



**SRI MANAKULA VINAYAGAR**  
**ENGINEERING COLLEGE**  
(AN AUTONOMOUS INSTITUTION)



03.03.2025  
Puducherry

From

Dr.R.Raju  
Professor and Head  
Chairman - BoS/IT  
Department of Information Technology  
Sri Manakula Vinayagar Engineering College  
Puducherry - 605107

To

The Director cum Principal  
Chairman/Academic Council  
Sri Manakula Vinayagar Engineering College  
Puducherry - 605107

Respected Sir,

**Sub:** Requisition for the approval to conduct Ninth Meeting of Board of Studies on 14.3.2025 - Reg.

I would like to bring to your kind notice that we have planned to conduct the Ninth Board of Studies meeting in the Department of Information Technology on 14.3.2025, Friday from 2.00 PM to 4.30 PM as per your direction. This meeting focuses on finalizing and approving the curriculum R-2023, syllabi of B.Tech./IT, Seventh Semester and Honors Degree Syllabi for the upcoming semester. We have enclosed the Agenda of meeting in Annexure - I. The venue of the meeting is at Seminar Hall (V Floor). Sir, I kindly request you to do the needful in the above regard.

Thanking You

yours faithfully

(Dr.R.Raju, HOD/IT)

**Encl:**

Annexure I : BOS Agenda

Annexure II: BOS Members list

  
Dean Academics  
(Dr.S.Anbumalar)

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





**SRI MANAKULA VINAYAGAR**  
ENGINEERING COLLEGE  
(AN AUTONOMOUS INSTITUTION)

**Annexure I**

*9<sup>th</sup> Board of Studies Meeting*  
***Department of Information Technology***

***Venue***

Application Programming Laboratory  
Sri Manakula Vinayagar Engineering College  
Madagadipet, Puducherry – 605 107

***Date & Time***

14.03.2025  
02.00 pm





## AGENDA OF THE MEETING

<b>Item No:BoS/UG/IT/9.1</b>
To welcome the members and apprise about the college
<b>Item No:BoS/UG/IT/9.2</b>
To Confirm the minutes of the Eighth BoS meeting held on 04.9.2024
<b>Item No:BoS/UG/IT/9.3</b>
To discuss the Syllabi of VII semester, under Autonomous Regulations R-2023 for the B. Tech - Information Technology students admitted from the Academic Year 2023-24
<b>Item No:BoS/UG/IT/9.4</b>
To discuss the B.Tech. Degree, Professional and Open Elective Courses selected for the VII semester under Regulation 2023 along with assessment methodologies
<b>Item No:BoS/UG/IT/9.5</b>
To discuss the syllabus of the Honors and Minors Degree
<b>Item No:BoS/UG/IT/9.6</b>
To discuss the Assessment Methodology for the Honors and Minors Degree
<b>Item No:BoS/UG/IT/9.7</b>
Details of Students Registered for Honors and Minors Degree
<b>Item No:BoS/UG/IT/9.8</b>
To appraise about the methods to be adopted for Internship / Inplant Training
<b>Item No:BoS/UG/IT/9.9</b>
To Apprise about the Department Research Activities
<b>Item No:BoS/UG/IT/9.10</b>
To Apprise about the End Semester Examination Results
<b>Item No:BoS/UG/IT/9.11</b>
To discuss about the remarkable Achievements of Faculty and Students
<b>Item No:BoS/UG/IT/9.12</b>
Any other items to be discussed with the permission of the Chair





**DEPARTMENT OF INFORMATION TECHNOLOGY**

**Annexure II**

**Board of Studies - Members List**

S.NO.	Name of the Member	Designation
<b>1.Head of the Department Concern (Chairperson)</b>		
1	<b>Dr. R. Raju</b> Professor & Head	Chairperson
<b>2.All faculty members of the Department</b>		
2	<b>Dr. S. Balaji</b> Professor	Member Secretary
3	<b>Dr. R. Saravanan</b> Professor	Member
4	<b>Dr. N. Thilagavathi</b> Professor	Member
5	<b>Dr. B. Vijayakumar</b> Associate Professor	Member
6	<b>Dr. Puspita Dash</b> Associate Professor	Member
7	<b>Dr. R. Anandkumar</b> Assistant Professor	Member
8	<b>Dr. B. Ananth</b> Assistant Professor	Member
9	<b>Mr. R. Suresh</b> Associate Professor	Member
10	<b>Mrs. V. Padmapriya</b> Associate Professor	Member
11	<b>Mrs. N. Kalaiselvi</b> Assistant Professor	Member
12	<b>Mrs. M. Lakshmiprabha</b> Assistant Professor	Member
13	<b>Mrs. E. Valarmathi</b> Assistant Professor	Member
14	<b>Mr. P. Praveenkumar</b> Assistant Professor	Member
15	<b>Mr. G. Prabu</b> Assistant Professor	Member
16	<b>Mrs. C. Vanaja</b> Assistant Professor	Member
17	<b>Ms. L. Durgadevi</b> Assistant Professor	Member
18	<b>Mr. T. Periasamy</b> Assistant Professor	Member
19	<b>Ms. K. Poornambigai</b> Assistant Professor	Member





