	PE	3	0	0	3	40	60	100
Proje	ect Work								- 00	
4	P23CSW301	Project Phase – I	PA	0	0	12	6	50	50	100
5	P23CSW302	Internship	PA	0	0	0	2	100	_	100
Abili	ty Enhanceme	nt Course			1 1	4				
6	P23CSC301	NPTEL/SWAYAM/MOOC	AEC	0	0	0 1		400		-
			ALC	U	U	0	-	100		100
						500	17	370	230	600

		No. 10	SEMESTER - I	V						
SI. Course No. Code		Course Title	Category		Periods		Credits	Max. Marks		
	ect Work	, , , , , , , , , , , , , , , , , , , ,		L	T	Р	Orcuits	CAM	ESM	Total
1	P23CSW403	Project Phase – II	PA	0	0	24	12	50	50	100
							12	50	50	100

* Professional Elective Courses are to be selected from the list given in Annexure I # Ability Enhancement Courses are to be selected from the list given in Annexure II

** Audit Courses are to be selected from the list given in Annexure III

**BS-Basic Sciences** 

PC - Professional Core

PE - Professional Elective

HS - Humanities and Social Sciences

PA - Professional Activity

CC- Common Course

AC- Audit Course

AEC - Ability Enhancement Course

#### **CREDIT DISTRIBUTION**

Semester	Ĭ	II	III	IV	Total
Credits	21	22	17	12	72

Total number of credits required to complete

M.Tech in Computer Science and Engineering : 72 credits

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#### ANNEXURE- I PROFESSIONAL ELECTIVE COURSES

SI. No.	Course Code	Course Title
Profe	ssional Elective	9-1
1	P23BDE101	Data Driven Decision Making
2	P23BDEC01	Neural Networks
3	P23BDE102	Multicore Architectures
4	P23CSTD01	Advanced Data Structures and Algorithms
5	P23BDE103	Machine Learning
Profes	ssional Elective	-11
1	P23CSEC01	Information Visualization
2	P23CSEC03	Text, Web and Social Media Analytics
3	P23CSTD02	Speech and Language Processing
4	P23BDEC02	Web Analytics and Development
5	P23BDE204	Expert System and Decision Making
Profes	sional Elective	_
1	P23BDE205	Information Retrieval
2	P23BDE206	Supply Chain Analytics
3	P23BDE207	Cryptography and Information Security
4	P23BDE208	Semantic Web and Knowledge Management
5	P23BDE209	Artificial Intelligence
Profes	sional Elective-	IV
1	P23BDE310	Optimization Techniques for Analytics
2	P23CSEC04	Data Storage Technologies and Networks
3	P23BDE311	Models of Computation
4	P23CSEC02	Soft Computing
5	P23BDE312	Deep Learning
Profes	sional Elective-	V
1	P23BDE313	Blockchain Technology
2	P23BDE314	Speech Recognition
3	P23ADEC01	Agile and Software Project Management
4	P23CSEC05	Game Design and Augmented Reality
5	P23CSEC06	Image and Video Analytics
Profess	ofessional Elective-VI	
1	P23BDE315	Graphs – Algorithms and Mining
2	P23BDE316	Real-Time Systems
3	P23BDE317	Social Network Analysis
4	P23BDEC03	Analytics of Things
5	P23BDE318	User Interface/ User Experience Design
( <del>-</del> 2)	-	

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### ANNEXURE- II ABILITY ENHANCEMENT COURSES

SI. No.	Course Code	Course Title
1	P23XXCX01	Adobe Photoshop
2	P23XXCX02	Adobe Animate
3	P23XXCX03	Adobe Dreamweaver
4	P23XXCX04	Adobe After Effects
5	P23XXCX05	Adobe Illustrator
6	P23XXCX06	Adobe InDesign
7	P23XXCX07	Autodesk AutoCAD -ACU
8	P23XXCX08	Autodesk Inventor – ACU
9	P23XXCX09	Autodesk Revit – ACU
10	P23XXCX10	Autodesk Fusion 360 – ACU
11	P23XXCX11	Autodesk 3ds Max – ACU
12	P23XXCX12	Autodesk Maya – ACU
13	P23XXCX13	Cloud Security Foundations
14	P23XXCX14	Cloud Computing Architecture
15	P23XXCX15	Cloud Foundation
16	P23XXCX16	Cloud Practitioner
17	P23XXCX17	Cloud Solution Architect
18	P23XXCX18	Data Engineering
19	P23XXCX19	Machine Learning Foundation
20	P23XXCX20	Robotic Process Automation / Medical Robotics
21	P23XXCX21	Advance Programming Using C
22	P23XXCX22	Advance Programming Using C ++
23	P23XXCX23	C Programming
24	P23XXCX24	C++ Programming
25	P23XXCX25	CCNP Enterprise: Advanced Routing
26	P23XXCX26	CCNP Enterprise: Core Networking
27	P23XXCX27	Cisco Certified Network Associate - Level 2
28	P23XXCX28	Cisco Certified Network Associate- Level 1
29	P23XXCX29	Cisco Certified Network Associate- Level 3
30	P23XXCX30	Fundamentals Of Internet of Things
31	P23XXCX31	Internet Of Things / Solar and Smart Energy System with IoT
32	P23XXCX32	Java Script Programming
33	P23XXCX33	NGD Linux Essentials

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34	P23XXCX34	NGD Linux I
35	P23XXCX35	NGD Linux II
36	P23XXCX36	Advance Java Programming
37	P23XXCX37	Android Programming / Android Medical App Development
38	P23XXCX38	Angular JS
39	P23XXCX39	Catia
40	P23XXCX40	Communication Skills for Business
41	P23XXCX41	Coral Draw
42	P23XXCX42	Data Science Using R
43	P23XXCX43	Digital Marketing
44	P23XXCX44	Embedded System Using C
45	P23XXCX45	Embedded System with IOT / Arduino
46	P23XXCX46	English For IT
47	P23XXCX47	Plaxis
48	P23XXCX48	Sketch Up
49	P23XXCX49	Financial Planning, Banking and Investment Management
50	P23XXCX50	Foundation Of Stock Market Investing
51	P23XXCX51	Machine Learning / Machine Learning for Medical Diagnosis
52	P23XXCX52	IOT Using Python
53	P23XXCX53	Creo (Modelling & Simulation)
54	P23XXCX54	Soft Skills, Verbal, Aptitude
55	P23XXCX55	Software Testing
56	P23XXCX56	MX-Road
57	P23XXCX57	CLO 3D
58	P23XXCX58	Solid works
59	P23XXCX59	Staad Pro
60	P23XXCX60	Total Station
61	P23XXCX61	Hydraulic Automation
62	P23XXCX62	Industrial Automation
63	P23XXCX63	Pneumatics Automation
64	P23XXCX64	Agile Methodologies
65	P23XXCX65	Block Chain
66	P23XXCX66	Devops
67	P23XXCX67	Artificial Intelligence
68	P23XXCX68	Cloud Computing
69	P23XXCX69	Computational Thinking



	-	
70	P23XXCX70	Cyber Security
71	P23XXCX71	Data Analytics
72	P23XXCX72	Databases
73	P23XXCX73	Java Programming
74	P23XXCX74	Networking
75	P23XXCX75	Python Programming
76	P23XXCX76	Web Application Development (HTML, CSS, JS)
77	P23XXCX77	Network Security
78	P23XXCX78	MATLAB
79	P23XXCX79	Azure Fundamentals
80	P23XXCX80	Azure Al (Al-900)
81	P23XXCX81	Azure Data (DP -900)
82	P23XXCX82	Microsoft 365 Fundamentals (SS-900)
83	P23XXCX83	Microsoft Security, Compliance and Identity (SC-900)
84	P23XXCX84	Microsoft Power Platform (Pl-900)
85	P23XXCX85	Microsoft Dynamics Fundamentals 365 – CRM
86	P23XXCX86	Microsoft Excel
87	P23XXCX87	Microsoft Excel Expert
88	P23XXCX88	Securities Market Foundation
89	P23XXCX89	Derivatives Equinity
90	P23XXCX90	Research Analyst
91	P23XXCX91	Portfolio Management Services
92	P23XXCX92	Cyber Security
93	P23XXCX93	Cloud Security
94	P23XXCX94	PMI – Ready
95	P23XXCX95	Tally – GST & TDS
96	P23XXCX96	Advance Tally
97	P23XXCX97	Associate Artist
98	P23XXCX98	Certified Unity Programming
99	P23XXCX99	VR Development

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#### ANNEXURE-III

#### **AUDIT COURSES**

(Common to all M.Tech Programme)

SI. No.	Course Code	Course Title
1	P23ACTX01	English for Research Paper Writing
2	P23ACTX02	Disaster Management
3	P23ACTX03	Sanskrit for Technical Knowledge
4	P23ACTX04	Value Education
5	P23ACTX05	Constitution of India
6	P23ACTX06	Pedagogy Studies
7	P23ACTX07	Stress Management by Yoga
8	P23ACTX08	Personality Development Through Life Enlightenment Skills
9	P23ACTX09	Unnat Bharat Abhiyan



2. A.3.210

Department		outer Sc Data Ana	ience Engineering alytics)	Progran	nme: <b>M</b>	.Tech.				
Semester	I			Course	Catego	ry : BS	*End	d Semester E	xam Type	e: TE
Course Code	D0014	A=464	-	····	ods / We		Cred	······································	ximum Ma	
Course Code	P23M	AT104		L	Т	Р	С	CAM	ESE	TM
Course Name	Mathe Analy		Foundations for Data	2	1	-	3	40	60	100
Prerequisite	Basic	Mathem	afics			<u> </u>				
			n of the course, the stud	lents will b	e able t	to			BT Ma	
	CO1	Basic kı	nowledge of matrix, set theory	y, functions a	and relati	ions conce	epts nee	ded for	(Highest	
Course Outcomes	CO2		ng and solving problems. and solve Boolean functions f	or defined pr	ohlems				K	
Gutoomoo	CO3					rao campl	oc in roo	l lifonrobleme		
	Type and some provided in the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s								K	
,	CO4 Concept of linear regression, correlation, and its applications  CO5 List the guidelines for designing experiments and recognize the key historical figuresin Design								K3	-
UNIT- I	of Experiments.  IT- I Matrix Algebra									
			g system of equations – Eige	n values and	d Eigenv		Periods ayley - ⊦		m -Inverse	CO1
UNIT- II	Mathe	matical	ogic				Periods	:9	271 27 1	<u> </u>
Propositions and I Basic laws - Some	ogical o more c	perators onnective	- Truth table - Propositions es - Functionally complete set	generated b	y a set es - Nor	- Equivale	ence and	implication		CO2
UNIT- III			oothesis			·····-	Periods	:9	***************************************	.I
			large samples –Tests based proportions — Contingency to					F test distributi	ons	CO3
UNIT- IV	Correl	ation ar	d regression			F	Periods	:9		L
Correlation –Rank - Coefficient of mul	correlat	tion– Req	gression –Multiple and partia - Coefficient of partial correlat	I correlation	– Metho	od of leas	st square	es –Plane of re	gression	CO4
UNIT- V			eriments			F	Periods	:9		L
•			two-way classifications - Co	mpletely ran	domized	design –	Random	ized block des	ign –Latin	COE
quare design - 2 ²		al design.	T	T B = 4:			I			CO5
Lecture Period	s: 3U		Tutorial Periods: 15	Practica	ii Perio	as: -		Total Period	ds: 45	
. David Makinson, . Grimaldi, R.P an	d Ramaı gineerin	na, B.V. '	Maths for Computing", Sprin 'Discrete and Combinatorial Matics", A Programmed Appro	<b>Mathematics</b>	", Pearso	on Educati	ion, Fifth	Edition, 2006.		
. Kenneth H. Rose . Sengadir, T. "Dis . Trembley, J.P. a Delhi, 2007. . Venkataraman, N	en, "Disc crete Ma nd Mano I.K., "En u, "Engi	athemation har, R, " ngineering	nematics and Its Applications and Combinatorics" Pearson Discrete Mathematical Structing Mathematics", Volume-II, Northematics - I", Meenakshi p	on Educatior ures with Ap ational Publi	n, New Diplications shing Co	elhi, 2009 s to Comp ompany, S	uter Scie econd E		Graw Hill, I	New
. https://sites.math . https://csd.cs.cm . https://www.cours	.northwe u.edu/co sera.org itb.ac.in/	ourse-pro /learn/ma /~supratil	u/~mlerma/courses/cs310-05 files/15-151-Mathematical-Fo athematics-for-computer-scien d/courses/cs719/index.html	oundations-fo	or-Compi	uter-Scien	ce			***************************************

* TE – Theory Exam, LE – Lab Exam

11

#### COs/POs/PSOs Mapping

COs			m Out	Program Specific Outcomes (PSOs)					
t .	PO1	PO2	PO3	PO4	PO5	PO6	PS01	PSO2	PSO3
1	2	1		-	-	1	1	2	1
2	3	2	1	1	-	1	2	2	1
3	3	2	1	1	-	1	2	2	1
4	3	2	1	1			2	2	1
5	3	2	1	1			2	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	End	la .		
Assessment		The second second	Model			Semester Examination	Total Marks
Marks	1	0	45			(ESE) Marks	interpretable t
	10		15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	-	uter Science Engineering ata Analytics)	Progra	mme: <b>M</b>	l.Tech.				
Semester	I		Course	Catego	ory : PC	*End Se	mester Ex	am Type:	TE
Cauras Cada	Daan	DT404		ods / W		Credit	······································	ximum Ma	
Course Code	P23B	DT101	L	Т	Р	С	CAM	ESE	TM
Course Name	Big D	ata Acquisition	3	-	-	3	40	60	100
Prerequisite	No Pre	erequisite needed			<u> </u>				1
	ļ	ompletion of the course, the stud	dents will k	e able	to		1	BT Ma	pping
								(Highest	
	CO1	Understand Big Data Acquisition						K	***************************************
Course Outcomes	CO2	Able to collect and store Big Data fro				K	4		
Outcomes	CO3	Make use of Pig Scripts- Extract, Tra	nsform and L	oad the	data on H	IDFS		K	
	CO4	Able to write Hive Scripts- Extract,	Transform,	_oad and	d Analyze	the data	,	K	3
		present in HDFS	-			12 21			3
	CO5	Able to extract and process semi and	un-structure	ed data u	ısing HBa			K4	1
UNIT- I		luction to Big Data Acquisition damental concepts of Big Data Manag				Periods:9			
equirements – Co	– Strate llection ( y) – Sp	Collection and Transmission egies – Types of Data Sources – Struc methods – Log files – sensors – Metho ecialized network monitoring software sues.	ds for acquiri	ng netwo	ork data (l	Libcap-based	and zero-c	opy packet	
UNIT- III		luction to Apache Pig			1. [	Periods:9			- <u>7</u> 8
nodel, Data Types Sorting, Splitting - n Batch Mode –U;	features s, Opera Built-In I se cases	<ul> <li>Pig Architecture - Pig Execution mo tors – Pig Latin Commands - Load &amp; S Functions, User define functions. Pig E s - Map Reduce programs with Pig – F</li> </ul>	tore , Diagno execution Mo	stic Ope	rators, Gr	commands. ouping, Cogr – Embedded	oup, Joinin	a. Filterina.	ce
UNIT- IV		and HiveQL				Periods:9		. 4	4.0
Altering database, Pig Vs Hive. HiveC By , Cluster By - S MapReduce exect	Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create to Create	s - Hive architecture -Hive Meta store table, alter table, Drop table, Built-In Fu duction, HiveQL Select, HiveQL – Map and Aggregation – Partitioning: Static & Hive Optimization – Setting Hivng Pal of Map Reduce programs with HiveQl	inctions - Bui Reduce usir & Dynamic parameters. Co	It- In Opo g HiveQ artitionin	erators, U L OrderB g – Index	ser defined for y Group By J Creation - B	unctions(UI loins, LIMIT ucketing –	DFs), View, , Distribute Analysis of	CO
UNIT- V		and its Features				Periods:9			i ju
pplications: Data	Masking	se, Concepts, Clients, Example, Hba g – Privately identified Information (PII) cial Media Analytics – Fraud Detection	- Privacy pre	DBMS, eservatio	Limitation	s of HBase	Big Data P r Big Data 1	rivacy And echniques	CO
Lecture Period		Tutorial Periods: -	Practic	al Perio	ods: -	To	otal Perio	ds: 45	- 5
ext Books			1						
<ol> <li>Philip Russom</li> <li>Kuan-Ching L</li> <li>Martin Atzmue</li> </ol>	i, Hai Jia eller and	White, and Ted Friedman, "Data Ware ang, and Albert Y. Zomaya, "Big Data: Andreas Hotho, "Big Data Analytics: F raph", Morgan Kaufmann, 1st edition,	Algorithms, A	Analytics	, and App	lications" CF	RC Press, 1	st edition, 2	013. 015.

4. Martin Kleppmann, "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and MaintainableSystems", O'ReillyMedia, 1st edition, 2017.

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- https://www.kaggle.com/
- 4. https://towardsdatascience.com/
  - * TE Theory Exam, LE Lab Exam

#### COs/POs/PSOs Mapping

COs		Progra	m Out	comes	(POs	)	Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	1	2	2	2	2	2	3	2	2	
2	2	2	2	1	2	2	3	2	2	
3	2	3	3	1	3	3	3	3	3	
4	2	3	3	1	3	3	3	3	3	
5	2	3	3	1	3	3	3	3	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	End				
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks	
Marks	10		15	10	5	60	100	

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

J &

Department	Management Same	uter ScienceEngineering ata Analytics)	Progran	nme: <b>N</b>	1.Tech.		Programme: M.Tech.								
Semester	I		Course	Catego	ory: <b>PC</b>	*End	Semester E	xam Type	e: TE						
Course Code	P23B	DT102	Perio	ods / W	/eek	Credi	······································	ximum Ma							
Oodise Oode	1 200	D1102	L	Т	Р	С	CAM	ESE	TM						
Course Name	Explo	oratory Data Analysis	3	-	-	3	40	60	100						
Prerequisite	No Pre	erequisite needed			<u> </u>										
0	On co	ompletion of the course, the st						BT Ma (Highest							
	CO1	Handle missing data in the real-wor	ld data sets by c	hoosing	g appropri	ate method	ls.	K							
Course Outcomes	CO2	Summarize the data using basic st		ze the c	data using	basic gra	ohs and plots.	K	3						
Outcomes	CO3	Identify the outliers if any in the dat						K	2						
	CO4	Choose appropriate feature selection	on and dimensio	onality re	eduction.			K	3						
	CO5	Apply Techniques for handling mult		lata.				K	3						
UNIT – I		uction To Exploratory Data An				Periods			8						
Data Types: Nur	nerical [	ry Data Analysis (EDA) - Data Analy Pata – Discrete data, continuous data ing EDA with classical and Bayesia	a - Categorical	data -	Measurer	nent Scale	in data explos: Nominal, O	oration- ordinal,	CO1						
UNIT – II		Transformation, Correlation A				Periods	9		.1						
	Analy					r.L									
Transformation	Techniq	ues: Performing data deduplication	n - replacing v	values	<ul><li>Discreti</li></ul>	zation and	l binning. Intro	oduction to	CO2						
analysis - biyaria	andling ite analv	missing data: Traditional methods sis - multivariate analysis. Time Ser	– Maxımum L ies Analysis (T	IKEIIHOO	od Estima Indament	tion. Type	s of analysis:	Univariate							
- Time based in	dexing -	visualizing time series – grouping tin	ico Alialysis (1	OA). I U	inuament	315 UI 1 3 A	- Characteris	ucs of 15A	Y						
		visualizing time series – grouping till	ne series data -	<ul><li>resample</li></ul>	olina time	series dat	a.		1						
UNIT – III		Summarization and Visualization		resam	oling time	series dat Periods:			<u> </u>						
UNIT – III Statistical summ	Data Sary mea		on ical data analy	sis, 2-D	) Statistic	Periods:	9	ency	CO3						
UNIT – III Statistical summ tables, n-D Statis UNIT – IV	Data S ary mea stical dat Cluste	Summarization and Visualization sures, data elaboration, 1-D Statist a analysis. Visualization: Scatter plo pring Algorithms and Dimension	on ical data analy ots – Dot charts onality Reduc	sis, 2-D - Bar p	Statistica lots.	Periods: al data An Periods:	9 alysis, conting 9		CO3						
UNIT – III  Statistical summ tables, n-D Statis UNIT – IV ntroduction to Special Statistering – Expecial Statistering. Princip	Data sary meastical date Cluste ectral clustestation-Wall Comparison	Summarization and Visualization sures, data elaboration, 1-D Statist a analysis. Visualization: Scatter plocering Algorithms and Dimension attering — Document clustering — Maximization algorithm — Hierarchical bonent Analysis (PCA) — Singular V	on ical data analy ots – Dot charts onality Reduc inimum Spanni Agglomerative /alue Decompo	sis, 2-D - Bar pl etion ing Tree model- osition -	Statistical lots. clustering based cluster A	Periods: al data An Periods: g. Overvie stering. O	9 alysis, conting 9 ew of Model- I	based	CO3						
UNIT – III  Statistical summ tables, n-D Statis UNIT – IV ntroduction to Special Statistering – Expecial Statistering. Princip	Data sary meastical data Clusto ectral clustation-Mal Compode: Mul	Summarization and Visualization sures, data elaboration, 1-D Statist a analysis. Visualization: Scatter ploering Algorithms and Dimensionstering — Document clustering — Maximization algorithm — Hierarchical	on ical data analy ots – Dot charts onality Reduc inimum Spanni Agglomerative /alue Decompo	sis, 2-D - Bar pl etion ing Tree model- osition -	O Statistica lots. e clusterin based clu - Factor A zing Map	Periods: al data An Periods: g. Overvie stering. O Analysis -l s.	9 alysis, conting 9 ew of Model- I utlier detection ntrinsic Dime	based	1 23						
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UNIT – III  Statistical summ tables, n-D Statist UNIT – IV  Introduction to Specustering – Expecustering Princip Non Linear method UNIT – V  Statistical summan analysis, continge Lecture Period Text Books  1. Suresh Kuman 2. Martinez, W. 2017  3. Foster Provo	Data S ary mea stical dat Cluste ectral clustation-M al Comp ods: Mul Model ry meas ncy table is: 45 ar Mukh , Martine st and T	Summarization and Visualization sures, data elaboration, 1-D Statist a analysis. Visualization: Scatter plotering Algorithms and Dimension stering – Document clustering – Maximization algorithm – Hierarchical bonent Analysis (PCA) – Singular Vitidimensional Scaling – Manifold Loudens, data elaboration, 1-D Statistices, n-D Statistical data analysis. Visualization	pical data analysis – Dot charts ponality Reduction inimum Spanni Agglomerative falue Decomponearning – Self- cal data analysis ualization: Scat  Practica  Practica  Oloratory Data A Analysis with M	sis, 2-D tion ing Tree model- position - Organia is, 2-D tter plots I Perio	Statistical lots.  c clustering based clusering Mapsing Mapsis s – Dot chods: -  s with Pyte, CRC Presented	Periods: al data An Periods: g. Overvie stering. O Analysis -I s. Periods: data larts -Bar I	9 elysis, conting 9 ew of Model- I utlier detection ntrinsic Dime 9 plots. Total Period	based n using nsionality.	CO4						
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Periods: data earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -B	9 elysis, conting 9 ew of Model- I utlier detection ntrinsic Dime 9 plots. Total Period	based n using nsionality.	CO5							
Statistical summ tables, n-D Statist CALL STATE CONTROLL STATE CALL  Data S ary meastical data Cluste ectral clustation-M al Composes: Mul Model ry meass ncy table is: 45 ar Mukh , Martine st and T s ou, "Expl garwal, "I gers, "App , "Data t, "Statis ataschoo atascam	Summarization and Visualization sures, data elaboration, 1-D Statist a analysis. Visualization: Scatter plotering Algorithms and Dimension stering — Document clustering — Maximization algorithm — Hierarchical bonent Analysis (PCA) — Singular Vitidimensional Scaling — Manifold Lot Development and Evaluation ures, data elaboration, 1-D Statistic es, n-D Statistical data analysis. Visualization Development and Evaluation ures, data elaboration, 1-D Statistical data analysis. Visualization Development and Evaluation ures, data elaboration, 1-D Statistical data analysis. Visualization Data Algorithms and Evaluation or Fawcett, "Data Science for Busin Data Mining The Text book", 2015, Solied Missing Data Analysis", 2010, 1: Visualization: A Practical Introduction stics Done Wrong", 1st Edition, 2015 of Lio/p.com/	ical data analysis – Dot charts  Dots – Dot charts  Dots – Dot charts  Dots – Dot charts  Dots – Dot charts  Dots – Dot charts  Dots – Dot charts  Agglomerative  Agglomerative  Agglomerative  Alue Decompose  earning – Self-  cal data analys  ualization: Scat  Practical  Doratory Data A  Analysis with M  ness", 1st Edition  is", 1991, 1st Edition  pringer.  st Edition, The Con"1st Edition, 2	sis, 2-D - Bar pi - tion ing Tree model- position - Organiz is, 2-D tter plots Analysis IATLAB on, 2013 dition, A Guilford	Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statistical Statis	Periods: al data An Periods: g. Overvie stering. O Analysis -l s. Periods: data earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -Bar earts -B	9 elysis, conting 9 ew of Model- I utlier detection ntrinsic Dime 9 plots. Total Period	based n using nsionality.	CO4							

1 1

#### Academic Curriculum and Syllabi R-2023

COs/POs/PSOs Mapping

COs		Progra	m Out	comes	(POs	)	Program Specific Outcomes (PSOs)			
	PO1	PO2	PO ₃	PO4	PO5	P06	PSO1	PSO2	PSO3	
1	2	2	2	2	1	1	1	3	3	
2	1	2	2	1	1	2	1	2	3	
3	2	1	3	2	1	2	1	3	1	
4	2	1	3	1	2	1	2	3	1	
5	2	1	3	2	1	2	2	2	1	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

571		Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	10		15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

JV

Department		outer Science Engineering Data Analytics)	Progran	nme : <b>I</b>	M.Tech.				74 74 75	
Semester	Ì	Course Category :PC *End Semester Periods/Week Credit Maxis L T P C CAM g Data Frameworks 3 0 0 3 40  assics of Big Data In completion of the course, the students will be able to  Discuss the challenges and their solutions in Big Data. Understand and work on Hadoop Framework and eco systems.  Analyze the Big Data using Map-reduce programming in both Hadoop and Spark framework. Demonstrate spark programming with different programming languages. Demonstrate the graph algorithms and live streaming data in Spark.  Introduction to Big Data Periods:9  Inalysis - Characteristics of Big Data - Big Data Analytics - Typical Analytical ement for new analytical architecture - Challenges in Big Data Analytics - Need of big dataframew adoop Ecosystem Into of Hadoop Framework - Design principle of Hadoop - Comparison with ot he system - Hadoop op 1 vs Hadoop 2 - Hadoop Daemon's - HDFS Commands Map Reduce Programming: I/O formats e Join, Secondary sorting, Pipelining Map Reduce jobs, Hadoop ecosystem technologies Serializatic Zookeeper, Databases: HBase, Hive, Scripting language: Pig, Streaming: Flink, Storm.								
Course Code	P23B	DT103					Max CAM 40 40  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gramework.  Gra	imumMar		
Course Code				7	<del>-</del>			ESE	TM	
Course Name	Big D	ata Frameworks	3	0	0			60	100	
Prerequisite	Basic	es of Big Data								
	On c	ompletion of the course, the stu	idents will b	e able	to		***************************************	BT Ma		
Course	CO1	Discuss the challenges and their solu	ıtions in Big Da	ita.				K		
Outcomes	CO2	Understand and work on Hadoop Fra	mework and e	co syste	ems.			K		
	CO3	Analyze the Big Data using Map-redu	uce programm	ing in b	oth Hado	op and Spark	framework.	K		
	CO4	Demonstrate spark programming with	h different prog	grammir	ng langua	ges.		K		
	CO5	Demonstrate the graph algorithms an	d live streamin	g data i	n Spark.			K		
UNIT- I						Periods:9				
Data Storage and	d Analy	rsis - Characteristics of Big Data – E	Big Data Analy	vtics - 1	Typical A			-	CO1	
Architecture – Rec	quireme	ent for new analytical architecture - Ch	nallenges in Big	g Data A	Analytics	<ul><li>Need of bid</li></ul>	ı dataframev	vorks		
UNIT- II	Hado	op Ecosystem			1182	Periods:9	P /		Face	
Hadoop – Require	ment o	f Hadoop Framework - Design principl	le of Hadoop –	Compa	rison with	ot he system	ı - Hadoop	***************************************	CO2	
Components – Ha side ioin, Reduce	doop 1 Side lo	vs Hadoop 2 – Hadoop Daemon's – F	HDFS Commar	nds Mar	Reduce	Programmin	g: I/O format	s Map	*1017000000	
AVRO. Co-ordinat	ion: Zo	okeeper. Databases: HBase Hive Sci	rinting language	Hadoop	ecosyste Streamin	em technolog	ies Serializa	tion:	M.	
UNIT- III		k Framework	iipiiiig iaiigaag	ic. i ig,	T	Periods:9				
Introduction to GP		puting, CUDA Programming Model, C	LIDA API. Simr	nle Matr			DA CUDAN		CO3	
Model, Shared Me	mory M	atrix Multiplication, Additional CUDA A	Pl Features-	oic iviati	ix, ividitip	ilcation in CO	DA, CODAIV	lemory	161	
Introduction to spa	rk, Spa	rk architecture and Components sema	intic web .				1		131)	
UNIT- IV		Analysis with Spark Shell				Periods:9			1	
Writing Spark App	lication	- Spark Programming in Scala, Pytho	n, R, Java - Ap	plicatio	n Executi	ion. SQL Con	text – Impor	tingand	CO4	
		s – using SQL – GraphX overview – C	reating Graph							
– Graph Algorithm UNIT- V		( Streaming				D:				
		n Operations in Spark, Spark Streami	ing Architecture	o Error	s and Pa	Periods:9	i C		7 3 4 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5	
Streaming live data	with s	park	ing Architecture	e, ∟⊓oi:	s and Rei	covery – Stre	aming Source	ce –	CO5	
LecturePeriods	s:45	Tutorial Periods:-	Practica	l Perio	ds:-	To	talPeriods	:45	01	
Text Books			***************************************							
Houghton Mitt	lin Hard	AND COUNTY OF THE PARTY OF THE							72	
lications, 2015	(C	mesWarren, "Big Data: Principles and				altime Data S	Systems", Ma	anning Pul	o-	
3. Bill Chambers	and Ma	itei Zaharia,"Spark: The Definitive Guid	de" O'Reilly Me	dia Yea	ar: 2018					
Reference Book										
<ol><li>TomWhite,"Ha</li></ol>	doop:T	ering Apache Spark", Packt Publishing heDefinitiveGuide",O'Reilly,4thEdition	,2015.						03	
<ol> <li>Nick Pentreath</li> </ol>	, Mach	ine Learning with Spark, Packt Publish	ning, 2015.						115	
<ol> <li>Mohammed Gr</li> <li>Donald Miner,</li> </ol>	ulier, Bi Adam S	g Data Analytics with Spark, Apress,20 Shook, "Map Reduce Design Pattern", 0	015 O'Reilly 2012							
Veb References		,	- 110my, 2012.						04	
1. https://hadoop.										
<ol> <li>https://spark.ap</li> <li>https://flink.apa</li> </ol>									150	
5. https://storm.ap									05	
5. https://kafka.ap	ache.c	org/							. All Dis.	
* TE - Theo	rv Exa	m, LE – Lab Exam								

M.Tech. Computer Science Engineering (Big Data Analytics)

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COs/POs/PSOs Mapping

COs	l	Progra	m Out		ram Spo omes (P				
-4	P01	PO2	PO3	PO4	PO5 PO6		PSO1	PSO2	PSO3
1	2	2	2	3	3	2	2	2	2
2	2	3	3	3	2	1	2	2	1
3	1	3	3	2	1	2	2	2	1
4	2	2	3	2	3	2	2	3	1
5	3	2	2	3	3	1	2	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department	Comp	uter Sci	ence Engineering	Program	mme: <b>M</b>	Tech			·····	
	4	ata Ana		riogiai	mne. w	. i coii.				
Semester	i i			Course	Catego	rv : HS	*Fnd	Semester E	xam Tyne	·TF
0	Dooli	07004			ods / We		Credit		kimum Ma	
Course Code	P23H	STC01		1	T	P	C	CAM	ESE	TM
Course Name	Rese	earch M	ethodology and IPR	2	-	-	2	40	60	100
			(Common t	o all M.Tech	 Courses`	)				
Prerequisite	No pre	erequisit	e needed							
			on of the course, the stu			to			BT Ma (Highest	
	CO1	Gain K	nowledge to formulate the re	search proble	em.				K2	2
Course	CO2	Unders	tand the concepts to carry οι	it the literatur	e review	, ethics a	and researcl	n analysis.	K2	2
Outcomes	CO3	Explain	the way of writing technical	paper and pre	esentatio	n metho	ds.		K2	2
	CO4	Ability to	o understand that today's wo orrow world will be ruled by ic	rld is controlle	ed by Co	mputer,	Information	Technology,	K2	2
	CO5		o understand about IPR and						K3	3
UNIT- I	Resea	<b></b>	blem Formulation	<u> </u>		1	Periods:	6	1	3.23
a research proble data collection – a	m - scor nalysis	oe and ol – interpre	ces of research problem - crit ojectives of research problem etation - necessary instrumen	<ol> <li>Approache</li> </ol>	ristics of s of inve	a good re	esearch prol of solutions	olem - errors i s for research	n selecting problem -	CO1
UNIT- II		ture Re				<u>i</u>	Periods:	6		
***************************************	Ţ		hes – analysis – plagiarism a	nd research e	ethics	т		······		CO2
UNIT- III			iting /Presentation			<u> </u>	Periods:			
=πective technical and assessment b	writing - by a revie	now to we	rite report – paper - developir ittee.	ng a research	proposa	l - format	of research	proposal - Pr	esentation	CO3
UNIT- IV	Introd	luction	To Intellectual Property I	Rights (IPR	)		Periods:	6		
esearch – innova Procedure for gra	ation -   nts of pa	patenting tents - Pa	ents – Designs - Trade and ( - development. Internationa atenting under PCT.	Copyright. Pro al Scenario:	ocess of Internation	Patentin	g and Deve peration on	lopment: Ted Intellectual	chnological Property -	CO4
UNIT- V			roperty Rights (IPR)				Periods:		, L	
ndications - New Fraditional knowle	Develop	ments in	<b>,</b>	of technology ent System - I	r - Paten IPR of B	t informa iological	ition and da Systems - 0	tabases - Ge Computer So	ographical ftware etc.	CO5
Lecture Period	ds: 30	••••	Tutorial Periods: -	Practica	al Perio	ds: -	•	Total Period	ds: 30	
Text Books										959
1996. 2. Wayne Goddard 3. C.R. Kothari, Ga	d and Strauray Ga	uart Melv	ard, "Research methodology ille, "Research Methodology: earch Methodology: Methods	An Introducti	ion", Lan	sdowne	Publisher, S	Second Editio	n. 2001.	
Reference Book										(3)
l. Ranjit Kumar, "F 3. Trochim, "Resea	Research arch Met	n Method hods: Th	operty", Taylor & Francis Lim ology: A Step by Step Guide e concise knowledge base", erature Reviews: From the Ir	for beginners Atomic Dog F	ublishing	g, 2005.				13
Veb Reference	S				o, , cag	C I UDIIC	4110113, 2008	•		710
. https://www.scri	bd.com/	documen	t/427419672/Research-Meth esearch-methodology/RM-lec	odology-and-	lpr -					14
. https://www.wipo	o.int/edo	cs/pubdo	ocs/en/intproperty/958/wipo_research-methodology		df					- 3

5. https://iare.ac.in/sites/default/files/

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	j	Progra	m Out	comes	(POs	)	Prog Outc	ram Spo omes (P	ecific SOs) PSO3 2		
	P01	PO2	PO3	PO4	PO5	PO6	PS01	PSO2			
1	3	2	1	1	2	1	3	3	2		
2	3	2	1	1	2	1	3	2	2		
3	3	2	1	1	2	1	3	2	2		
4	3	2	1	1	3	1	3	2	3		
5	3	2	1	1	2	1	3	2	2		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

	Contin	uous As	sessment Mark	s (CAM)	End	
CAT 1	CAT 2	Model Exam	Assignment*	Attendance		Total Marks
1	0	15	10	5	60	100
	CAT 1		CAT CAT Model Exam	CAT CAT Model Exam Assignment*	1 2 Exam Assignment* Attendance	CAT CAT Model Exam Assignment* Attendance Semester Examination (ESE) Marks

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

11

Department	Com _l (Big I	outer Science Engineering Data Analytics)	Progra	mme: M	Programme: M.Tech.								
Semester	1		Course	Catego	ry : PC	*End S	End Semester Exam T						
Course Code	P23E	BDP101	1	ods / W		Credit		Maximum Mar					
Course Name	   D:- E		L	T	P	С	CAM	ESE	TM				
Course Name	rse Name   Big Data Computing Laboratory		-	-	4	2	50	50	100				
Prerequisite	·	s of Big Data	<u> </u>		<u></u>								
		ompletion of the course, the stu			o			BT Ma	apping				
Course	CO1	Configure Hadoop and perform File	Management	Tasks.				(Highes					
Outcomes	CO2	Apply MapReduce programs to red dataset and sales of a company.			ord coun	it, weather		K	3				
	CO3	Critically analyze huge data set using	Hadoon dietri	huted file	. cvotomo	M D							
	CO4 Apply different data processing to		like Pia. Hive	and Sna	rk	and MapRed	luce.	K	2				
-	CO5	i K3							3				
List of Experin		To validate and analysis the data co	mputing.					K	4				

- 1. Develop a MapReduce program to calculate the frequency of a given word in agiven file.
- Develop a MapReduce program to find the maximum temperature in each year.
- 3. Develop a MapReduce program to find the grades of student's.
- 4. Develop a MapReduce program to implement Matrix Multiplication.
- 5. Develop a MapReduce to find the maximum electrical consumption in each year given electrical consumption for each month in each year.
- 6. Develop a MapReduce to analyze weather data set and print whether the dayis shinny or coolday.
- 7. Develop a MapReduce program to find the number of products sold ineach countryby considering sales data containing fields like Tranction _Date Product Price Payment_Type Name City\State CountryAccount_Created Last_Login Latitude Longitude
- 8. Develop a MapReduce program to find the tags associated with each movie byanalyzingmovie lens data.
- 9. XYZ.com is an online music website where users listen to various tracks, the data gets collected whichis given below. The data is coming in log files and looks like as shown below.UserId | TrackId | Shared | Radio | Skip

111115 | 222 | 0 | 1 | 0 111113 | 225 | 1 | 0 | 0 111117 | 223 | 0 | 1 | 1 111115 | 225 | 1 | 0 | 0

10. Write a MapReduce Number of unique listeners. Number of times the track was shared with others

Number of times the track was listened to on the radio

Number of times the track was listened to in total

Number of times the track was skipped on the radio

- 11. Develop a MapReduce program to find the frequency of books published each year and find in which year maximum number of books were published using the following data. Title Author Published year Author country Language No of pages
- 12. Develop a MapReduce program to analyze Uber data set to find the days on which each basement has more trips using the following dataset. The Uber dataset consists of four columns they are dispatching_base_number date active vehicles
- 13. Develop a program to calculate the maximum recorded temperature by year wise for the weather dataset in Pig Latin

14. Write queries to sort and aggregate the data in a table using HiveQL

Lecture Periods: -

Tutorial Periods: -

Practical Periods: 45

**Total Periods: 45** 

#### Reference Books

- 1. Tom White, "Hadoop: The Definitive Guide", Fourth Edition, O'reilly Media, 2015
- 2. Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007
- 3. Pete Warden, "Big Data Glossary", O'Reilly, 2011.
- 4. Michael Berthold, David J.Hand, "Intelligent Data Analysis", Spingers, 2007.
- 5. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data : Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012.