20	<b>Mr. T. Maheswaran</b> Assistant Professor	Member
21	<b>Mr. R. Vijayaprabhu</b> Assistant Professor	Member
22	<b>Mr. D. Prabhu</b> Assistant Professor	Member
23	<b>Ms. M. Madhumitha</b> Assistant Professor	Member
24	<b>Ms. A. Sowbarnika</b> Assistant Professor	Member
25	<b>Mr. A. Ranjeeth</b> Assistant Professor	Member
26	<b>Ms. V. Keerthana</b> Assistant Professor	Member
27	<b>Ms. M. Nandhini</b> Assistant Professor	Member
28	<b>Dr.N.S.N. Cailassame</b> Professor & Dean Placement Department of Management Studies	Member
29	<b>Mr. M. Devanathan</b> Assistant Professor Department of Mathematics , SMVEC	Member
30	<b>Dr. P. Jaichitra</b> Professor and Head Department of English, SMVEC	Member
31	<b>Dr. K. Karthikeyan</b> Associate Professor Department of Chemistry, SMVEC	Member
32	<b>Dr. T. Jayavarthan</b> Professor and Head Department of Physics, SMVEC	Member

**3. Two subject experts from outside the Parent University are to be nominated by the Academic Council**

33	<b>Dr.R.Manoharan, M. Tech., Ph.D</b> Professor, Department of CSE Puducherry Technological University, Puducherry rmanoharan@pec.edu , 9443468480 Specialization: High Speed Networks, Internet Technology, Software Engineering	Subject Expert
34	<b>Dr.N.Pughazendi,</b> Professor and Head, School of Science and Computer Studies, CMR University, Bangalore, pughazendi.n@cmr.edu.in, 9962969429 Specialization: Software Engineering, Cloud Computing	Subject Expert

**4. One expert to be nominated by the Vice-Chancellor from a panel of six recommended by the Autonomous college Principal as a University Nominee**

35	<b>Dr. S. Kanmani</b> Professor, Department of Information Technology Puducherry Technological University, Puducherry kanmani@ptuniv.edu.in , 9443206299 Specialization: Machine Learning Algorithms, Optimization Techniques	Subject Expert
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**5. One representative from industry/corporate sector/allied areas to be nominated by the Principal**

36	<b>Mr. Ashin Antony, CTO,</b> IGNITHO Technologies, Chennai-600018 ashin.antony@ignitho.com, 9444150791	Member
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**6. One member of the College Alumni to be nominated by the principal**

37	<b>Dr. P. Victor Paul</b> , Senior Assistant Professor, Department of Computer Science and Engineering, Indian Institute of Information Technology, Kottayam victerspaul@iiitkottayam.ac.in , 9944913170 Specialization: Bio-Inspired Optimization, Data Analytics	Member
<b>7. Experts from outside the Autonomous College, whenever special courses of studies are to be formulated, to be nominated by the Principal</b>		
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**Dean Academics**  
(Dr.S.Anbumalar)

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







**SRI MANAKULA VINAYAGAR**  
**ENGINEERING COLLEGE**

(An Autonomous Institution)

Puducherry - 605107

**Department of Information Technology**

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**BOARD OF STUDIES - NINTH MEETING**

**MINUTES**

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**Date and Time**

**14.03.2025 at 02.00 PM**





**Department of Information Technology**

**Minutes of Board of Studies**

The Board of Studies Ninth meeting of Department of Information Technology was held on 14<sup>th</sup> March 2025 from 2:00 P.M to 5:00 P.M in the Application Programming Laboratory, Department of Information Technology with the Head of the Department as the Chair.

The following members were present for the BoS meeting.