M.Tech. Computer Science Engineering (Big Data Analytics)

12

# Web References

- https://hadoop.apache.org/
   https://spark.apache.org/
- 3. https://flink.apache.org/

# COs/POs/PSOs Mapping

COs		Progra		Prog Outc	ram Spo omes (P	pecific (PSOs)			
LLT.	P01	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	2	2	3	2	2	3	2	2
2	1	2	2	2	2	2	3	2	2
3	1	3	3	3	3	3	3	3	3
4	2	3	3	3	3	3	3	3	3
5	1	3	3	3	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

	Co	ntinuous /	Assess	ment Marks (CA	AM)		
Assessment	Performan cla	ce in pract asses	tical	Model	LIET TO CASE	End Semester	Total
	Conduction of practical	Record work	viva	Practical Examination	Attendance	Examination (ESE) Marks	Marks
Marks	15	5	5	15	10	50	100

^{4.} https://storm.apache.org/

* TE – Theory Exam, LE – Lab Exam

Department	Comp (Big D	outer Science Engineering Pata Analytics)	Programi	me: N	VI.Tech.				······································
Semester	I		Course C	aten	ory · Ue	*==1.0			
Course Code	Daal	ISPC01	Period			Enas		ing each K3 K2 K2 ion sed on clarity of though relevance and clarity in selected information is specific and of onal and national	
Oodise Code	FZSF	13PCU1	1 01100	3 / V\ T		Credit			rks
Course Name	Tech	nical Report Writing and Seminar	-	<u> </u>	P 4	C 2			TM
		(Common to all	M Tech Pro		1 - 1		100	-	100
Prerequisite	No P	rerequisite needed	W. TECH FIC	ogran	rime)				
		ompletion of the course, the studer	its will be	able	to				
Course	CO1	Select a subject, narrowing the subject	into a topic.						
Outcomes	CO2	State an objective and collecting the rele	evant bibliog	raphy	v (at least 15 i	Ournal na		·	
	CO3	Study the papers and understanding the	author's co	ntribu	Itions and criti	cally anal	vzina ooob	·	
		paper.						K.	3
	CO4	Prepare a working outline and linking the	papers and	prep	aring a draft o	of the pane	er.	1//	
The little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of the little of th	CO5	Prepare a working outline and linking the	e papers and	prer	paring a draft of	of the nan	or.		
List of Experi	ments:			P. 0 P	samg a dian c	or trie pap	er.	K2	2
Activity Selection of area	_ f :_ t -	Instructions	7V7 3		Submission week	Evalu	ation		
and Topic	or intere	Select an area of interest, topic and s	tate an obje	ctive	2nd week	3 % E	Based on cla	rity of thou	ıght,
Stating an Objec Collecting Inform	tive					writing	9		
Collection of Jour	nal nane	3. List 2 conferences, symposia or word. 4. List 1 thesis title 5. List 3 web presences (mailing lists, sites) 6. List 3 authors who publish regularly 7. Attach a call for papers (CFP) from	forums, new	a		interna standa	ational and r ard)	national	
n the topic in the he objective – co hen filte  eading and notes	context of	using- Based on your objective -Search libraries and Google Scholar  When picking papers to read - try to - Pick papers that are related to each of ways and/or that are in the same field write a meaningful survey out of them Favour papers from well-known journ conferences, in the field (as indicated if more recent papers, - Pick a recent survey of the field so you gain an overview, Find relationships with each other and to your topic area(class scheme/categorization) - Mark in the hard copy of papers whet work or section/sections of the paper a considered	ch various dig cother in some so that you do als and n other Favo ou can quickle th respect to diffication ther complete re being	e can our	4th week	6% (the and re	ne list of star ason for seld	ndard pape ection)	ers
papers		Reading Paper Process For each paper answering the following questions:  What is the main topic of the article? What was/were the main issue(s) the they want to discuss?  Why did the author claim it was impour what simplifying assumptions does to be making?  What did the author do? How did the author claim they were gevaluate their work and compare it to ot What did the author say were the limit	author said rtant? ne author cla oing to hers?	nim 6	oth week	indicate paper a	your unders	tanding of ation is ba	sed

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* TF – Theory Exam I		eriods: 45	Total Periods: 45		
Lecture Periods: -		14th & 15th week	10% (based on presentation and Vivavoce)		
Seminar	A brief 15 slides on your paper	13th week	10% (formatting, English, Clarity and linking) 4% Plagiarism Check Repor		
Final Draft	Complete the final draft of your paper				
Conclusions	Write your conclusions and future work	12th week	59/ / 2020 Lui		
essions of the paper	Write the sections of your paper based on classification / categorization diagram in ket the goals of your survey	the 11th week eeping with	10% (this component will be evaluated based on the linking and classification among the papers)		
Sections of the paper	Write an introduction and background sect		5% ( clarity)		
Introduction Background	<u> </u>		6%(Clarity, purpose and conclusion) 6% Presentation & Viva Voce		
papers  Abstract	Prepare a draft Outline, your survey goals a classification / categorization diagram  Prepare a draft abstract and give a present		evaluated based on the linking an classification among the papers)		
Reading and notes for next 5 papers  Draft outline 1 and Linking		7 th week	indicate your understanding of the paper and the evaluation is based on your conclusions about each paper		
	research?  ☐ What did the author say were the impo directions for future research?  ☐ Conclude with limitations/issues not ad the paper ( from the perspective of survey	es not addressed by of survey)			

^{*} TE – Theory Exam, LE – Lab Exam

COs		Progra	m Out	Program Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3
1	2	3	3	1	3	3	2	1048	2
2	2	3	2	1	3	2	2	1	2
3	2	3	2	1	3	2	2	1	2
4	2	3	2	1	3	2	2	1	2
5	2	3	2	1	3	2	2	1	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

## **Evaluation Method**

	Contin	uous Asses	sment Marks (C		End			
Assessment	Weekly Progress	Sominor December		Viva	Attendance	Semester Examination (ESE) Marks	Total Marks	
Marks	40	30	10	10	10	Maria Salahan Maria Telah I	100	



Department	Computer Science and Engineering	Programme: M.Tech.									
Semester	1	Course	Catego	ry : AEC	*End S	Semester	emester Exam Type:				
Course Code	P23CSC1XX	Perio	ds / We	eek	Credit	Maximum Marks					
		L	T	Р	Ç	CAM		ТМ			
Course Name	Ability Enhancement Courses	-	-	4	-	100		100			

Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.

Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.

J. V

Department		ter Scien ta Analy	ce Engineering tics)	Prograr	nme: <b>N</b>	l.Tech.						
Semester	II			Course	Catego	ory : PC	*End S	Semester E	xam Type	: TE		
Course Code	P23BD	T204	0		ods / W		Credit	······································	ximum Ma			
Course Code	PZSDD	1204		L	Т	Р	С	CAM	ESE	TM		
Course Name	Minin	g Massi	ve Data	3	-	-	3	40	60	100		
	·							-				
Prerequisite	<u> </u>		e needed									
	On co	mpletic	on of the course, the s	tudents will b	e able	to			BT Ma (Highest			
	CO1	Recolle	cting fundamentals of data	a mining.					K			
Course Outcomes	CO2	Apply the	a	and data strear	data streams for storing and processing ofmassive							
	CO3	Analyze	the issues underlying the	ations o	of massive	e datasets.		K	3			
	CO4	Evaluate	e different clustering algor	ithms and analy	ze vari	ousdecon	nposition tec	hniques.	K	3		
	CO5	Make u	se of Clustering technique	es					K	3		
UNIT- I		Data Mining Periods:9										
		stical Modeling, Machine Learning, Computational Approaches to Modeling, Feature Extraction, Sta iing, Hash Functions, Indexes, Natural Logarithms, Power Laws.										
UNIT- II	Map F	Reduce	and Software Stack				Periods:9					
. Distributed File Reduce.	Systems	s, Map Re	educe, Algorithms Using N	/lap Reduce, Ex	ensions	s to Map F	Reduce, Con	plexity The	ory for Map	CO2		
UNIT- III	Minin	g Data S	treams				Periods:9		9	***************************************		
The Stream Data in a Window, De			g Data in a Stream, Filterii	ng Streams, Cou	ınting D	istinct Ele	ements in a S	Stream, Cou	ntingOnes	CO3		
UNIT- IV	Frequ	ent Iten	Sets				Periods:9			· <b>Ł</b>		
The Market-Bask Algorithms, Cour			Baskets and the A-Priori ms in a Stream.	Algorithm, Hand	lling Lar	ger Datas	sets in MainN	Летогу, Lim	nited-Pass	CO4		
UNIT- V	Cluste	ering					Periods:9	***************************************		•		
Introduction to Cl Euclidean Space	ustering s, and C	Techniq lustering	ues, Hierarchical Clusterir for Streams and Paralleli	ng, K-means Alg sm. Dimensiona	orithms lity Red	, The CUI uction: Ei	RE Algorithm gen values a	n, Clustering and Eigenve	in Non- ctors of	CO5		
		cipal-Cor	nponent Analysis, Singula							<u> </u>		
Lecture Period	ls: 45		Tutorial Periods: -	Practica	al Perio	ods: -	T	otal Perio	ds: 45			
2. Nick Pentreat	h, "Mach lle, Bern	nine Lear	an, Jeffrey Ullman, "Minin ning with Spark", Packt Pเ olkopf, Alexander Zien "S	ublishing,2015	•				-			
1. Ron Bekkerma	an, Mikh		o, John Langford "Scaling	Up Machine Lea	arning: F	Parallel Ar	nd Distribute	d Approache	es",Cam-			
bridge Univers			ntensive Text Processing	with ManBadus	a" Mara	an Clave	oolDublishs.	- 2010				
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	Kar-Ann	•	nuel Grana Romay, Kezhi	•	earning	Machines	2013: Algor	ithms andA	oplications'	ı I		
/eb References												
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5. https://www.j												
* TE – The	ory Exar	n, LE – L	ab Exam									

COs/POs/PSOs Mapping

COs		Progra	m Out	comes	)	Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3	
1	3	3	3	2	3	3	3	1	1	
2	3	3	3	2	3	2	3	1	1	
3	3	3	3	2	2	2	3	1	1	
4	3	3	3	2	2	2	3	1	1	
5	3	3	3	2	2	2	3	1	1	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

J. D

Department	Comp (Big D	uter Sc ata Ana	ience Engineering alytics)	Prograi	nme: <b>M</b>	Tech.					
Semester	II			Course	Catego	rv : PC	*Fnd s	Semester	Evam Tv	no. I	
Course Code	P23B	DT205		······································	ods / We				ximum Marks		
	. 200	D1200		L	ТТ	Р	С	CAM	ESE	T	
Course Name	Strea	ming D	ata Analytics	3	-	-	3	40	60	10	
Prerequisite	No Pre	ereguisi	te needed								
			on of the course, the st	udents will b	e able t	0			BT Ma	appir	
Course	CO1	Recog	nize the characteristics of da	ta streams that	make it u	seful to so	lve real-wo	rld	(Highest Le		
Outcomes	CO2		y and apply appropriate alg	gorithms for an	alyzing t	he data st	treams for v	ariety of	K2 K3		
	CO3		Implement different algorithms for analyzing the data streams								
	CO4	Identify	the metrics and procedures	anaiy∠ing the da s to evaluate a n	ita strean	ns			K		
<u> </u>	CO5		edge for handling and analyz						K		
UNIT- I	l	uction	and Data Streams	y sucalling C	ala.	F	Periods:9		K	3	
Concept and me	ementa	ı iearnin	ms, Challenges in mining og. Data Streams Counting	the Number o	f Distinct	ents and p	orinciplesfor	Rounds o	orocessing of Random	, C(	
variables, Poissoi	Proces	sses,Ma	intaining Simple Statistics from Data Streams	om Data Stream	ns, Slidir	ig Windov	vs, Data Sy	nopsis.			
lustering Exampl	es: Bas	ic Conc	epts. Partitioning Clustering	a - The Leader	Algorith	m Single	eriods:9	ane Mier-	Olusta :		
lustering Variable	s: A Hie	rarchica	I Approach	y The Leader	7 ligoriti	iii, oiligie	rassk-ivie	ans, iviicro	Clustering	ı, CC	
UNIT- III	Evalua	ting St	treaming Algorithms ation Experiments, Evaluati			P	eriods:9			<u>.l</u>	
JNIT- IV	Freque	ent Pati	t, The 0-1 loss function, Ev tern Mining a Streams- Landmark Windo ce Pattern Mining- Reservoi	ows Mining Re	cent Free	P	eriods:9			cc	
JNIT- V	Comple	ex Ever	nt Processing			P	ariode:0			<u> </u>	
troduction to Com	plex Ev	ent Pro	cessing, Features of CEP, ns, Rules and Constraint, S	Need for CEP,	CEP Ar	chitectura	I avore Se	aling CEP,	Events,	60	
ecture Periods	: 45	t i atten	Tutorial Periods: -	Practical			y			CO	
ext Books				- Tactica	renou	J	10	tal Perioc	is: 45		
<ul> <li>David Luckham Wesley, 2002.</li> <li>Charu C. Aggan</li> </ul> Ference Books	, "The Powal, "Da	ower of E	ery from Data Streams", CR Events: An Introduction to Co ms: Models And Algorithms"	omplex Event P	mic Publi			rise Syster	ns",Addisc	on	
Chris Eaton, Dirk and Streaming I Anand Rajarama Bill Franks, "Tamin	DeRoos Data", M an and J g the Big	s, Tom D cGrawH effrey Da Data Tid	ive Guide" Third Edition, O're Deutsch, George Lapis, Paul Z Iill Publishing, 2012. avid Ullman, "Mining of Mass dal Wave: Finding Opportunitie f Data", John Wiley & Sons,	Zikopoulos,"Und sive Datasets", es in Huge Data S	erstandin	2					
https://cloud.goog https://www.inform business.html 3.h	atica.co https://w soft.com	m/blogs/ ww.tibco /en-us/a:	nttps://docs.aws.amazon.cor /streaming-analytics-what-it-is o.com/reference-center/wha zure/stream-analytics/stream	s-and-how-it-ben	efits-your	<u>-</u>					
11	/										

COs	ı	Progra	m Out	comes	(POs	)	Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	P06	PS01	PSO2	PSO3		
1	2	2	3	2	-	-	3	-	-		
2	3	2	3	3	-	-	3	2	1		
3	3	1	3	3	2		2	2	1		
4	1	1	2	3	3	-	2	2	1		
5	2	1	2	3	2	-	2	2	3		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

J V

		uter Science Engineering Pata Analytics)	Prograr	nme: M	.Tech.						
Semester	l II		Course	Catego	ory : PC	*End	Semeste	r Exam Ty	me. TE		
Course Code	P23B	DT206		ods / W		Credit		ximum M			
	1 200	51200	L	Т	Р	С	CAM	ESE	TM		
Course Name	Big D	ata SQL with Hive	3	-	-	3	40	60	100		
Prerequisite	Basic	s of Big Data	-								
	On co	ompletion of the course, the st						BT Ma			
Course	CO1	Work with big data platform and applications.	explore the big	g data a	nalytics te	chniques bu	ısiness	K3			
Outcomes	CO2	Design efficient algorithms for mining the data from large volumes.									
	CO3	Analyze the HADOOP and Map Reduce technologies associated whoig data analytics.									
	CO4	Explore on Big Data applications Using Hive.									
	CO5	Understand the fundamentals of va	arious big data	analytics	technique	25		K2			
UNIT- I		uction To Big Data			ja j	Periods:9		······································			
Introduction to b analysis – Nature	ig data of Data	: Introduction to Big Data Platforn - Analytic Processes and Tools - Ar	n – Challenge nalysis vs Repo	s of Cor	nventiona	Systems -I	ntelligento	lata	CO1		
UNIT- II		Concepts				Periods:9			<u> </u>		
Frameworks: Ap Querying Data ir	plication Hive -	ns on Big Data Using Pig and Hive fundamentals of HBase and Zook	– Data proces eeper - IBM Int	ssing op	erators in	Pig - Hivo	services – eams.	· HiveQL –	CO2		
UNIT- III	Hadoo	p Eco System			F	Periods:9			<u> </u>		
Map Reduce Wor Reduce Types an	ks-Anat	op- the Hadoop Distributed File Syst eaming- Design of HDFS-Java interfa omy of a Map Reduce Job run-Failu ats-Map Reduce Features Hadoop e	ices to HDFS B ires-Job Schedi	acine_ D	avalonina	a Man Dadu	oo Annline	diam Illano	CO3		
		L and Hbase			F	eriods:9	1		4.		
i ibase . i ibasics.	Concep	ts, Clients, Example, Hbase Versus l	RDBMS. Big SC	⊋L : Intro	duction				CO4		
	111				1 5	eriods:9					
UNIT- V		nd Hadoop Distributed File Sy							i		
<b>UNIT- V</b> Hive : Hive Shell, User Defined Fun	Hive S		on with Tradition	ine Inte	abases, H	liveQTables,	em interfac	ces Data	CO5		
UNIT- V Hive: Hive Shell, User Defined Fun flow, Data Ingest Data structures.	, Hive S ctions. ⁻ with Flu	nd Hadoop Distributed File Sy ervices, Hive Metastore, Comparis The Design of HDFS, HDFS Concep me and Scoop and Hadoop archive	on with Tradition ots, Command Les, Hadoop I/O:	ine Inte	abases, F rface, Hac ession, Se	liveQTables, loop file syst rialization, A	em interfactive and Fi	ces, Data le-Based	CO5		
UNIT- V Hive: Hive Shell, User Defined Fun flow, Data Ingest	, Hive S ctions. ⁻ with Flu	nd Hadoop Distributed File Sy ervices, Hive Metastore, Comparis The Design of HDFS, HDFS Concep	on with Tradition	ine Inte	abases, F rface, Hac ession, Se	liveQTables, loop file syst rialization, A	em interfac	ces, Data le-Based	CO5		
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- 1.https://www.mygreatlearning.com/courses/big-data-analytics-dse 2.https://www.classcentral.com/course/big-data-analysis-9506 3.https://intellipaat.com/big-data-hadoop-training/

- 4.https://www.simplilearn.com/big-data-and-analytics/big-data-and-hadoop-training
  5.https://www.edureka.co/comprehensive-hive

  * TE Theory Exam, LE Lab Exam

COs	ey E : 20	Progra	m Out	comes	un etc.	Program Specific Outcomes (PSOs)				
	P01	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3	
1	2	2	-	_	-1	-	2	3	2	
2	2	2	3	3	2	-	3	3	2,	
3	2	2	3	3	2	-	2	1	1	
4	2	2	3	3	2		1	1	2	
5	2	2	3	3	2	3	2	1	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

- 1		Contin	uous As	sessment Mark	s (CAM)	End	dant.
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	Computer Data Analy	Science Engineering(Big rtics)	Program	nme: <b>N</b>	/I.Tech.			X			
Semester	e II		Course	Catego	ory : PC	*End S	emester Ex	am Type:	TE		
Course Code	P23BDTD0	4	Perio	ods / W	/eek	Credit			kimum Marks		
Course Code	P23BD1D0	( <b>!</b> .	L	Т	P	С	CAM	ESE	TM		
Course Name	No SQL D	atabases	3	-	-	3	40	60	100		
Prerequisite	Basics of	SQL and Databases									
11.	On comp	etion of the course, the stu	dents wil	l be ab	le to		is g	BT Ma (Highest			
	CO1 Expl	ain the detailed architecture, Dat	abase prop	erties a	nd storag	e requireme	nts.	K	2		
Course	CO2 Diffe	, g									
Outcomes		CO3 Outline Key value architecture, characteristics, and Design Schema and implementCRUD operations, distributed data operations.									
	CO4 Com										
	1 1	CO5 Choose and implement advanced columnar data model functions for the realtime Applications.									
UNIT- I	·····	on to NoSQL			<u> </u>	Periods:9	}	<u> </u>			
Data Model Grap	del: Aggregate h Data Model	nta Architecture Patterns  Models- Document Data Model  NoSQL system ways to handle  he data on clusters, replication to	big data	oroblem	s, Moving	g Queries to	Model, Gra	ata to the	CO2		
UNIT- III	Key Value	Data Stores and Documen	t Oriented	d Datak	base	Periods:9	)		- complete		
	of key value [	Databases, Properties of keys, Cocument, Collection, Naming, CR	haracteristi	cs of Va	alues, Ke				CO3		
UNIT- IV	Columnar	Data Model – I and II		***************************************		Periods:9			100		
Vector-Wise, Colu	ımn-store inter	mparison of columnar and row-o nals and, Inserts/updates/delete on Compressed Data Late Mate	s. Advance	d techni	iques: Ve	ctorized Pro	cessing Cor	npression,	CO4		
UNIT- V	Data Mode	eling with Graph				Periods:9					
graph, Page Rank	elational and G c- Markov chai ng, Random wa	raph Modeling, Property Graph N n, page rank computation, Topic alk distribution Querying Graphs:	specific pa	ge rank	(Page Ra	analysis al	gorithm- We outation tech	niques:	CO5		
Lecture Period		Tutorial Periods: -	Practica	al Perio	ods: -	•	Total Perio	ds: 45			
ext Books	1	- The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the				······································					
		L for Mere Mortals", Addison-We hakar Raghavan, Hinrich Schutz			to Inform	ation Retrie	val", Cambric	dge Univers	sity		

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- 5. Guy Harrison, "Next Generation Database: NoSQL and big data", Apress, 2015.

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- 2. https://www.geeksforgeeks.org/introduction-to-nosgl/

M.Tech. Computer Science Engineering (Big Data Analytics)

2. A. 3.242

- 3. https://www.javatpoint.com/nosql-databa
- 4. https://intellipaat.com/nosql-cassandra-hbase-training/
- 5. https://www.udemy.com/nosql/online-cours

### COs/POs/PSOs Mapping

COs	STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY	Progra	m Out	Program Specific Outcomes (PSOs)					
No.	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3
1	3	3	3	3	2	3	- 3	3	2
2	3	2	2	2	1	2	2	2	1
3	3	1	1	1	2	1	1	1	2
4	3	1	1	2	2	1	2	1	2
5	3	2	2	2	3	2	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	End	- 1		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

JV

^{*} TE – Theory Exam, LE – Lab Exam

Department		outer Science Engineering Pata Analytics)	Prograr	nme: <b>M</b>	.Tech.					
Semester	l II		Course	Catego	ry : PC	*End Ser	nester Exar	m Type: <b>LE</b>		
Course Code	P23B	DP202	Perio	Periods / Week				imum Marks		
300,00 0000	. 200	D1 202	L	Т	P	С	CAM	ESE	TM	
Course Name	Big [	Data SQL with Hive Laboratory	-	-	4	2	50	50	100	
Prerequisite	Basic	s of Big Data and SQL	Big Data and SQL							
	On completion of the course, the students will be able to								BT Mapping (Highest Level	
Course Outcomes	CO1	To Describe the key issues in Big Da framework		₹2						
	CO2	To Explain the structure and unstructu		K3						
	CO3	To Apply scientific computing algorithm						ŀ	⟨2	
-	CO4	To Test fundamental enabling techniquestream mining	TENEZ E AR	K3						
	CO5								K4	

#### **List of Experiments:**

- 1. Installation of Hadoop Framework, it's components and study the HADOOP ecosystem.
- 2. Write a program to implement word count program using MapReduce
- Experiment on Hadoop Map-Reduce / PySpark: -Implementing simple algorithms in Map-Reduce: Matrix multiplication.
- 4. Install and configure MongoDB/ Cassandra/ HBase/ Hypertable to executeNoSQL Commands.
- 5. Implementing DGIM algorithm using any Programming Language/ Implement BloomFilter using any programming language
- 6. Implement and Perform Streaming Data Analysis using flume for data capture, PYSpark / HIVE for data analysis of twitter data, chat data, weblog analysis etc.
- 7. Implement any one Clustering algorithm (K-Means/CURE) using Map-Reduce.
- 8. Implement Page Rank Algorithm using Map-Reduce.
- 9. Installation of Single Node Hadoop Cluster on Ubuntu
- 10. Hadoop Programming: Word Count MapReduce Program Using Eclipse
- 11. Implementing Matrix Multiplication Using One Map-Reduce Step.
- 12. Implementing Relational Algorithm on Pig.
- 13. Implementing database operations on Hive.
- 14. Implementing Bloom Filter using Map-Reduce
- 15. Implementing Frequent Item set algorithm using Map-Reduce.
- 16. Implementing Clustering algorithm using Map-Reduce
- 17. Implementing Page Rank algorithm using Map-Reduce
- 18. Mini Project:

Few topics for Projects:

- a. Twitter data analysis
- b. Fraud Detection
- c. Text Mining
- d. Equity Analysis etc.

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 45	Total Periods: 45

## Reference Books

- 1. Tom White,"Hadoop: The Definitive Guide", O'Reilley, Third Edition, 2012.
- 2. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.
- 3. Vignesh Prajapati, "Big data analytics with R and Hadoop", SPD 2013.
- 4. E. Capriolo, D. Wampler, and J. Rutherglen ,"Programming Hive", O'Reilley, 2012.

#### Web References

- 1. https://www.youtube.com/watch?v=waaN9069O3I
- 2. https://www.ibm.com/cloud/learn/nosql-databases
- https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp
- 4. https://www.geeksforgeeks.org/introduction-to-nosgl/
- 5. https://www.javatpoint.com/nosql-databa
  - * TE Theory Exam, LE Lab Exam

10

M.Tech. Computer Science Engineering (Big Data Analytics)

2. A. 3. 244

COs	ı	Progra	m Out	)	Program Specific Outcomes (PSOs)				
1 16	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	3	3	3	2	2	3	3	3	2
2	3	2	2	2	1	2	2	2	1
3	3	1	1	1	2	1	1	1	2
4	3	1	1	2	2	1.	2	1	2
5	3	2	2	2	3	2	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

## **Evaluation Method**

Assessment	Co	Continuous Assessment Marks (CAM)							
	Performan cla	ce in pract asses	ical	Model		End Semester	Total		
	Conduction of practical	Record work	viva	Practical Examination	Attendance	Examination (ESE) Marks	Marks		
Marks	15	5	5	15	10	50	100		

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Department		puter Science Engineering Data Analytics)	Prograr	nme: N	/I.Tech.				
Semester	II	-	Course	Catego	ory : <b>HS</b>	*End S	emester E	xam Type	e: LE
Course Code	D23H	SPC02		ods / W	,	Credit		ximum Ma	
Course Code	FZJII	37002	. L	Т	Р	С	CAM	ESE	TM
Course Name	Semi	nar on ICT: A Hands-On Approach	-	İ -	4	2	100	-	100
	.4	(Common to all I	M.Tech Pr	ogramn	nes)			I	
Prerequisite	1	erequisite needed							£ 1
	On co	ompletion of the course, the studer	nts will b	e able	to			BT Ma (Highes	apping st Level
Course									(2
Outcomes	CO2	State an objective and use the relevant	ctive.	K	(3				
	CO3	Study the topic and understanding the o		K2					
	CO4	Prepare a working demo.	K3						
	CO5	Prepare conclusions based on the read	ing of the	topic ar	nd giving fi	nal Presenta	tion.	K	4
<ul><li>☐ Manage multi</li><li>☐ Deal with mai</li></ul>	tasking. n issues	flow in the respective domain choosed. s using tech in class. rer audio and video.							
□ Automate ass									
Scope  ☐ Perspective in ☐ Understand th	order to ne proce	o design activities in class. ss of creating audiovisuals.							2
Teaching tools  □ Different ways  □ Handle audiov  □ Collaborative s  □ Individualize k  □ Get instant fee	to creatisual ed working	experience.							
and prepare a session. The de	report, r emo will	nts will be assigned an ICT Topic and the running to 30 or 40 pages for which a de be evaluated by the internal assessment total of 100 marks.	emo to be	perforr	ned follow	ed by a brie	f auestion	and answe	r

* TE – Theory Exam, LE – Lab Exam

Tutorial Periods: -

10

Lecture Periods: -

M.Tech. Computer Science Engineering (Big Data Analytics)

Total Periods: 45

Practical Periods: 45

COs		Progra	m Out	comes	(POs	k	Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3	
1	7.544	3	1	1	3	3	3	2	1	
2	13	3	1	1	3	2	3	2	1	
3	-	3	1_	1	3	2	3	2	1	
4		3	1	1	3	2	3	2	1	
5	1.1	3	1	1	3	2	3	2	1	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

	Continu	Continuous Assessment Marks (CAM)							
Assessment	Performanc	e in practical	classes	", ", ", ", ", ", ", ", ", ", ", ", ",	End Semester	Total Marks			
7,000001110111	Presentation using ICT	Report	viva	Attendance	Examination (ESE) Marks	IVIAIRS			
Marks	50	30	10	10	1 1 m Eq. (1 2	100			

J V

Department	Computer Science and Engineering (Big DataAnalytics)	Programme: M.Tech.						-		
Semester	ll en en en en en en en en en en en en en	Course	Catego	ry : <b>AEC</b>	*En	*End Semester Exam T				
Course Code	P23CSC2XX	Periods / Week			Credit		ximum M			
		L	Т	Р	С	CAM	ESE	TM		
Course Name	Ability Enhancement Courses	-	-	4	-	- 100 -		100		
								: - : : : : : :		

Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.

Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.



2-A-3-249

Department		uter Science Engineering ata Analytics)	Prograr	nme: M	.Tech.				
Semester	I		Course	Catego	ry : PE	*End S	Semester E	xam Type	: TE
Course Code	P23B	DE101		ods / W		Credit	······································	ximum M	
Course Code			L	Т	Р	С	CAM	ESE	TM
Course Name	Data l	Driven Decision Making	3	-	-	3	40	60	100
Prerequisite		s of Big Data							
	On co	mpletion of the course, the stu		e able	to			BT Ma (Highes	
Course	CO1	Understand data in decision making						K	
Outcomes	CO2	Make use of data preprocessing						K	3
	CO3	Analyze decision making concepts						K	2
	CO4	Illustrate ML for decision making						K	3
IIIIIT I	CO5	Make use of Data visualization				171-		K	3
UNIT – I	role of	uction to Data-Driven Decision data in decision making – Importance	of data driv	ion doci-	ion mal-	Periods:	9	The second	
lata and data sour	ces – D	ata collection methods and techniques	S uata – univ	ren decis	sion mak	ing in variou	is domains -	- Types of	CO1
UNIT – II	Data F	reprocessing and Exploratory I	Data Analys	sis		Periods:	9		
		ality assessment – Handling missing					and normaliz	ation	CO2
·····		ata Analysis (EDA) for understanding		tions and	pattern	S			
UNIT – III		ical Concepts for Decision Mak				Periods:			
robability theory Inderstanding p-v	and dis	tributions – Statistical inference an d confidence intervals	d hypothesis	testing	- Corre	elation and	regression	analysis -	CO3
UNIT – IV		ne Learning for Decision Making	9			Periods:9	}		
ntroduction to mac	hine lea	rning algorithms – Supervised, unsupe	ervised, and re	einforcer	ment lear			/aluation	CO4
nd validation – Fe	ature se	lection and engineering for better dec	ision-making	models				No.	
UNIT – V		isualization and Communicatio			ļ	Periods:9		A .	À
rinciples of Data Storytelling with	Visualia data: Pre	ation– Data visualization techniques senting results to stakeholders – Ethi	s and tools - cal considera	- Design	principl	es for effec ven decision	tive data vi	sualizations	CO5
Lecture Period		Tutorial Periods: -	Practica				Total Perio	ds: 45	1
ext Books			L			L			······································
		Business" by Foster Provost and Tom		***************************************					•••••••
<ol> <li>"The Data</li> <li>"Python fo</li> </ol>	Wareho	use Toolkit: The Definitive Guide to D	imensional M	lodeling"	by Ralpl	h Kimball ar	nd Margy Ro	SS	
		nalysis" by Wes McKinney ace" by George Casella and Roger L.	Berger						
5. "Data Poin	ts: Visu	alization That Means Something" by N							
eference Book						,			
"Data Science fro	om Scra	ch: First Principles with Python" by Jo hat Will Transform How We Live, Wo	oel Grus			. 0 . 1	117		
"Rig Data: A Roy	na: A Pr	babilistic Perspective" by Kevin P. Mu	urphy	by vikt	or waye	r-Schonberg	ger and Kenr	iethCukier	
"Big Data: A Rev "Machine Learnir		Data Culture" by Hilary Mason and D.	J Patil						
"Machine Learnir "Data-Driven: Cre	eating a								
"Machine Learnir "Data-Driven: Cre "Applied Predictiv	eating a	ling" by Max Kuhn and Kjell Johnson							
"Machine Learnir "Data-Driven: Cre "Applied Predictive Teb References	eating a ve Mode	ling" by Max Kuhn and Kjell Johnson	374280/						
"Machine Learnir "Data-Driven: Cre "Applied Predictiv "Eb References https://www.oreill https://www.wiley p-978111942582	eating a ve Mode y.com/li .com/er	ling" by Max Kuhn and Kjell Johnson orary/view/data-science-for/97814493 - us/The+Data+Warehouse+Toolkit%	3A+The+Def	înitive+G	Guide+to-	+Dimension	al+Modeling	%2C+4th+l	Edition
"Machine Learnir "Data-Driven: Cre "Applied Predictiv eb References https://www.oreill https://www.wiley p-978111942582: https://www.oreill	eating a re Mode y.com/li .com/er 2 y.com/li	ling" by Max Kuhn and Kjell Johnson  orary/view/data-science-for/97814493 - us/The+Data+Warehouse+Toolkit%  orary/view/python-for-data/97814919	3A+The+Def 57653/		Suide+to-	+Dimension	al+Modeling	%2C+4th+l	Edition
"Machine Learnir "Data-Driven: Cre "Applied Predictiv /eb References https://www.oreill https://www.wiley p-978111942582 https://www.oreill https://www.ceng	eating a ve Mode y.com/li .com/er 2 y.com/li age.cor	ling" by Max Kuhn and Kjell Johnson orary/view/data-science-for/97814493 - us/The+Data+Warehouse+Toolkit%	3A+The+Def 57653/ 80534243128	3/				%2C+4th+i	Edition

12

COs			m Out	Program Specific Outcomes (PSOs)					
	P01	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	3	3	3	3	2	3	3	3	2
2	3	1	2	2	2	2	2	2	
3	3	1	1	1	2	1	1	4	1 -
4	3	2	1	2	1	1		1	2
E	3	2	-	2		1	2	1	2
5	3	2	2	2	3	2	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

## **Evaluation Method**

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model	- Ex. /	Attendance	Semester Examination	
Marks	1	0	15	. 10		(ESE) Marks	
		0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department			cience Engineering nalytics)	Prograr	nme: <b>N</b>	/I.Tech.				•	
Semester	II			Course	Catego	ory : PE	*En	d Semes	ter Ex	xam Type	: TE
Course Code	D22D	DEC01			ods / W		Cred	······		cimum Ma	
Course Code	F 23D	DECUI		L	Т	Р	С	CA		ESE	TM
Course Name	Neur	al Netw	orks	3	-	-	3			60	100
			(Common to M.	Tech CSE(B	DA) an	d CSE)		L	I.	-	<u> </u>
Prerequisite	i		ite needed								***************************************
	On co		on of the course, the st					,		BT Ma (Highest	
0	CO1		oe the basics of ANN and co							K	
Course Outcomes	CO2	Unders	tand the role of neural ne	etworks in en	gineerin	ng, artifi	cia			K	2
Outcomes	CO3		ence, and cognitive modelling tand the concepts and techni		network	ks throug	nhthe study	of the mo	net	1/	^
		importa	int neural network models.					y or the mic	JSI	K	3
	CO4	Evaluat applica	te whether neural networks tion.	are appropria	ate to a	a particu	lar			K	2
	CO5	Apply r	neural networks to particula nance.	r application, a	and to I	know wh	atsteps to	take to im	prove	K	2
UNIT- I		luction	. 2344 (14 )			- 1	Periods	s: 9	4		
Knowledge Repre Learning Process Credit Assignment	sentatio : Error :Probler	n-Artificia Correction n- Memo	Models of a Neuron-Neural Na al Intelligence and Neural Na on Learning- Memory Base ory-Adaption-Statistical Natu	etworks. ed Learning-He	ebbian I	Learning					CO1
UNIT- II			Perceptrons strained Organization Techn				Periods				
Learning Curves- Bayes Classifier f	Learning or a Ga ation an	g Rate Ai lussian E	nnealing Techniques- Perce Environment. Multilayer Per on Rule-Computer Experime	ptron –Convergore	gence T Propag	Theorem	- Relation	Between F OR Proble	Percer	otron and	CO2
Back Propagation	and Di	fferentiat	tion- Hessian Matrix- Gene	ralization- Cro	ss Valid	dation- 1	NetworkPru	uning Tecl	hnique	es-	
			opagation Learning- Acceler	rated Converge	ence-Su	pervised	d Learning.				CO3
UNIT- IV			ation Maps (SOM)				Periods				_
I WO Basic Feature	Mappii	ng Mode tor Ouan	ls, Self-Organization Map, S tization, Adaptive Patter Cla	SOM Algorithm	, Prope	erties of	FeatureMa	ıp, Compu	ıter		CO4
UNIT- V		O DYNA	***************************************	issincation.			Periods	. 0			
			quilibrium States, Attractors-	Neuro Dynami	cal Mod	tols Ma					
			field Models – Hopfield Mod					OI Alliacit	JIS as	a	CO5
Lecture Period			Tutorial Periods: -	Practica		***************************************		Total P	eriod	s: 45	
Text Books	***************************************			<u>-</u>							
<ol><li>Introduction to</li></ol>	Artificia	Neural	sive Foundations, Simon S Systems Jacek M. Zurada, J n Approach -Satish Kumar,	JAICO Publishi	ng Hous	se Ed. 2 ion (Ind	006. ia) Pvt. Lt	d, Second	d Editio	on.	
Neural Network	s in Con	nputer In	teligance, Li Min Fu TMH 20	003							
2. Neural Networks	s -Jame	s A Free	man David M S Kapura Pea	rson Ed., 2004							
			egnanarayana Prentice Hall								
			ystems - J.M. Zurada, Jaico gnanarayana, Pill, New Delh		994.						
Neb References		J- D. 16	grianarayana, Fili, New Delh	II 1330.					***************************************		
1. https://ww 2. https://ww	ww.cs.rii	renignite	courses/nn/main.html ccom/up/neural-network com/terms/n/neuralnetwork.	aen				_			
			ing.com/blog/types-of-neura								

**5.** https://link.springer.com/10.1007/978-3-642-20617-7_6563 * TE – Theory Exam, LE – Lab Exam

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M.Tech. Computer Science Engineering (Big Data Analytics)

2. A.3.252

COs		700	Program Outcomes (POs)					Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3		
1	2	2	-	-	-	-	2	3	2		
2	2	2	3	3	2		3	3	2		
3	2	2	3	3	2		2	1	1		
4	2	2	3	3	2		1	1			
5	2	2	3	3	2	3	2	1			