Sl.No	Name of the Member with Designation and official Address	Members as Per University norms
1	<b>Dr. R. Raju, M.Tech, Ph.D</b> Professor & Head Department of IT, SMVEC	Chairperson
2	<b>Dr. S. Kanmani</b> Professor, Department of Information Technology Puducherry Technological University, Puducherry	Subject Expert (University Nominee)
3	<b>Dr.R.Manoharan, M. Tech., Ph.D</b> Professor, Department of CSE Puducherry Technological University, Puducherry	Subject Expert (Academic Council Nominee)
4	<b>Dr.N.Pughazendi,</b> Professor and Head, School of Science and Computer Studies CMR University, Chennai	Subject Expert (Academic Council Nominee)
5	<b>Mr.Ashin Antony,</b> CTO,IGNITHO Technologies, Chennai-600018	Representative from Industry
6	<b>Dr. P. Victor Paul,</b> Senior Assistant Professor, Department of Computer Science and Engineering, IIIT, Kottayam	Post Graduate Alumnus ( nominated by Principal)
7	<b>Dr. S. Balaji</b> Associate Professor/IT	Member Secretary
8	<b>Dr. R. Saravanan</b> Professor	Member
9	<b>Dr. N. Thilagavathi</b> Associate Professor	Member
10	<b>Dr. B. Vijayakumar</b> Associate Professor	Member
11	<b>Dr. Puspita Dash</b> Associate Professor	Member
12	<b>Dr. R. Anandkumar</b> Assistant Professor	Member
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32	<b>Ms. M. Nandhini</b> Assistant Professor	Member
33	<b>Dr.N.S.N. Cailassame</b> Professor & Dean Placement Department of Management Studies	Member
34	<b>Dr. K. Karthikeyan</b> Associate Professor Department. of Chemistry	Member
35	<b>Prof. M. Devanathan</b> Assistant Professor Department of Mathematics	Member
36	<b>Dr. P. Jaichitra</b> Professor and Head Department of English	Member
37	<b>Dr.T.Jayavarthan</b> Professor Department. of Physics	Member



## Agenda of the Meeting

<b>Item:2025.9.1</b>	To welcome the members and apprise about the college
<b>Item:2025.9.2</b>	To Confirm the minutes of the Eighth BoS meeting held on 04.9.2024
<b>Item:2025.9.3</b>	To discuss the Syllabi of VII semester, under Autonomous Regulations R-2023 for the B. Tech - Information Technology students admitted from the Academic Year 2023-24
<b>Item:2025.9.4</b>	To discuss the B.Tech. Degree, Professional and Open Elective Courses selected for the VII semester under Regulation 2023 along with assessment methodologies
<b>Item:2025.9.5</b>	To discuss the syllabus of the Honors and Minors Degree
<b>Item:2025.9.6</b>	To discuss the Assessment Methodology for the Honors and Minors Degree
<b>Item:2025.9.7</b>	Details of Students Registered for Honors and Minors Degree
<b>Item:2025.9.8</b>	To appraise about the methods to be adopted for Internship / Inplant Training
<b>Item:2025.9.9</b>	To Apprise about the Department Research Activities
<b>Item:2025.9.10</b>	To Apprise about the End Semester Examination Results
<b>Item:2025.9.11</b>	To discuss about the remarkable Achievements of Faculty and Students
<b>Item:2025.9.12</b>	Any other items to be discussed with the permission of the Chair

## Minutes of the Meeting

Dr. R. Raju, Chairperson, BoS / B.Tech. Information Technology officially announced the opening of the meeting and welcomed the members. He also thanked them for accepting the invitation and giving us their valuable time. The meeting thereafter deliberated on agenda items that had been approved by the Chairperson.

Item:2025.9.1	<b>To welcome the members and apprise about the college</b>				
	The Chairperson Dr.R.Raju welcomed the members of Board of Studies and apprised about the successful functioning of the college				
Item:2025.9.2	<b>To Confirm the minutes of the Eighth BoS meeting held on 04.9.2024</b>				
	As per the suggestions given during 8 <sup>th</sup> BoS meeting the following changes have been carried out in the curriculum and syllabus.				
	<b>Details of Changes carried in the Courses</b>				
	<b>S.No.</b>	<b>Existing Course Name</b>	<b>Course Existed in Semester</b>	<b>Suggestion Provided</b>	<b>Changes Carried</b>
	1.	Artificial Intelligence	III	To reframe the syllabus , Since Machine Learning contents were included in Unit III	Syllabus reframed by removing Machine Learning Contents
	2.	Information Visualization	III	To Ellaborate the contents	Syllabus reframed with elaborated contents
	3.	Quantum Computing	III	To add up contents in Unit II	Qubit Gates and Quantum Error Correction has been added
	4.	Parallel and Distributed Computing	III	Elective Course can be included	Included instead of Business Intelligence and Applications
	<b>Professional Elective List</b>				
	<b>Professional Elective - I (Offered in Semester IV)</b>				
	<b>Sl. No.</b>	<b>Existing Course Titles</b>	<b>After 8<sup>th</sup> BoS – Approved Course Titles</b>		
	1	Object Oriented Analysis and Design	Object Oriented Analysis and Design		
	2	Web Application Development	Web Application Development		
	3	Information Coding Techniques	Information Coding Techniques		
	4	Agile Methodologies	Agile Methodologies		
	5	Mobile Adhoc Network	Data Warehousing and Data Mining		