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester	Total Marks
Marks	- 1	0	4.5	10		(LOL) Walks	
Maiks		U	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department		uter Sci ata Ana	ence Engineering lytics)	Progran	nme: <b>M</b>	.Tech.				
Semester	I		n fi	Course	Catego	ry : PE	*End S	Semester I	Exam Tv	pe: TE
0	Door	DE400			ods / We		Credit		ximum M	
Course Code	PZ3B	DE102		L	Т	Р	С	CAM	ESE	TN
Course Name	Multi	core Ar	chitectures	3	1	-	4	40	60	100
Droroguioito	No Dr	roguioi	e Needed							- 1
Prerequisite										
		-	on of the course, the st						BT Ma (Highes	apping st Leve
	CO1	}	oe multicore architectures a			eristics a	indchallenges	i.	K	3
Course	CO2	Identify	the issues in programming	Parallel Proces	ssors.				K	3
Outcomes	CO3	Make u	ise of OpenMP and MPI.						К	2
	CO4	Design	parallel programming soluti	ions to common	problem	 1S.				
	CO5		re and contrast programmi				grammingforn	arallal	K	
UNIT – I			ocessors	g .c. conarpro		and pro	Periods:9	aranor.	K	.3
			ures – SIMD and MIMD sys	eteme _ Intercor	nnoction	notwork		o and Distri		
Shared Memory	Architec	tures – C	ache coherence – Perform	nance Issues – F	Parallel p	program	s – Symmetri design.	c and Distri	Dutea	CO1
UNIT – II	İ		ram Challenges				Periods:9			
erformance – So	alability	<ul><li>Synch</li></ul>	ronization and data sharing	j – Data races –	Synchro	onizatior	primitives (m	utexes,		CO
cks,semaphores	s, barrier	s) – dead	dlocks and livelocks - comr	munication						
			les, signals, message queu			······································				
			y Programming with O	-		<u></u>	Periods:9			
penMP Execution	n Model	- Memo	ry Model – OpenMP Direct	tives – Work-sha	aring Co	nstructs	<ul> <li>Library fund</li> </ul>	ctions		CO
			allelism – Handling Loops	-						İ
Performance Cor UNIT – IV				.:4L MDI		T				
PERCONANT DES ET AND			emory Programming w		D-:-44		Periods:9			
derived datatype	s – Perfo	rmance	structs – libraries – MPI se evaluation	nd and receive -	- Point-ti	o-point a	ina Collective	communica	ation – MP	CO4
UNIT – V	Paralle	el Progr	am Development			1	Periods:9		***************************************	1
Case studies – n			ree Search – OpenMP and	MPI implement	ations a	nd Com				1
										CO5
Lecture Period	ls: 45		Tutorial Periods: -	Practica	l Perio	ds: -	To	otal Perio	ds: 45	***************************************
ext Books				-				***************************************		
I. "Computer Arc	hitecture	: A Quai	ntitative Approach" by John	ı L. Hennessy a	nd David	d A. Patt	erson.			
			: A Hardware/Software App					andAnoop	Gupta	
			ning: For Windows, Linux, a						19	
l."Programming l	Massivel	y Paralle	l Processors: A Hands-on	Approach" by D	avid B. I	Kirk and	Wen-mei W.	Hwu.		
5."Parallel Progra	ımming:	Techniqu	ues and Applications Using	Networked Wo	rkstation	ns and P	arallel Compu	iters"by Bar	ry	
eference Book					****					
			ion to Parallel Programmin							<del></del>
			ion Programming for Windo					1 (unit 2)		
			amming in C with MPI and							
			ory Application Programmi	ing, 1st Edition,	Concep	ts and S	trategies in M	ulticore App	olication	
Programming, Mo				0000	004-					
	maman	tals of Pa	arailei Multicore Architectur	re CRC Press	2015.					
i. Yan Solihin, Fu		100011	aranor mantoore / normeeta	10, 0110 1 1033,						
b. Yan Solihin, Fu eb References	3	n t								
<ul><li>Yan Solihin, Fulleb References</li><li>https://software.</li></ul>	intel.cor	n/conten	t/www/us/en/develop/topics	s/multi-core.htm	Ī	einn				***************************************
<ul><li>Yan Solihin, Fulleb References</li><li>https://software.</li></ul>	intel.cor .com/re	n/conten	t/www/us/en/develop/topics education/textbooks/compu	s/multi-core.htm	Ī	esign				

5. https://hpc.llnl.gov/training/tutorials

* TE – Theory Exam, LE – Lab Exam

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COs/POs/PSOs Mapping

COs	l	Progra	m Out	)	Prog Outc	ram Spo omes (P	ecific (SOs)		
777	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3
1	2	2	3	-	-	-	2	3	2
2	2	2	3	3	2		3	3	2
3	2	2	3	3	2		2	1	1
4	2	2	3	3	2	3	1	1	
5	2	2	3	3	2	3	2	100	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

## **Evaluation Method**

L.X		Contin	uous As	End	-11		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10		(LOL) Walks	
Marko		0	10	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department		puter Science Engineering Data Analytics)	Prograr	nme: <b>M</b>	.Tech.				
Semester	The second		Course	Catego	rv: PE	*End S	emester F	Exam Type	- TF
Course Code	P230	STD01		ods / We		Credit	ximum M	***************************************	
000.00	1200		L	Т	Р	С	CAM	ESE	TN
Course Name		anced Data Structures and rithms	3	-	-	3	40	60	100
		(Common to M.)	Tech CSE ar	nd CSE	(BDA))		<u> </u>	7.9	
Prerequisite	Basic	s of Data Structures and Algorithn			(,//			- 1 W	
	1.4	ompletion of the course, the stu						BT Ma (Highes	
Course	CO1	Demonstrate various algorithm nota	tions and algo	orithm co	rrectnes	S.	7	K	
Outcomes	CO2	Construct various applications base	d on sorting a	nd tree o	data stru	cture.		K	2
	CO3	Experiment with the performance of	various Text	Processi	ina opera	ations.		K	
	CO4	Apply graph data structures to the re			3 - 1 - 1			K	
	CO5	Illustrate the performance of the poly	vnomial time a	algorithm	1				
UNIT- I		ithm Notations and Representat		aigontiiii	1.	Periods: 9		K	42
Mathematical Ind – Solving Recurre	uction -	Asymptotic Notations – Algorithm Ana juations – Memory Representation of	alvsis - NP-Ha	ard and Nonal Arra	NP-Com	nleteness - E	ecurronco	Equations	CO1
UNIT- II		g and Trees			Ī	Periods: 9		113	12.000
runctions- Binary van Emde Boas Ț	Search rees –	opological sort - Sorting in Linear Tim n Trees – AVL Trees – Red Black tree Data Structures for Disjoint Sets.	ie – Elementa s – Multi-way	ry Data S Search	Structure Trees –E	es – Hash Tal 3-Trees- Fibol	oles – Hasł nacci Heap	n s –	CO2
		Processing Operations				Periods: 9			
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- https://www.w3schools.in/data-structures-tutorial/intro/ https://www.geeksforgeeks.org/data-structures

  * TE Theory Exam, LE Lab Exam

M.Tech. Computer Science Engineering (Big Data Analytics)

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COs		Progra	m Out	comes	(POs	Market in	Program Specific Outcomes (PSOs		
	P01	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3
1	2	2	2	1	2	2	3	2	2
2	1	2	2	2	2	2	3	2	2
3	2	3	3	1	3	3	3	3	3
4	2	3	3	1	3	3	3	3	3
5	2	3	3	1	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

	E.	Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Semester I Course Code P23 Course Name MAC Prerequisite Basics On c Course Outcomes  CO1 CO2 CO3 CO4 CO5  NIT - I Intro Machine Learning Pro tatistics-Bayesian Condi NIT - II Supe troduction-Discriminative Overfitting -Cross-Validati radient Linear Models earest Neighbors - Tree orest - Evaluation of Clai NIT - III Unsu	BDE103 HINE LEARNING  of Artificial Intelligence ompletion of the course, the stu  Understand and outline problems for Design a Decision tree and Random of Implement Probabilistic Discriminative and analyze the results  Use a tool to implement typical Clusted Design and implement an HMM for a applications suitable for different type duction and Mathematical Foundations of Need –History – Definitions – Applicational Probability -Vector Calculus & Corvised Learning  and Generative Models -Linear Regressions – Regressions – Linear Regressions – Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regressions – Linear Regress	L 3  Idents will be each type of many forest for an appreciate and General ering algorithm Sequence Moss of Machine Leations  lications - Adversity - Linear Alge	e able to nachine le pplication tive algor ns for diffe odel type Learning	eek P - earning n rithms for erent type of applica with suita if Disadvar analytical	Credit C 3 an applicati s of application and ide ble justificat Periods:9 ntages &Ch Geometry	ion ations. entify tion. allenges -T -Probability	BT Ma (Highest K3 K3	pping Leve 3 3
Course Name   MAC  Prerequisite   Basics   On c   Course   C01   C02   C03   C04   C05     Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   Intro-   In	HINE LEARNING  s of Artificial Intelligence ompletion of the course, the stu  Understand and outline problems for Design a Decision tree and Random of Implement Probabilistic Discriminative and analyze the results  Use a tool to implement typical Clusted Design and implement an HMM for a applications suitable for different type duction and Mathematical Foundations of Need —History — Definitions — Applications — Mathematical Foundations itional Probability -Vector Calculus & Corvised Learning	Period L 3 Idents will be each type of many forest for an appreciate and General ering algorithm Sequence Most of Machine Legations Ilications - Adversalications - A	e able to nachine le pplication tive algor ns for diffe odel type Learning	eek P - earning n rithms for erent type of applica with suita if Disadvar analytical	Credit C 3 an applicati s of application and ide ble justificat Periods:9 ntages &Ch Geometry	ion ations. entify tion. allenges -T-Probability	BT Ma (Highest K3 K3	pping Leve 3 3 3
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omponent Analysis – Re emporal Difference Lear	commendation Systems - EM algorithm	m. Reinforcem	nent Lear	ning – Ele	ments -Mod	del based L	earning –	CO
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	cal Motivation- Perceptron – Multi-laye	er Perceptron -	– Feed F			ck Propaga	ition-	
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ecture Periods: 45	Tutorial Periods: -	Practica	l Period	ls: -	To	otal Period	ds: 45	
ext Books	chine Learning: An Algorithmic Perspe				t	-		

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- 3. Hal Daumé III, "A Course in Machine Learning", 2017 (freely available online)5
- 4. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", Springer, 2009 (freely available online)
- 5. Aurélien Géron , Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems 2nd Edition, o'reilly, (2017)

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   https://www.tensorflow.org/learn
   https://pytorch.org/docs/stable/index.html

- 5. http://cs229.stanford.edu/

#### COs/POs/PSOs Mapping

COs		Progra	m Out		ram Spo omes (P				
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	1	2	1	2	2	3	3	1	3
2	1	2	1	2	2	3	3	1	2
3	1	2	1	2	2	3	2	1	3
4	2	2	2	3	2	3	1	1	2
5	3	1	2	3	2	3	2	2	_ 1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	End	_ = pr		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	10		15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



^{*} TE - Theory Exam, LE - Lab Exam

Department		outer Science Engineering Data Analytics)	Programme: M.Tech.							
Semester	II		Course	Catego	ory : PE	*En	d Semester E	mester Exam Type: <b>TE</b>		
Course Code P23CSEC01				ods / W		Cred	······································	ximum Ma		
Course Code	L	Т	Р	С	CAM	ESE	TM			
Course Name	Infor	nation Visualization	3	-	-	3	40	60	100	
		(Common to M.T	Tech CSE ar	nd CSE	(BDA))					
Prerequisite		rerequisite needed								
	On completion of the course, the students will be able to									
	CO1 Analyze the different data types, visualization types to bring out the insight.									
Course	CO2 Make use of Visualization Techniques									
Outcomes	CO3	Illustrate different Visual Analytics				l .		K3		
v * *	CO4	Make use of Data Visualization Tools	S					K2 K3		
	CO5 Demonstrate Visualization dashboard creations								K2	
UNIT-I	Introd	luction				Periods	· 9			
Validation. Statistic Scatter plot - Regr	cal chan ession c		ction - Dimer e Chart - Hist	nsions a ogram -	nd Meas Pie char	ures - An t- Frequer	alysis:Four Lev ncy Polygon - E	rels for Box plot -	CO1	
UNIT-II		lization Techniques				Periods		1-2-2-		
techniques - visu	arious di alizing d	ata visualization tools - Scalar and poi cluster analysis – K-means and Hierar	nt techniques chical Cluste	s - vecto r technic	r visualiz ques.	ation tech	niques -multidi	mensional	CO2	
UNIT-III		/isualization and Visual Analytic			Ī	Periods	: 9			
Map - Map Color	and Otl ques - Id ay - Par	ration – Text data visualization – Spat ner Channels Manipulate View – Visua con-based techniques - Pixel-oriented allel coordinates Visualization Tools	al Attributes -	Multiva	riate data	visualiza	tion – Geometi Scatterplot mat	ric	СОЗ	
Tableau functions	and lo	gics: Marks and Channels-Arrange Ta	bles- Arrange	e Spatial	I Data- F				CO4	
UNIT-V		ization Dashboard Creations		- opatia	- Data 1	Periods			1001	
Data Dashboard- Workbook Optimiz marketing-insuran	Taxono zation -	mies- User Interaction- Organizationa Protection and common mistakes. Da	l Functions-D shboard crea	ashboa tion usir	rd Desigr ng visuali	ı – Works	heets - Workho	ooks – nance-	CO5	
Lecture Period	s: 45	Tutorial Periods: -	Practica	al Perio	ods: -		Total Perio	ds: 45	Α	
ext Books				***************************************		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			***************************************	
2.Michael Fry, Jef Western College i	frey Ohl Publishi en," Info	zation Analysis and Design, 1st editio mann, Jeffrey Camm, James Cochrar ng, 2021 mation Graphics", Taschen America I	n, Data Visua	s, United	d States, Exploring	2015. g and Exp	laining with Da	ita, South-		
		, 1st edition, O'Reilly Media, United S	tates 2008							
Avril Coghlan, A Colin Ware,Inform Riccardo Mazza,	little bo nation V Introduc	ok of R for multivariate analysis, 1st issualization Perception for Design,2 nation to Information Visualization,1st Eals of Data Visualization,0'Reilly Med	edition, Weld d Edition ,Els ditionSpringe	evier Sc	ience.20	er Institut 19	e,United Kingo	lom, 2013.		
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- 5. https://www.nobledesktop.com/learn/data-visualization/video-tutorials

* TE - Theory Exam, LE - Lab Exam

LV

COs		Progra	m Out	Program Specific Outcomes (PSOs)					
	PO1	PO2	PO3	P04	PO5	P06	PSO1	PSO2	PSO3
1	1	2	1	2	2	3	3	. 1	3
2	1	2	1	2	2	3	3	3	2
3	1	2	1	2	2	3	2	1	3
4	2	2	2	3	2	3	1	1	2
5	3	1	2	3	2	3	2	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	uous As	End	5, 841		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	10		15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department		uter Science Engineering ata Analytics)	Prograi	mme: <b>N</b>	/I.Tech.		7.1-2		*
Semester	II.		Course	Catego	ory : PE	*End S	Semester	Fyam Ty	ne. TE
Course Code	Dasc	SEC03		ods / W			*End Semester Exam Type: TI Credit Maximum Marks		
- Course Code	F230	SEC03	L	Т	Р	C	CAM	ESE	TM
Course Name	Text	Web and Social Media Analytics	3	-	-	3	40	60	100
December in its	Na Da	(Common to M.Te	ch CSE a	nd CSE	E(BDA))		F 1		
Prerequisite		erequisite needed							
	On cc	empletion of the course, the stude	ents will b	e able	to				apping
	CO1	Understand Text Mining						(Highes	t Leve (2
Course	CO2	Illustrate Web Mining							(3
Outcomes	CO3	Make use of Social Network Analys	sis						
	CO4	Exploit Social Media Mining						}	(2
	CO5	Make use of Sentimental Mining							(3
UNIT- I	Introd	uction to Text Mining				Periods: 9	2	<u> </u>	3
Text Representation		nization, stemming, stop words, TF-IDF,	Feature V	ector Re	enresents	tion NED N	arom mod		CO1
Text Clustering, Te	xt Class	sification, Topic Modeling-LDA,HDP	, outure v	00101 111	opiesente	ation, NEIX, IV-	-gram mod	ieling.	001
UNIT- II	Introd	uction to Web-Mining				Periods: 9			
nverted indices an	d Boole	an queries. PLSI, Query optimization, p	age rankin	g. Web	Crawling-	Crawler Alge	rithms,		CO2
implementation iss	ues, Ev	aluation, Session & visitor Analysis, Visi dictions based on web user transactions	tor Seame	ntation,	Analysis	of Sequential	&		
		mentals of Social Network Analys			T				
						Periods: 9			-T
of Networks: One-N	Ande Ti	e, Fundamentals concepts in Network A wo-Mode, Affiliation, Ego-centered and	naiysis: 50 Special Dw	ciogram	i, Sociom	etry. Social N	etwork Da	ta: Types	CO3
Collection, Notation	ns for So	ocial Network Data: Graphs, Directed, Si	nged Valu	adic ive	lworks, N	etwork Data,	Measurem	ent and	003
		Media Mining	ngcu, valu	eu grap			ns and Ma	trices	
	al Media	a Network Essentials of Social graphs, S	Social Note	iorko M		Periods: 9			T = = :
ocialMedia. Beha	vioral Ar	nalytics, Influence and Homophily, Reco	mmendatio	n in So	oueis, ini rial Media	ormation Diffi	usion in		CO4
JNIT- V	Sentim	ental Mining				Pariode: 0			<u> </u>
entiment classifica	tion fea	ture based opinion mining, comparative	sentence a	nd relat	ional min	ing, Opinion	spam		CO5
Lecture Periods	s: 45	Tutorial Periods: -	Practica				tal Perio	ds: 45	003
ext Books				***************************************					
i Neza Zaiai ai ii, ivi	ent Ana	ng-Exploring Hyperlinks, Contents, and ad Ali Abbasi and Huan Liu, "Social Med lysis and Opinion Mining", Morgan & Cla	dia Mining -	– An Inti	roduction!	ond Edition, 2 ", Cambridge	2011. Universityl	Press, 201	4.
Nitin Indurkhya, F	red J D	amerau, "Handbook of Natural Languag	e Process"	. 2nd F	dition CR	C Press 201	0		•••••••••••••••••••••••••••••••••••••••
Matthew A.Russe	ii, "Minii	ig the social web". 2nd edition- O'Reilly	Media 201	12					
Ganis, Kohirkar,"	ngor Po Social M	latkan, P. Oscar Boykin, Antonios Challed and Analytics", Pearson Education Indi	kiopoulos,":	Social M	ledia Dat	a Mining and	Analytics",	Willey, 20	18
Marshall Sponder	," Socia	Media Analytics: Effective Tools for Bu	ilding, Inter	rpreting,	and Usir	na Metrics". M	lcGraw-Hill	l Education	2014
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.nttps://machinele	arningge tascione	eek.com/text-analytics-for-beginners-usi	ng-python-	nltk/		_			
.nttps://www.tutori	alspoint	e.com/a-guide-text-analysis-text-analyti .com/web_analytics/index.html			dt7b7874	7			
.https://www.tutori	alspoint	.com/social media marketing/social me	edia_analy	sis.htm					
.nttps://www.simpl	ilearn.co	om/web-analytics-guide-for-newbies-arti	cle						

* TE – Theory Exam, LE – Lab Exam

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COs/POs/PSOs Mapping

COs		Progra	m Out	Program Specific Outcomes (PSOs)					
	P01	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3
1	2	2	-	-	<b>1</b> 4		1	1	1
2	2	2	2	3	2		1	2	1 1
3	1	1	2	2	A-10	1 -90	1	2	1
4	1	1	-	3	2	-	1	2	1
5	3	2	2	2	2	3	a 1 4	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

### **Evaluation Method**

		Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department	(Big Data Analytics)								
Semester	II		Course	Catego	ory : PE	*End S	emester E	xam Type	: TE
Cauraa Cada	<u> </u>			ods / W		Credit	······································	ximum Ma	
Course Code	P23C	STD02	L	Т	Р	С	CAM	ESE	TM
Course Name	Spee	ch and Language Processing	3	-	-	3	40	60	100
		(Common to M.T		nd CSE	(BDA))				
Prerequisite	Natura	al language processing, Machine Learr	ning						
	On co	ompletion of the course, the stud	lents will b	e able	to		-	BT Ma (Highes	
Cauras	CO1	Understand the basics of NLP	- 4 32			1 725 - 19		K	2
Course Outcomes	CO2	Apply the basic ML and DL techniques	s for NLP					К	3
Outcomes	CO3	Understand and realize the advanced	NLP Technic	ques.				K	2
	CO4	Understand the concept of NLU, NLG	and apply th	e conce	pt of Infor	nation Retrie	eval	К	2
	CO5	Apply ethics to be followed while build	ing NLP App	lications	and how	to use NLP I	ibraries	K	3
UNIT – I		duction   Alexander   Alexander	må i fran	100 100		Periods:9			
		rocessing: Tokenization, Stemming an d Count Vector, Word Sense Disambig		ation, Po	s Tagging	, Named Ent	ity Recogn	ition. NLP	CO1
-	Hidden N	uage Modelling Markov Models, Maximum Likelihood E		( T	55 X.51				CO2
N -gram Models, I Learning.Text Cla CNN for NLP. <b>UNIT – III</b>	Hidden N ssification	Markov Models, Maximum Likelihood E on and Sentiment Analysis, Topic Mode nced NLP Techniques	elling and Clu	ustering,	Word Em	ervised and subeddings, R			
N -gram Models, I Learning.Text Cla CNN for NLP. <b>UNIT – III</b> Sequence- to -Se	Hidden N ssification Advar quence I	Markov Models, Maximum Likelihood E on and Sentiment Analysis, Topic Mode nced NLP Techniques Models, Attention Mechanisms, Transfo	elling and Clu	ustering,	Word Em	ervised and Subeddings, R			
N -gram Models, I Learning.Text Cla CNN for NLP. <b>UNIT – III</b>	Hidden Messification  Advanguence Messification	Markov Models, Maximum Likelihood E on and Sentiment Analysis, Topic Mode nced NLP Techniques Models, Attention Mechanisms, Transfo uage Understanding and General	elling and Clu	ustering,	Word Em	ervised and subeddings, R			
N -gram Models, I Learning.Text Cla CNN for NLP. UNIT – III Sequence- to -Sec UNIT – IV	Advar Advar Quence I Langu Retrie	Markov Models, Maximum Likelihood E on and Sentiment Analysis, Topic Mode nced NLP Techniques Models, Attention Mechanisms, Transfo uage Understanding and General	elling and Clu ormer Archite	ecture: B	Word Em	ervised and subeddings, R Periods:9 Periods:9	NN & LSTN	Ms for NLP	
N -gram Models, I Learning.Text Cla CNN for NLP. UNIT – III Sequence- to -Sec UNIT – IV	Advar Advar quence I Langu Retrice Question Search,	Markov Models, Maximum Likelihood E on and Sentiment Analysis, Topic Mode nced NLP Techniques Models, Attention Mechanisms, Transfo uage Understanding and General eval on Answering, Dialogue Systems and C	elling and Clu ormer Archite tion, Inforn	ecture: B	Word Em	ervised and subeddings, R Periods:9 Periods:9	NN & LSTN	Ms for NLP	CO3
N -gram Models, I Learning.Text Cla CNN for NLP. UNIT – III Sequence- to -Sec UNIT – IV Text Generation, TextIndexing and UNIT – V Bias and Fairness	Advar quence I Langu Retrie Question Search, NLP I	Markov Models, Maximum Likelihood E on and Sentiment Analysis, Topic Mode nced NLP Techniques Models, Attention Mechanisms, Transfo uage Understanding and General eval n Answering, Dialogue Systems and Co Text Summarization. Fools, Libraries, Applications, Et	ormer Architetion, Inforn chatbots. Machics ns. NP librar	ecture: B nation chine Tr	Word Em	Periods:9 Cross Lingu Periods:9 , Tensor Flo	INN & LSTN	r Learning.	CO3
N -gram Models, I Learning.Text Cla CNN for NLP. UNIT – III Sequence- to -Sec UNIT – IV Fext Generation, FextIndexing and UNIT – V Bias and Fairness Applications: Sen	Advar quence I Langu Retric Question Search, NLP To in NLP	Markov Models, Maximum Likelihood Epon and Sentiment Analysis, Topic Models, Mced NLP Techniques Models, Attention Mechanisms, Transformage Understanding and General eval  Answering, Dialogue Systems and Context Summarization.  Tools, Libraries, Applications, Etc., Privacy Concerns in NLP Applicationallysis, Named Entity Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition i	ormer Archite tion, Inforn hatbots. Mac hics ns. NP librar eal World Da	ecture: B nation chine Tr	Word Em	Periods:9 Cross Lingu Periods:9 , Tensor Flossification for	INN & LSTN  Ial Transfel  Ow, Pytorch  Various D	r Learning.  n. NLP omains.	CO3
N -gram Models, I Learning.Text Cla CNN for NLP. UNIT – III Sequence- to -Sec UNIT – IV Fext Generation, FextIndexing and JNIT – V Bias and Fairness Applications: Sent Lecture Period	Advar quence I Langu Retric Question Search, NLP To in NLP	Markov Models, Maximum Likelihood E on and Sentiment Analysis, Topic Mode nced NLP Techniques Models, Attention Mechanisms, Transfo uage Understanding and General eval n Answering, Dialogue Systems and Co Text Summarization. Fools, Libraries, Applications, Et	ormer Architetion, Inforn chatbots. Machics ns. NP librar	ecture: B nation chine Tr	Word Em	Periods:9 Cross Lingu Periods:9 , Tensor Flossification for	INN & LSTN	r Learning.  n. NLP omains.	CO3
N -gram Models, I Learning.Text Cla CNN for NLP. UNIT - III Sequence- to -Sec UNIT - IV  Text Generation, TextIndexing and UNIT - V Bias and Fairness Applications: Sent Lecture Period Text Books Cambridge, Mas Daniel Jurafsky Rajesh Arumuga	Advar quence I Langu Retrice Question Search, NLP 1 s in NLP timent A Is: 45	Markov Models, Maximum Likelihood Epon and Sentiment Analysis, Topic Models, Mced NLP Techniques Models, Attention Mechanisms, Transformage Understanding and General eval  Answering, Dialogue Systems and Context Summarization.  Tools, Libraries, Applications, Etc., Privacy Concerns in NLP Applicationallysis, Named Entity Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition in Recognition i	elling and Clubrance Architection, Information Chatbots. Machics  Ins. NP libraries World Date Practica  Natural Languary Processing", atural languary	ecture: B nation chine Tr ries: NL ata Sets, al Peric	Word Em  BERT, GPT  anslation,  TK, Spacy, Text Clast  rocessing  tion, Prent	Periods:9 Cross Lingu Periods:9 Cross Lingu Periods:9 Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Floring Tensor Flori	NN & LSTN  ual Transfer  ow, Pytorch  Various D  otal Perio  on, The MIT	r Learning.  n. NLP omains. ods: 45	CO4

5. https://www.javatpoint.com/nlp

* TE – Theory Exam, LE – Lab Exam

2. https://gtuematerial.in/natural-language-processing-3170723/

4. https://www.ultimate.ai/blog/ai-automation/how-nlp-text-based-chatbots-work

1. https://www.udemy.com/course/chatbot/

M.Tech. Computer Science Engineering (Big Data Analytics)

de

3. https://chatbotsmagazine.com/understanding-the-need-for-nlp-in-your-chatbot-78ef2651de84?gi=ecca664b642a

# Academic Curriculum and Syllabi R-2023

COs/POs/PSOs Mapping

COs		Progra	m Out	Program Specific Outcomes (PSOs)					
	P01	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3
1	2	2	2	3	3	2	2	2	2
2	2	3	3	3	2	1	2	2	1
3	2	3	3	2	1	-	2	2	1
4	2	2	3	2	3	2	2	3	1
5	3	2	2	3	3	1	2	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

### **Evaluation Method**

		Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department	-	uter Science Engineering ata Analytics)	Prograr	nme: <b>N</b>	l.Tech	ı.				
Semester	l II		Course	Catego	ory : P	E *End	*End Semester Exam Type			: TE
0		DEC02	)	ods / W		Cred	lit	Ma	ximum Ma	rks
Course Code			L	Т	Р	С	(	CAM	ESE	TM
Course Name	Web	Analytics and Development	3	-	-	3		40	60	100
	•	(Common to M.Te	ch CSE(BD	A) and	AI&D	S)				
Prerequisite	1	et Programming							-	
	On co	ompletion of the course, the stud	dents will b	e able	to				BT Ma (Highest	
_	CO1	Understand the Web analytics platfor	m, and their	evolutio	n.				K2	2
Course	CO2	Use the various Data Streams Data.							K	3
Outcomes	CO3 Know how the survey of capturing of data will benefit.								K	2
	CO4	Understand Common metrics of web	as well as k	Pl relat	ed con	cepts.		F T 7	K	2
	CO5	Apply various Web analytics versions			-				K	3
UNIT – I	Intro	duction				Period	s:9			
Content characte	erization	terms: Site references, Keywords and terms, Conversion metrics; Categories analytics, Advantages, Limitations								CO1
UNIT – II		Collection				Period		<u>,                                    </u>	r smetse:	F.
Brand/Advocacy measurement, IS	and Su SP-base	logs, Web Beacons, JavaScript tags, ipport; Research data: Mindset, Orgard measurement, Search Engine data.	Packet Sniffi nizational str	ng; Out ucture,	comes Timing	; Competitiv	e Data:	, Lead g : Panel-	generation, Based	CO2
UNIT – III		ative Analysis onducting a heuristic evaluation, Bene				Period			., .,	T
data: Web logs	or Javas I web a	rveys: Website surveys, post-visit surve Script's tags, Separate data serving a nalytic tool, Understanding click strea	nd data cap	ture, Ty	pe and	size of data	a, Inno	vation,	Integration,	
UNIT – IV	Webl	<b>Metrics</b>				Period			-	
on site, new visite Real time report KPI, characterist	s; Optimi , Audien ics, Nee	Page views, Visits, Unique visitors, Uni ization (e-commerce, non-e- commerce nce report, Traffic source report, Custo ed for KPI, Perspective of KPI, Uses o entext Transfer Protocol), Server Log F	e sites): Impr om campaigi f KPI. Releva	oving bons, Con ant Tecl	ounce r tent re nnologi	ates, Optimi: port, Google	zing Ad analyt	lWords ics, Inti	campaigns; roduction to	
UNIT – V		Analytics 2.0				Periods	s:9	<u> </u>		\
Veb analytics 1.0 ourcesToolbar d affic trends Anal enchmarkingCat	, Limitati ata, Pan yzing co egories	ions of web analytics 1.0, Introduction el data ,ISP data, Search engine data impetitive site overlap and opportunition of traffic: Organic traffic, Paid traffic; Goncerns, Privacy issues.	, Hybrid data es. Google A oogle websit	i, Webs Analytics e optim	ite trafi s: Brie izer, In	fic analysis: introduction nplementatio	Compa and won tech	iring lor orking, nology,	ng term AdWords,	CO5
Lecture Period	ds: 45	Tutorial Periods: -	Practic	al Perio	ods: ·	•	Tota	l Perio	ds: 45	
ext Books										
		eb Metrics with Google Analytics, Wiley								×
		Rajaraman, and Jeffrey D. Ullman , "Minir								
3.Kaushik A., We References Boo		ics 2.0, The Art of Online Accountability	y and Scienc	e of Cu	stomer	Centricity, W	VileyPul	blishing	, Inc. 1st ed	, 2010
Brian Clifton , "/ Jerri L. Ledford edro Sostre ,"We	Advance and Joe b Analy k ,"Web	s: Proven methods for measuring web sid Web Metrics with Google Analytics" Teixeira, "Learning Web Analytics: A tics For Dummies", For Dummies, See Analytics 2.0: The Art of Online Account	, Sybex, Thing Beginner's ( cond Edition	d Editio Guide to , 2012	n, 201 Goog	2 le Analytics",	, O'Reil			, 2009
		earning.com/courses/big-data-analytic	s-dse							
pe	., g. outic	3								

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2. https://intellipaat.com/big-data-hadoop-training/

## 3. https://www.edureka.co/comprehensive-hive

### COs/POs/PSOs Mapping

COs		Progra	m Out	comes	)	Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3	
1	3	3	2	1	-	-	-	1	3	
2	3	3	2	1	-	-		1	3	
3	3	3	2	1	-	. =		1	3	
4	3	3	2	1	-	-	_	1	3	
5	3	3	2	1			-	1	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

. 0.7		Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



^{*} TE – Theory Exam, LE – Lab Exam

Department		outer Science Engineering Pata Analytics)	Prograr	nme: N	1.Tech.					
Semester	111		Course	Catego	orv: PE	*End	Semeste	r Exam Ty	ne: TF	
O O	P23E	BDE204		ods / W			Credit Maximum I			
Course Code			L	Т	Р	С	CAM	ESE	TM	
Course Name	Exper	t System and Decision Making	3	-	-	3	40	60	100	
Prerequisite	<u> </u>	ial Intelligence, Knowledge Representat					***************************************		)	
	On c	ompletion of the course, the stud	ents will b	e able	to		- 215	BT Ma (Highest		
0	CO1	Familiar with basic concepts of Expert	System					K		
Course Outcome	CO2	Understanding the concepts of Expert S	System desi	gn				K	2	
Gutoome	CO3									
	CO4	Ability to develop corporate strategy, or		l develo	pment ar	nd change		K	3	
	CO5	programs and ensure their implementa								
UNIT – I		Decision-making methods and technol duction to Expert Systems	ogies variety	y and the	eir applica	Periods: 9		K	<b>3</b>	
<u> </u>	11100	duction & Expert Systems				renous. 9			CO1	
system, Knowled UNIT – II	ge base	Repair, instruction and control-Basic exp e- Production rule, Sematic net and in rt Systems Design and Developme	nference en	gine, Ba	ckward c	haining and for Periods: 9	orward cha	ining.		
uzzy logic, comme xpert system, typ	ercial ap es of er	rules, methods of dealing with uncerta oplications of fuzzy logic. How to select rors to expect in the development stag- cycle of an expert system, how to do a	an appropries, the role	iate prol of the kı	blem, the	stages in the	e developr	nent of an		
UNIT – III		em Solving and Decision Making.				Periods: 9		***************************************	<b></b>	
efinition of the pr	roblem	and potential causes for the problem-lo	dentifying alf	ternative	es for app	proaches to r	esolve the	problem	CO3	
		resolve the problem. – Implementation						ementation		
		ersus Organic Approach to Problem Sc	olvingDisc	over Yo			/le.			
UNIT – IV		ion Making Process		T:		Periods: 9				
Requirements ide scheme)Paired	ntificatio	ing processFormal decision- makir onGoal establishmentEvaluation crit arison Analysis.	eria develor	oment	General	sProblem o Decision–Ma	lefinition king Proce	SS	CO4	
UNIT – V	V	ion Making Methods		***************************************		Periods: 9		1		
ecision Analysis t	echniqu	uesPros and Cons AnalysisPros and	d Cons Anal	vsis(exa	ample) - l	Kenner-Treac	e (K-T) D	ecision	CO5	
nalysisKepner-	Tregoe	(K-T) Decision Analysis (example),K- Tr	oubleshooti	ng Meth	nodology.	- Determining	g pros and	cons		
franchising by us			T =							
Lecture Period ext Books	S: 45	Tutorial Periods: -	Practica	I Perio	ds: -	To	tal Perio	ds: 45		
Bratko, I., Prolog ublishers Inc; 4th Stuart Russel, Pe Rajasekaran. S	edition, eter Nor	mming for Artificial Intelligence (Internat 2011. vig "Artificial Intelligence – A Modern Ap akshmi Pai. G.A. "Neural Networks, Fuz	proach", 3rd	d Edition	n, Pearso	n Education 2	2009.			
mited, 2003 eference Book										
		uction to Machine Learning (Adaptive C	omputation	and Ma	ohino I sa	rning corio-\	The MIT!	Droom	- d	
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# Academic Curriculum and Syllabi R-2023

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## COs/POs/PSOs Mapping

COs		Progra	m Out	Program Specific Outcomes (PSOs)							
CTV.	P01	PO2	PO3	PO4	PO5	PO6	PSO1 PSO2 PS				
<b>1</b>	2	2	-	-	1	-	1	1	1		
2	2	2	2	3	2	-	1	2	1		
3	1	1	2	2	-	-	1	2	1		
4	1	1	-	3	2	-	1	2	1		
5	3	2	2	2	2	3	1	2	1		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

### **Evaluation Method**

		Contin	uous As	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

^{*} TE - Theory Exam, LE - Lab Exam

		uter Science Engineering Pata Analytics)	Progran	nme: <b>M</b>	.Tech.				
Semester	<u>\</u>		Course	Catego	rv : PE	*End S	Semester	Exam Typ	e TF
				ods / We		Credit Maximum			
Course Code	P23B	DE205	L	Т	Р	C	CAM	ESE	TM
Course Name	Inforn	nation Retrieval	3	-		3	0		00
Prerequisite	No Pre	erequisite needed							
	Į	mpletion of the course, the st	udents will b	e able	to			BT Ma (Highes	
	CO1	Build an Information Retrieval syst	em using the av	/ailable t	ools.			K	3
Course	CO2	Identify and design the various of				etrievalsyste	m.	K	3
Outcomes	CO3	Categorize the different types of IR	R Models.					K	
	CO4	Apply machine learning techniques which is used for Efficient Informati	s to text classifi	cation ar	nd cluster	ing	- 7 9	K	
2	CO5	Make use of Web Searching						K	3
UNIT- I	Introd	luction	_	***************************************		Periods: 9	4		<u> </u>
Open-Source IR	System	ical Issues - Retrieval Process – Ar Is–History of Web Search – Web a Search engine.	chitecture - Bo Characteristics	olean R –The im	etrieval – pact of th	Retrieval ne web on IR	Evaluation —IR Vers	– sus Web	CO1
UNIT- II	Model			81251 =		Periods: 9			
Pattern Matching	J. Query and Glo	rted Indices – Index Construction ar Operations -Query Languages – Qu	nd Index Comp	ression. a - Relev	Searchin	<b>Periods: 9</b> g - Sequentiand edback and	al Searchi Query Ex	ing and	Ī
UNIT-IV		obal Analysis – Measuring Effectiv	eness and Eff	ciency			•	pansion -	CO3
		ation and Parallel Information	veness and Eff Retrieval	iciency		Periods: 9		•	CO3
Traditional Effect Measures – Mea	tiveness asuring (		veness and Effi Retrieval n – Minimizing	ciency Adjudica	ation Effect y Schedu	ct – Nontradi lling – Paralle	tional Effe	ctiveness	<u> </u>
Traditional Effect Measures – Mea Retrieval – Paral <b>UNIT-V</b>	tiveness asuring l lel Quen Searcl	Ation and Parallel Information  Measures – Statistics in Evaluation  Efficiency – Efficiency Criteria –Qu  y Processing – MapReduce  hing the Web	veness and Effi Retrieval n – Minimizing ueueing Theory	ciency Adjudica / – Quer	ation Effect y Schedu	ct – Nontradi lling – Paralle <b>Periods: 9</b>	tional Effe	ctiveness	
Traditional Effect Measures – Mea Retrieval – Paral UNIT-V Searching the W	tiveness asuring I lel Quen <b>Searcl</b> eb -Stru	ation and Parallel Information  Measures – Statistics in Evaluatior  Efficiency – Efficiency Criteria –Qu  y Processing – MapReduce	veness and Effi Retrieval n – Minimizing Jeueing Theory Jech – Static an	Adjudica	ation Effect y Schedu l	ct – Nontradi lling – Paralle <b>Periods: 9</b> na – Web Ci	tional Effe el Informat	ctiveness ion	CO4
Traditional Effect Measures – Mea Retrieval – Paral  UNIT-V Searching the Wo – Link Analysis - Digital Libraries	tiveness asuring I lel Quen <b>Searci</b> eb –Stru XML Re	Ation and Parallel Information  Measures – Statistics in Evaluation  Efficiency – Efficiency Criteria –Qu  y Processing – MapReduce  hing the Web  acture of the Web –IR and web sea	veness and Effi Retrieval n – Minimizing Jeueing Theory Jech – Static an	Adjudica	ation Effect y Schedu   I   I   I   I   I   I   I   I   I   I	ct – Nontradi ling – Paralle Periods: 9 ng – Web Ci ching Parallel	tional Effe el Informat	ctiveness ion d Indexing buted IR –	CO4
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- 3. https://www.edureka.co/comprehensive-hive
  - * TE Theory Exam, LE Lab Exam

NE

M.Tech. Computer Science Engineering (Big Data Analytics)

2. A. 3.270

# COs/POs/PSOs Mapping

COs	1	Progra	m Out	Program Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3
1	2	2	1	-	1		1	1	1
2	2	2	2	3	2	_	1	2	1
3	1	1	2	2	2	-	1	2	1
4	1	1	2	3	2	3	1	2	a 1
5	3	2	2	2	2	3	1	2	. 1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

### **Evaluation Method**

	-4)	Contin	uous As	End	100		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

JV.

Department	Comp	uter Sc	ence Engineering	Prograi	nme: <b>N</b>	l.Tech.			***************************************		
	(Big D	ata Ana	alytics)								
Semester	11			Course	Catego	ory: <b>PE</b>	*End S	emester l	Exam Type	e: <b>TE</b>	
Course Code	P23E	DE206		Perio	ods / W	'eek	Credit	Ma	aximum Ma	arks	
				L	T	Р	С	CAM	ESE	TM	
Course Name	Supp	ly Chai	n Analytics	3	-	-	3	40	60	100	
Prerequisite	No Dr	oroguialt	e needed								
ricicquione			on of the course, the stu	donto will h	o oblo	40			DEM		
	On co	mpieti	on or the course, the stu	ideniis wiii b	e able	to .			BT Ma		
	CO1	Unders		(Highest Leve							
Course	CO2	Illustra									
Outcomes	CO3	Analyz		K2 K3							
	CO4	Make u	se of transportation network	models					K		
	CO5	1	e MCDM Models						K3		
UNIT - I		uction					Periods:9				
Descriptive, pred	ictive a	nd presc	riptive analytics, Data Drive	en Supply Ch	ains – E	Basics, tr	ansforming s	upplychai	ins.	CO1	
UNIT - II	Wareh	ousing	Decisions			·-pA	Periods:9		areana .	.1	
P-Median Method Methods.	s - Guid	ed LP Ap	proach, Greedy Drop Heuris	tics, Dynamic	Locatio	n Models	, SpaceDete	mination a	and Layout	CO2	
UNIT - III	Invent	ory Mai	nagement			Ī	Periods:9			<u> </u>	
Oynamic Lot sizin	g Metho	ds, Mult	-Echelon Inventory models,	Aggregate In	ventory	svstem a		k Analysis	in Supply	T	
Chain, Risk poolin	g strate	gies.						,		CO3	
UNIT - IV	Transp	ortatio	n Network Models				Periods:9			A	
Minimal Spanning	Tree, S	hortest F	ath Algorithms, Maximal Flo	w Problems, 7	ranspor	tation Pro	oblems, Setc	overing an	d Set	CO4	
······································			alesman Problem, Scheduling	g Algorithms.							
UNIT - V		l Model					Periods:9				
Analytic Hierarchy ANP), TOPSIS.	Process	(AHP), [	Data Envelopment Analysis (E	DEA), Fuzzy L	ogic a Te	echnique	s, theanalytic	al network	process	CO5	
Lecture Period	ls: 45		Tutorial Periods: -	Practica	l Perio	ds: -	To	otal Perio	ds: 45	L	
ext Books				L							

- 1. Nada R. Sanders, "Big data driven supply chain management: A framework for implementing analytics and turning information into intelligence", Pearson Education, 2014.
- 2. Michael Watson, Sara Lewis, Peter Cacioppi, Jay Jayaraman, "Supply Chain Network Design: Applying Optimization and Analytics to the Global Supply Chain", Pearson Education, 2013.
- Anna Nagurney, Min Yu, Amir H. Masoumi, Ladimer S. Nagurney, "Networks Against Time: Supply Chain Analytics for Perishable Products", Springer, 2013.

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   Gerhard J. Plenert, "Supply Chain Optimization through Segmentation and Analytics", CRC Press, Taylor & Francis Group, 2014.
   T. A. S. Vijayaraghavan, "Supply Chain Analytics", Wiley, 2021.
- 4. Peter W Robertson," Supply Chain Analytics Using Data to Optimise Supply Chain Processes", Routledge, 2020

#### Web Referance

- 1. https://www.researchgate.net/publication/255621095_Guidebook_to_Decision-Making_Methods
- 2. https://docplayer.net/415860-Guide-to-cost-benefit-analysis-ofinvestment-projects.html
- 3. http://www.informs.org/Community/DAS
- 4. http://www.mindtools.com/pages/article/newTED 01.htm
- 5. http://managementhelp.org/groups/group-decision-making.htm
  - * TE Theory Exam, LE Lab Exam

10

COs/POs/PSOs Mapping

4 24		Progra			(POs	Program Specific Outcomes (PSOs)			
COs	P01	PO2	PO3	PO4	PO5	PO6	PS01	PSO2	PSO3
1	2	2	2	3	2	2	3	2	2
2	3	2	2	2	2	2	3	2	2
3	3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

### **Evaluation Method**

117		Contin	uous Ass	sessment Mark	s (CAM)	End	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Marks
			4.5	10	5	60	100
Marks	1	0	15	10			· 1

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5



Department	1 1 10	Data An	cience Engineering alytics)	Prograr	mme: <b>M.</b>	Tech.				
Semester	II			Course	Catego	v· PF	*End	Semeste	r Exam Ty	no: T
Course Code	Boop	DE00=			ods / We		Credit	······································	ximum Ma	
Course Code	PZ3B	DE207		L	T	Р	С	CAM	ESE	TN
Course Name	Crypt Secu		and Information	3	-	-	3	40	60	100
Prerequisite	III.				<u> </u>			1		
Trerequisite		erequisit	e needed n of the course, the stu		1-1- 4	1				
	Once	mpieno	ii oi tile course, tile sti	idents will b	e abie t	0			BT Ma	
2.7.4	CO1	Underst	and the fundamentals of n	etworks securi	tv secur	ity archite	ecture three	te and	(Highest	
Course		vulneral		ctworks securi	ty, secur	ity arcini	ecture, tillea	is and	K	2
Outcomes	CO2		e different cryptographic op	perations of sy	mmetric o	cryptogra	aphic algorith	ms	100	•
No.	CO3	L	e different cryptographic op						K	
Academ	CO4								K	2
	1.72	<del>}</del>	and various Security practi						K	2
iment	CO5	Underst vulnerat	and the fundamentals of ne pilities	etworks securi	ty, securi	ty archite	ecture, threat	ts and	K	2
UNIT-Í		luction	Professional Aspects of Se			-640 5	Periods: 9	E 2	L IV	
	Block	Cipher	system – cryptanalysis. and Data EncryptionSta				Periods: 9	m v v		
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M.Tech. Computer Science Engineering (Big Data Analytics)

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# Academic Curriculum and Syllabi R-2023

* TE - Theory Exam, LE - Lab Exam

COs/POs/PSOs Mapping

COs		Progra	m Out	Program Specific Outcomes (PSOs)					
	P01	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	2	1	3	1	-	1	1	1
2	2	2	2	3	2	-	1	2	1
3	1	1	2	2	1	-	1	2	1
4	1	1	2	3	2	-	1	2	1
5	3	2	2	2	2	3	1.	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

# **Evaluation Method**

TEATIN

		Contin	uous As	End			
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	larks 10		15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department		outer Science Engineering Pata Analytics)	Prograr	nme: <b>N</b>	l.Tech.	9			
Semester	(=. <u>9</u>		Course	Catego	orv: PE	*End	Semester	Exam Ty	pe: <b>TE</b>
		2		ods / W		Credit	······································	ximum Ma	
Course Code	P23B	DE208	L	T	P	C	CAM	ESE	TM
Course Name	Seman	itic Web and Knowledge	3	-	-	3	40	60	100
	Manag	_							
	· .			<u> </u>			<u> </u>		
Prerequisite		s of Web						T ==	
	On co	ompletion of the course, the stu	idents will b	e able	to			BT Ma (Highest	
	CO1	Demonstrate the semantic web tech	nnologies like	Semant	ic Web te	echnologies		(riighes	***************************************
Course	CO2	Learn the various semantic web app	plications				1 4	K	3
Outcomes	CO3	Identify the architectures and challe		ng socia	l network	(S		K	
CO4 Use the knowledge management tools.								K	
CO5 Develop knowledge management Applications.								K	
UNIT- I	Intro	duction to Semantic				Periods: 9	R	····L	
Γoday's Web, The	Next G	and Intelligent Web Applications, The eneration Web, Machine Intelligence, , Semantic Road Map, Logic on the s	Artificial Intel	ligence,					CO1
UNIT-II		ntic Web				Periods: 9			<u></u>
Learning, Sema UNIT-III ntroduction: An cultural issues- t support system	Introdustriantic Bio Introdustriantic Introduscinologic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic Introdustriantic I	pplications, Services and Technology informatics, Knowledge Base, XML Buction to Knowledge Management of the Knowledge Management of the Knowledge Management of the Knowledge Management of the Knowledge Management of Knowledge Management of Knowledge Manages Facing the Evolution of King The Culture of Learning and	ased Web Senent Int - The four Incepts and Incepts and Incepts and Incepts A	ndations process rom In	s of kno ses- mai	Periods: 9  wledge man  nagement as  n Managen	nagement spects- an	- including	CO3
		edge Management - Building the Lo			Knowle		· Coopera	tion among	CO4
		cialists – Tacit Knowledge and Quality		mzauon	. Kilowic	age Markets	. Оборста	don among	004
UNIT-V	Know	ledge Management - The Tools				Periods: 9		1 6	
nformation Techn Mapping in Informa	ology in ation Re	Networks in Knowledge Managem Support of Knowledge Management strieval -Information Coding in the Inte	t - Knowledge ernet Environn	Manag nent - R	ement aı epackagi	nd Vocabulary ng Informatio	/ Control - n.	Information	CO5
Lecture Period	IS: 45	Tutorial Periods: -	Practic	ai Perio	oas: -		otal Perio	oas: 45	
		Berners Lee, Godel and Turing, Wiley		, 2008.					-
.Social Networks .Srikantaiah,T.K., <b>Reference Boo</b> l	Koenig	Semantic Web, Peter Mika, Springer, M., "Knowledge Management for the	, 2007. e Information	Professi	ional".		-		
L. Liyang Lu Chap B. Programming th L. Michael C. Daco Management,2003	man and e Sema onta,Led 3.	logies, Trends and Research in Ontol d Hall "Semantic Web and Semantic \ ntic Web, T.Segaran, C.Evans, J.Tay o J. Obrst, Kevin T. Smith,"The Seman	Web Services lor, O'Reilly.	", CRC I	Publisher		b Services	, and Know	ledge
Veb References	S	2							

- https://www.mygreatlearning.com/courses/big-data-analytics-dse
   https://intellipaat.com/big-data-hadoop-training/
   https://www.edureka.co/comprehensive-hive
   * TE Theory Exam, LE Lab Exam

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COs/POs/PSOs Mapping

COs		Progra	m Out	comes	(POs	) 7	Program Specific Outcomes (PSOs)			
	P01	PO2	PO3	PO4	PO5	P06	PSO1	PSO2	PSO3	
1	2	1	1	-	2	1	1	2	2	
2	2	1	1	2	2	1	1	2	2	
3	2	2	2	2	1	1	1	2	1	
4	2	3	1	-	-	1	1	2	1	
5	2	2	3	-	3	1	1	2	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

### **Evaluation Method**

	е. х	Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

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Department		uter Science Engineering ata Analytics)	Prograr	nme: <b>N</b>	l.Tech.				
Semester	II		Course	Catego	rv: PE	*End S	Semester	Exam Typ	e TF
		<b>D</b>		ods / W		Credit	······································	ximum Ma	
Course Code	P23B	DE209	L	T	P	C	CAM	ESE	TM
Course Name	Artific	ial Intelligence	3	-	-	3	40	60	100
Droroguioito	No Dr	proquinite pooded		<u> </u>					
Prerequisite		erequisite needed			4 ==				
	On co	ompletion of the course, the stu	idents will b	e abie	το			BT Ma	
	CO1	Understanding Artificial Intelligence						(Highes	
Course		Understand search and Constraint p	rohlems	•••••••••••••••••••••••••••••••••••••••		······································		••••}	
Outcomes		Make use of Knowledge, Reasoning						K	
								K	3
		Implement knowledge and reasoning	<b>,</b>	***************************************				K	3
		Apply Philosophy, Ethics and Safety	of Al					K	4
UNIT- I		luction and Problem Solving				Periods: 9			
Artificial Intelligend Informed (Heuristi	e -Intro c) Searc	duction - Problem-solving -Solving Pr ch Strategies - Local Search - Search	oblems by Se in Partially Ob	arching oservabl	– Uninfor e Environ	med Search ments	Strategies	_ 	CO1
UNIT- II	Adve	rsarial Search and Constraint S	atisfaction F	Probler	ns	Periods: 9			.L
Game Theory-	Optim	al Decisions in Games - Heuris	tic AlphaBe	eta Tre	e Searc	h- Monte C	arlo Tree	Search	CO2
Stochastic Gan	nes - P	artially Observable Games - Limi	itations of Ga	ame Se	arch Alc	orithms Co	nstraint S	atisfaction	
		mples - Constraint Propagation B							•
UNIT-III		ledge, Reasoning and Planning			<del>-</del>	Periods: 9			.L
First Order Logic	– Infer	rence in First Order Logic -Using Pr	edicate Logic	- Know	ledae Re	presentation	- Issues -	Ontologica	l
Engineering - Ca	tegories	s and Objects – Reasoning Systems	for Categorie	s - Plar	nning -De	finition - Algo	orithms -He	euristics for	CO3
Planning -Hierard						<b>.</b>			
UNIT-IV	Uncer	tain Knowledge and Reasoning	3			Periods: 9			
Quantifying Und		y - Probabilistic Reasoning - Prob		soning o	over Tim	e 19 Probak	ilistic Pro	gramming	CO4
-Making Simple	Decis	ions - Making Complex Decisions	s - Case Base	ed Rea	soning -	Explanation	n-Based I	_earning -	
<b>Evolutionary Co</b>					, ,	a∎a na nasa asaasa			
UNIT-V	Philos	ophy, Ethics and Safety of Al				Periods: 9		γ	L
The Limits of AI -	Knowle	edge in Learning –Statistical Learning	Methods - Ro	einforce	ment Lea	rning - Introd	uction to N	lachine	
		ning -Can Machines Really Think? - D							CO5
	······	ents -Al Architectures		_					1
Lecture Period	s: 45	Tutorial Periods: -	Practica	i Perio	ds: -	To	tal Perio	ds: 45	4
Γext Books			***************************************						
1. Stuart Russell,	eter N	orvig, "Artificial Intelligence: A Moderr	n Approach", F	earson,	4th Editio	on, 2020.			***************************************
		d Artificial Intelligence", World Scienti							
3. Kevin Knight, E	aine Ri	ch, Shivashankar B. Nair, "Artificial In	telligence", Mo	Graw H	lill Educat	ion; 3rd edition	on, 20174.	Christophe	er
		of Statistical Natural Language Proce				,		20 0 0 0 0 000 000	
Reference Book	S								
edition,		ia Jiang, "Artificial Intelligence with ar				1991		/CRC; 2nd	
Dheepak Khemai	ni, "A fir	st course in Artificial Intelligence", Mc	Graw Hill Edu	cation P	vt Ltd., N	ew Delhi, 201	13.		
		Intelligence: A New Synthesis", Morga					1, 2003.		
		Being Human in the Age of Artificial I elligence: Paths, Dangers, Strategies'							
Veb References			, onora onivi	or only 1 1	200,2010	•			

- 1. https://www.mygreatlearning.com/courses/big-data-analytics-dse
- https://intellipaat.com/big-data-hadoop-training/
   https://www.edureka.co/comprehensive-hive
   * TE Theory Exam, LE Lab Exam

M.Tech. Computer Science Engineering (Big Data Analytics)

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### COs/POs/PSOs Mapping

COs	1r, I	Progra	m Out	comes	(POs	)	Program Specific Outcomes (PSOs)				
_	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3		
1	2	2	2	3	1	-	1	1	1		
2	2	2	2	3	2		. 1	2	1		
3	1	1	2	2	,	-	1	2	1		
4	1	1	2	3	2	-	1	2	1		
5	3	2	2	2	2	3	1	2	1		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

#### **Evaluation Method**

		Contin	End	- pc ii i			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	15	10	5	60	100

^{*}Application Oriented /Problem solving/Design/Analytical in content beyond the syllabus to be given from Unit-5

JV.

Department	1	uter Sci	ence Engine lytics)	ering	Prograi	nme: <b>N</b>	1.Tech.					
Semester					Course	Catego	ory: AC	*	End S	emester	Exam Ty	pe: <b>TE</b>
Course Code	DOSAC	TV04			Peri	ods / W	eek	Cre	dit	Ма	ximum Ma	irks
Course Code	P23A0	ZIXUI			L	T	P	С		CAM	ESE	TM
Course Name	English	for Res	earch Pape		2	-	-	-	•	100	-	100
				(Comn	non to all M	1.Tech	Prograr	nme)				
Prerequisite	<u> </u>		e needed									
	On co	mpletio	n of the cou	rse, the stud	lents will b	e able	to				BT Ma (Highest	
	CO1	Understar	d that how to	improve your	writing skills	and leve	el of rea	dability.			K	2
Course Outcomes	CO2	Learn abo	ut what to writ	e in each sect	ion.						K1	
Outcomes	CO3	Understar	d the skills ne	eded when wr	iting a Title.	<u> </u>					K2	
	CO4	Jnderstar	d the skills ne	eded when wr	iting the Co	nclusion					K2	
- *	1	CO5 Ensure the good quality of paper at very first-time submission.									K3	
UNIT- I				aper Writing	9			Period			743	
Planning and Pre Removing Redun					ces, Structu	ing Para	agraphs	and Sente	ences,	Being Co	oncise and	CO1
UNIT- II	Presei	ntation S	Skills					Period	ls: 6			
Clarifying Who Di Abstracts, Introdu	10 1 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Highlightin	g Your Findin	gs, Hedging ar	nd Criticizing	j, Parapl	hrasing	and Plagia	arism, S	Sections	of a Paper,	CO2
UNIT- III	Title V	Vriting S	kills					Period	s: 6			***************************************
Key skills are nee ntroduction, skills	ded wher needed	n writing a when writ	Title, key skil ing a Review o	ls are needed of the Literatur	when writing e, Methods,	an Abs Results	stract, ke , Discus	y skills are sion, Con	e need clusion	led when is, The Fi	writing an inal Check.	CO3
UNIT- IV	Result	Writing	Skills					Period	s: 6			
Skills are needed Discussion, skills					writing the F	Results,	skills are	e needed v	when v	vriting the	9	CO4
UNIT- V	Verific	ation Sk	ills					Period	s: 6			.1
Jseful phrases, cl	necking F	Plagiarism	, how to ensur	e paper is as	good as it co	ould pos	sibly be	the first- ti	ime su	bmission		CO5
Lecture Period	ds: 30		Tutorial Per	riods: -	Practic	al Perio	ods: -		Tot	tal Perio	ds: 30	
Reference Boo	ks			*	V. Co. (C. (2.))							
<ol> <li>Adrian Wallwo</li> <li>Day R, "How to</li> <li>Goldbort R, "W</li> <li>Highman N, "H</li> </ol>	Write a	nd Publish Science",	n a Scientific F Yale Universi	aper", Cambri ity Press (Avai	dge Univers lable on Go	ity Pres	s, 2006. oks), 200	06.	Londo	on, 2011.		

Assessment	Cor	ntinuous Assess	ment Ma	rks (CAN	л)	End Semester Examination (ESE) Marks	Total Marks
	Assignment 1	Assignment 2	Test 1	Test 2	Attendance		
Marks	20	20	10	-	100		

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Department	Computer So (Big Data An	ience Engineering	Progran	nme: M	.Tech.						
Semester		ary aloo)	Course	Catego	rv: AC	*En	d Semester	r Exam Tv	pe: TE		
	D00107V00		}	ds / We		Credit		ximum Ma			
Course Code	P23ACTX02		L	Т	Р	С	CAM	ESE	TM		
Course Name	Disaster Man	agement	2	-	-	-	100	-	100		
		(Comm	on to all M	Tech F	rogram	me)	•				
Prerequisite	No Prerequisite	needed	į.								
	-	on of the course, the stude	ents will b	e able 1	to			BT Ma (Highest			
	CO1 Ability to	summarize basics of disaster.						K'	1		
Course Outcomes		explain a critical understanding	g of key con	cepts in	disaste	risk reduct	ion and	K	2		
		from multiple perspectives.									
	CO4 Ability to	O4 Ability to describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.									
		CO5 Ability to develop the strengths and weaknesses of disaster management approaches.									
UNIT- I	Introduction					Periods:	6	····			
	n, Factors and Si e, Types and Mag	gnificance; Difference between nitude.	Hazard An	d Disast	er; Natu	ral and Man	made Disas	ters:	CO1		
UNIT- II	Repercussion	ns of Disasters and Hazard	ds			Periods:	6				
yclones, Tsunan	nis, Floods, Droug	in and Animal Life, Destruction Ints and Famines, Landslides a Spills, Outbreaks Of Disease A	nd Avalancl	nes, Mai	n-made d	disaster: Nu					
UNIT- III		e Areas in India			I	Periods:	6		I		
		ne To Floods and Droughts, La Tsunami; Post-Disaster Disea				reas Prone	To Cyclonic a	and Coasta	CO3		
UNIT- IV	Disaster Prep	aredness and Manageme	nt		Ī	Periods:	6		I		
		omena Triggering a Disaster or r Agencies, Media Reports: Go						te Sensing	CO4		
UNIT- V	Risk Assessn	nent	***************************************		Ī	Periods:	6		L		
		nts, Disaster Risk Reduction, G in Risk Assessment and Warr									
Lecture Period	ls: 30	Tutorial Periods: -	Practica	l Perio	ds: -		Total Peric	ds: 30			
Reference Bool	ks										
. NishithaRai, Sir	igh AK, "Disaster	on and Management Text And Management in India: Perspec Mitigation Experiences And Re	tives, issue	s and st	rategies'	, New Roya	al book Comp				

	Conti	nuous Assess	ment N	larks (	CAM)	End	
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100

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Department		puter Sc Data Ana	ience Engineering	Progran	nme: <b>M</b>	l.Tech.					
Semester	(Big i	butu All	ary (100)	Course	Catego	rv: AC	*Er	nd Semeste	r Exam Tv	pe: <b>TE</b>	
					ds / W		Credi		ximum Ma	<u></u>	
Course Code	P23A	CTX03		L	Т	Р	С	CAM	ESE	TM	
Course Name	Sansk	rit for Te	ecnical Knowledge	2	-	-	-	100	-	100	
	•			non to all M	.Tech F	rogram	nme)				
Prerequisite	No Pre	requisite	needed								
	On co	ompletic	n of the course, the stud	dents will b	e able	to			BT Ma (Highest		
	CO1	Understa	nding basic Sanskrit languag	je.					K	2	
Course Outcomes	CO2	Write ser	ntences						K	2	
Outcomes	CO3	Know the	order and roots of Sanskrit.						K	K3	
	CO4	Know ab	out technical information abo	information about Sanskrit literature							
	CO5	Understand the technical concepts of Engineering.								2	
UNIT- I	Alph	abets			•••••••••••••••••		Periods:	6			
Iphabets in Sans	krit.					······································	·			CO1	
UNIT- II	Tense	es and S	entences				Periods:	6		<u>L</u>	
ast/Present/Futu	re Tens	e - Simple	Sentences.							CO2	
UNIT- III	Order	r and Ro	ots				Periods:	6		.L	
rder - Introductio	n of roo	ts of Engi	neering-Electrical, Mechanica	al, Architectui	re, Math	ematics	•		. 1		
						1				CO3	
UNIT- IV echnical informa		krit Liter					Periods:	6		004	
echnical informa	uon abo	ut Sanski	it Literature.							CO4	
UNIT- V		nical Co	ncepts of Engineering				Periods:	6			
echnical concept	S									CO5	
Lecture Period	ds: 30		Tutorial Periods: -	Practica	l Perio	ds: -	T.	Total Perio	ds: 30	· <b>!</b> ········	
Reference Bool	ks			<del></del>			L				
. Prathama Deek	sha, Ve	mpati Kut	Samskrita-Bharti Publication umbshastri, Rashtriya Sansk ientific Tradition", Ocean boo	rit Sansthana			self Sanskri	t", New Delhi	Publication	1.	

	Conti	nuous Assess	CAM)	End			
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100

2 6

Department		outer Sc Data Ana	ence Engineering llytics)	Progran	nme: M	l.Tech.				
Semester	1/11			Course	Catego	ory: AC	*End Se	mester Ex	cam Type:	TE
0	D02 A	OTV04		Perio	ds / W	eek	Credit	ximum Ma	kimum Marks	
Course Code	PZJA	CTX04		L	Т	Р	С	CAM	ESE	TM
Course Name	Value	Educat	ion	2			-	100	-	100
****		,	(Comm	on to all M	.Tech F	Program	me)		V	
Prerequisite N	lo Pre	requisite	needed							
	On co	ompletio	n of the course, the stude	ents will b	e able	to			BT Ma (Highest	
<u> </u>	CO1	Knowledg	ge of self-development.						K	2
Course Outcomes	CO2	Learn the	importance of Human values	•					K1	
	CO3	Developii	ng the overall personality.						K	3
	CO4	Developii	ng Character and Competence	9					К3	
				=		***************************************				
UNIT- I	Value	s and S	elf Development				Periods: 6			
Values and self-dev moral valuation. Sta control. Honesty, S	andard	s and prin	al values and individual attitude ciples. Value judgments of Wo lv.	es. Work eth omen. All re	nics, Ind ligions a	lian visior and same	n of humanisn e message. M	n. Moral ar ind your M	nd non- ind, Self-	CO1
······		ation of					Periods: 6		-	
mportance of cultiv	ation o	of values. r of faith,	Sense of duty. Devotion, Self- National Unity. Patriotism. Lov	reliance. Co e for nature	onfidenc e, Discip	e, Conce line	ntration. Trutl	nfulness, C	leanliness.	CO2
UNIT- III	Perso	nality D	evelopment			The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	Periods: 6			
and Kindness. Avoi	d fault	Thinking.	ent-Soul and Scientific attitud Free from anger, Dignity of lal love for truth. Aware of self-de	bour. Unive	rsal brot	ther hood	and religious	tolerance	. True	CO3
<del>-</del>	Chara	cter De	/elopment				Periods: 6			
	peten	ce-Holy b	ooks vs Blind faith. Self-mana	gement and	Good h	nealth. Sc	cience of reinc	carnation. I	Equality,	CO4
Lecture Periods	s: 30		Tutorial Periods: -	Practica	al Perio	ods: -	T	otal Perio	ods: 30	
Reference Book										
Obalashada CV	"\/alı	oc and Et	hics for organizations Theory	and practice	" Ovfo	rd I Iniver	city Proce No	w Delhi		
. Chakroborty, S.K	. vait	ies allu Li	The for organizations Theory	and practice	, OXIO	ia Oniver	31ty 1 1633, 146	W Denn.		

	Conti	nuous Assess	ment N	larks (	CAM)	End	
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100

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Department	Computer So	ience Engineering alytics)	Progran	nme: <b>M</b>	.Tech.								
Semester	1/11		Course	Catego	ry: AC	*End S	Semester Exa	m Type:	TE				
				ods / We		Credi		kimum Ma					
Course Code	P23ACTX05		L	Т	Р	С	CAM	ESE	TM				
Course Name	Constitution o	f India	2	-	-	-	100	-	100				
·		(Comn	non to all M	l.Tech F	Program	ıme)							
Prerequisite	No Prerequisite												
		on of the course, the stud	ents will b	e able	to			BT Ma	ppina				
	on completic	,,, or and odd, oo, and odd	, , , , , , , , , , , , , , , , , , ,	o unio				(Highes					
Course		the growth of the demand for Gandhi in Indian politics.	civil rights in	India fo	r the bul	k of Indians	s before the	K					
Course Outcomes	CO2 Discuss												
		e leadership of Jawaharlal Ne						] N	)				
		the passage of the Hindu Cod	le Bill of 195	6.				K	3				
	CO5 Discuss	the administration and Electio	n commissic	n				K	3				
UNIT- I	History of Mak	ing of The Indian Constit	ution			Periods	: 6	.1	***************************************				
History, Drafting	Committee, (Com	position & Working).							CO1				
UNIT- II	Philosophy o	f The Indian Constitution				Periods	: 6						
Preamble, Salien					······································				CO2				
UNIT- III	Contours of	Constitutional Rights and	Duties			Periods	: 6	······································					
		lity, Right to Freedom, Right a tutional Remedies, Directive F						tural and	CO3				
UNIT- IV	Organs of Go	vernance				Periods	: 6						
		tions and Disqualifications, Po	wers and Fu	inctions,	Executi	ve, Preside	ent, Governor,	Council of	CO4				
Ministers, Judicia	ry, Appointment a	nd Transfer of Judges, Qualifi	cations, Pov	vers and	Functio			<b></b>					
UNIT- V		stration and Election Cor				Periods	F						
Municipal Corpora and role. Block lo Importance of gra	ation. Pachayati ra evel: Organizatior ass root democra	and Importance, Municipalitie aj: Introduction, PRI: Zila Pacha nal Hierarchy (Different depar cy. Election Commission: Ro es for the welfare of SC/ST/O	ayat. Elected rtments), Vil ble and Fund	l officials lage leve ctioning.	and the el: Role	ir roles, CE of Elected	:O Zila Pachay: I and Appointe	at: Positior ed officials	COS				
Lecture Perio		Tutorial Periods: -	Practica		ds: -		Total Perio	ds: 30					
Reference Boo													
1. "The Constituti 2. Dr.S.N.Busi, Di 3. M.P. Jain, India 4. D.D. Basu, Intr	on of India, 1950( r.B. R.Ambedkar f an Constitution La oduction to the Co	Bare Act), Government Public framing of Indian Constitution, w, 7th Edition, Lexis Nexis, 20 onstitution of India, Lexis Nexis cientific Tradition" Ocean book	1 st Edition, )14. s, 2015.		i 2017								

Assessment	Continuous Assessment Marks (CAM)	End Semester Examination (ESE) Marks	Total Marks				
	Assignment 1	Assignment 2	Test 1	Test 2	Attendance		
Marks	20	20	25	25	10	-	100

1 2

Department	Computer Science Engineering Programme: M.Tech.  (Big Data Analytics)								
Semester	I/II	Course	Catego	nester Exa	m Type:	TE			
			ods / W	,	Credit		kimum Ma		
Course Code	P23ACTX06	L	Т	Р	С	CAM	ESE	TM	
Course Name	Pedagogy Studies	2	-	-	-	100	-	100	
	(Comm	non to all M	1.Tech	Progran	nme)				
Prerequisite	No Prerequisite needed								
	On completion of the course, the stude	ents will b	e able	to			BT Ma (Highes		
Course	What pedagogical practices are being used by teachers informal and informal classrooms in developing countries?								
Outcomes	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?								
	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?								
	CO4 Illustrate Professional development		K3						
3	CO5 Identify Research gaps and Future Directions								
	Introduction and Methodology	7			Periods: 6				
	le, Policy background, Conceptual framework a eptual framework, Research questions – Overv					rriculum, Te	acher	CO1	
UNIT- II	Thematic Overview				Periods: 6				
Pedagogical prac Feacher educatio	ctices are being used by teachers in formal and on.	informal cla	ssroom	s in deve	loping countri	ies - Curricu	ılum,	CO2	
UNIT- III	Evidence on The Effectiveness of Peda				Periods: 6		•		
oracticum) and the	the in depth stage: quality assessment of includ the school curriculum and guidance materials be body of evidence for effective pedagogical prac thes and beliefs and Pedagogic strategies	st support e	ffective	pedagog	y? - Theory o	f change - S	Strength	CO3	
UNIT- IV	Professional Development			Ī	Periods: 6				
	elopment: alignment with classroom practices a community - Curriculum and assessment - Barri							CO4	
UNIT- V	Research Gaps and Future Directions				Periods: 6			1	
Research design mpact.	- Contexts - Pedagogy - Teacher education - 0	Curriculum a	and asse	essment	- Disseminati	on and rese	arch	CO5	
	ecture Periods: 30 Tutorial Periods: - Practical Periods: - Total Period								
Reference Boo	ks								
2. Agrawal M, "Cu 3. Akyeampong k London, DFID 4. Akyeampong k	, Lussier K, Pryor J, Westbrook J, "Improving to	valuation, Journal of the valuation, Journal of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value of the value	ournal o ner educ I learnin	f Curricul ation res	um Studies", earch project c maths and r	36(3):361-3 (MUSTER)	country re	eport",	
teacher prepa	ration count?", International Journal Educationa "Culture and pedagogy: International comparisc	al Developm	ent, 33(	3): 272–2	282, 2013.			-	

- 5. Alexander RJ, "Culture and pedagogy: International comparisons in primary education", Oxford and Boston: Blackwell, 2001. 6. Chavan M, "Read India: Amass scale, rapid, 'learning to read' campaign", 2003. 7. www.pratham.org/images/resource%20working%20paper%202.pdf.

Assessment	Conti	nuous Assess	ment N	larks (	CAM)	End	
	Assignment 1	ignment Assignment Test Test		Attendance	Semester Examination (ESE) Marks	Total Marks	
Marks	20	20	25	25	10	-	100

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# Academic Curriculum and Syllabi R-2023

Department		puter So Data Ana	eience Engineering Alytics)	Prograr	nme: M	l.Tech.					
Semester	1/11			Course	Catego	ory: AC	*End Ser	nester Exa	am Type:	ΓΕ	
Course Code	D23 A	CTX07		Perio	Periods / Week			Credit Maximum N			
Course Code	FZJA	CIXUI		L	Т	Р	С	CAM	ESE	TM	
Course Name	Stress	s Manag	ement by Yoga	2	-	-	-	100	-	100	
	·			mon to all M	.Tech I	Program	ıme)				
Prerequisite	I	requisite							γ		
	On co	ompletio	n of the course, the stu	dents will b	e able	to			BT Ma (Highest		
	CO1 Develop healthy mind in a healthy body thus improving social health also										
Course Outcomes	CO2	Improve	efficiency.						K2		
Outcomes	CO3 Understand Asan and Pranayam								K	₹2	
	CO4	Apply As	anas				K4				
•	CO5 Apply Pranayam									K4	
UNIT- I	Intro	duction					Periods: 6				
Definitions of Eigh	t parts	of yoga. (A	Ashtanga).							CO1	
UNIT- II	Do`s	and Don	't's in Life				Periods: 6	)			
Yam and Niyam	- Do`s a	and Don't's	s in life - i) Ahinsa, satya, as	theya, bramh	acharya	and apa	rigraha, ii) Ah	insa, satya	, astheya,	CO2	
bramhacharya a	nd apari	igraha.					4				
UNIT- III		and Pra					Periods: 6				
Asan and Pranay effects-Types of p			a poses and their benefits f	for mind & bo	dy - Re	gularizati	on of breathi	ng techniqu	ues and its	CO3	
UNIT- IV	Asan	Practice	s				Periods: 6				
Practice on Variou	ıs yoga	poses								CO4	
UNIT- V	Prana	ayam Pra	ictices				Periods: 6			.4	
Practice on variou	s prana	yam								CO5	
Lecture Period	ds: 30		Tutorial Periods: -	Practic	al Perio	ods: -	T	otal Perio	ods: 30		
Reference Boo	ks										
i. Janardan Swan 2. Swami Vivekan	ni Yoga anda, "F	bhyasi Ma Rajayoga (	andal, "Yogic Asanas for Gro or conquering the Internal N	oup Tarining-F ature", Advait	Part-I", N a Ashrai	lagpur. ma Publi	cation Depart	ment, Kolk	ata		

## **Evaluation Method**

Assessment	Conti	nuous Assess	ment N	larks (	CAM)	End	
	Assignment 1	Assignment 2	innment Toot Toot		Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100

s. Di

Department		puter Sc Data Ana	ience Engine alytics)	ering	Programme: <b>M.Tech.</b>						
Semester	1/11				Course Category : AC *End				Semester Exam Type: <b>TE</b>		
Course Code	DOOA	CTX08			Periods / Week C			Credi	dit Maximum Ma		rks
Course Code	FZJA	CIAUO			L	T	Р	С	CAM	ESE	TM
Course Name		nality Do		through Life	2	-	-	-	100	-	100
				(Commo	n to all M	.Tech F	Programi	ne)			-L
Prerequisite	No Pre	erequisite	needed								
	On completion of the course, the students will be able to									BT Mapping (Highest Level)	
Course		achieve t	Shrimad-Bhagw he highest goal	in life.	•					K3	
Outcomes	CO2 The person who has studied Geeta will lead the nation and mankind to peace and prosperity.							<b>K</b> 1	K1		
	CO3	Study of I	Neet is hatakam	will help in dev	eloping ve	ersatile p	personality	of stude	nts.	K3	
UNIT- I								Periods	: 6	***************************************	
Neetisatakam-holi 26,28,63,65 (virtue											CO1
UNIT- II	***************************************							Periods	: 12		
Approach to day to 35 Chapter 6-Vers Chapter 3-Verses	es 5,13	3,17,23, 35	- Chapter 18-V								CO2
UNIT- III								<b>Periods</b>	: 12		
Statements of bas - Personality of rol		ledge – Sl	nrimad Bhagwad	d Geeta: Chapte	er2-Verses	56, 62,	, 68 Chap	ter12 -Vei	rses 13, 14, 15	5, 16,17, 18	CO3
Lecture Periods: 30 Tutorial Periods: - Practical Periods:						ods: -		Total Perio	ds: 30		
Reference Bool	(S			······································			-	-			
1. Gopinath, Rash 2. Swami Swarupa											

	Conti	nuous Assess	ment N	larks (	CAM)	End	
Assessment	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	20	20	25	25	10	-	100



Department		outer Scie	ence Engineering	Programme: M.Tech.							
Semester	(D.g.  /			Course Category: AC			*End Semester Exam Type: <b>T</b>			TE	
	5004	OTV00		Periods / Week			Credi	dit Maximum Mar			
Course Code	P23A	СТХ09		L	Т	Р	С	CAM	ESE	TM	
Course Name	Unnat	Bharath	Abhiyan	2	-	-	-	100	-	100	
	I		(Commo	n to all M	.Tech F	rogram	ıme)				
Prerequisite	No Pre	requisite	needed								
			n of the course, the stude						BT Mapping (Highest Level)		
	CO1 Gain an understanding of rural life, culture and social realities									3	
Course	CO2 Develop a sense of empathy and bonds of mutuality with local community									1	
Outcomes	CO3	Appreciate	e significant contributions of lo	cal commu	nities to	Indian s	ociety and	economy	K	3	
	CO4 Learn to value the local knowledge and wisdom of the community								K3		
	CO5 Identify opportunities for contributing to community's socio-economic improvements.									K3	
UNIT- I			Rural Society				Periods				
Rural life style, rui	al socie	tv. caste a	nd gender relations, rural valu llages' (Gandhi), rural infrastru	es with res cture.	pect to	commun	ity, nature	and resource	s,	CO1	
UNIT- II	Unde	rstanding	g Rural Economy and Live	elihood			Periods			·	
Agriculture, farm entrepreneurs, rui	al mark	ets.	ip, water management, ani	mal husb	andry, r	non-farm	,		sans, rural	CO2	
UNIT- III	Rural	Institution	ons				Periods	I II		T	
Traditional rural Committees), loca	organiz Il civil so	ations, Se ociety, loca	elf-help Groups, Panchayati I administration.	raj institut	ions (G	ram Sa	,		, Standing	CO3	
UNIT- IV	Rural	Develop	ment Programmes				Periods				
History of rural de Bharat, Swatchh I	Bharat, I	PM Awaas	current national programmes: Yojana, Skill India, Gram Pan	Sarva Shil chayat De	ksha Abh centraliz	niyan, Be ed Planr	ning, NRLN	I, MNREGA,	Ayushman etc.	CO4	
UNIT- V	Field	Based P	ractical Activities				Periods			T	
with local loaders	Danch	avat funct	hh Bharat project sites, Condu tionaries, Visit Rural Schools Gram Sabha meetings, Visit loo	/ mid-day cal Anganv	meal ce vadi Cen	entres, s itre, Con	study Acad	emic and infeath drii	nking water	CO5	
Lecture Perio	ds: 30		Tutorial Periods: -	Practic	al Perio	ods: -		Total Peri	ods: 30		
Reference Boo	ks										
2. A Hand book of 3. United Nations.	n Village "Sustai	e Panchaya inable Dev	: Principles, Policies and Man at Administration, Rajiv Gandh elopment Goals", 2015. ural Development", Shanlax P	i Chair for	Panchay	ublicatio /ati Raj s	ns, New De Studies, 20	elhi, 2015. 02.			

Assessment	Conti	nuous Assess	ment N	larks (	CAM)	End _				
	Assignment 1	Assignment 2	Test 1	Test 2	Attendance	Semester Examination (ESE) Marks	Total Marks			
Marks	20	20	25	25	10	-	100			