Professional Elective - II (Offered in Semester V)		
Sl. No.	Existing Course Titles	After 8 <sup>th</sup> BoS – Approved Course Titles
1	Parallel and Distributed Computing	Theory of Compiler Design
2	Data Warehousing and Data Mining	Information Visualization
3	Business Intelligence and Applications	Parallel and Distributed Computing
4	Software Testing	Software Testing
5	Wireless and Mobile Communication	Automation Techniques and Tools
Professional Elective - III (Offered in Semester VI)		
Sl. No.	Existing Course Titles	After 8 <sup>th</sup> BoS – Approved Course Titles
1	Distributed Databases	Quantum Computing
2	Bio-Inspired Computing	Full Stack Development
3	Software Defined Networks	Software Defined Networks
4	Natural Language Processing	Natural Language Processing
5	Edge and Fog Computing	Edge and Fog Computing
Professional Elective - IV (Offered in Semester VII)		
Sl. No.	Existing Course Titles	After 8 <sup>th</sup> BoS – Approved Course Titles
1	Full Stack Development	Six Sigma
2	Cyber Security and Forensics	Cyber Security and Forensics
3	Robotic Process Automation	Robotic Process Automation
4	Digital Image Processing	Digital Image Processing
5	Intrusion Detection System	Intrusion Detection System
Professional Elective – V (Offered in Semester VIII)		
Sl. No.	Existing Course Titles	After 8 <sup>th</sup> BoS – Approved Course Titles
1	Quantum Computing	Cloud Services Management
2	Human Computer Interaction	Human Computer Interaction
3	GPU Computing	Bio-Inspired Computing
4	Automation Techniques and Tools	Storage Technologies
5	Augmented Reality and Virtual Reality	Augmented Reality and Virtual Reality
Professional Elective – VI (Offered in Semester VIII)		
Sl. No.	Existing Course Titles	After 8 <sup>th</sup> BoS – Approved Course Titles
1	Green Computing	Green Computing
2	Social Network Analysis	Generative AI
3	Wireless Sensor Networks	Wireless Sensor Networks
4	Computer Vision	Game Development
5	E-Commerce	E-Commerce

All the Changes carried as per suggestion of the members and the same has been confirmed.

Item:2025.9. 3	To discuss the Syllabi of VII semester, under Autonomous Regulations R-2023 for the B. Tech - Information Technology students admitted from the Academic Year 2023-24										
	The BoS Members recommended to carry out the following changes in the VII Semester of Regulation 2023.										
	SEMESTER – VII										
	Sl. No.	Course Code	Course Title	Cate- gory	Periods			Credits	Max. Marks		
					L	T	P		CAM	ESM	Total
	Theory										
	1	U23ITT710	Neural Network and Deep Learning	PC	3	0	0	3	25	75	100
	2	U23ITT711	Cloud Computing and Virtualization	PC	3	0	0	3	25	75	100
	3	U23ITT712	IT Operations and Management	PC	3	0	0	3	25	75	100
	4	U23ITE7XX	Professional Elective IV #	PE	3	0	0	3	25	75	100
	5	U23XXO7XX	Open Elective III \$	OE	3	0	0	3	25	75	100
	Practical										
	6	U23ITP707	Neural Network and Deep Learning Laboratory	PC	0	0	2	1	50	50	100
	7	U23ITP708	Cloud Computing and Virtualization Laboratory	PC	0	0	2	1	50	50	100
	Project										
	8	U23ITW703	Project Phase - I	PA	0	0	4	2	50	50	100
	9	U23ITW704	Internship / Inplant Training	PA	0	0	2	1	100	-	100
								20	375	525	900
	• The BoS members suggested to carry out the following										
	S.No.	Course Title	Category	Suggestion Provided	Changes Carried						
	1.	Neural Network and Deep Learning	PC	<b>Unit I: Neural Networks</b> Consider briefly mentioning Gradient Descent, Stochastic Gradient Descent (SGD), and Batch Normalization, as they are fundamental to neural networks. <b>Unit III: Deep Learning</b> RNN should include LSTMs (Long Short-Term Memory) Add a brief	Syllabus reframed as per the suggestion provided						



				<p>mention of Transformer Models like BERT and GPT</p> <p><b>Unit IV:</b></p> <p>Boltzmann Machines are powerful but less commonly used today. Consider briefly comparing them with modern deep learning architectures like GANs (Generative Adversarial Networks) and Autoencoders</p>		
	2.	Cloud Computing and Virtualization	PC	<p><b>Unit I: Introduction</b></p> <p>Add Cloud Deployment Models (Public, Private, Hybrid, Community Cloud) for a clearer understanding of cloud strategies.</p> <p><b>Unit III: Virtualization</b></p> <p>VM server consolidation topic can be included (As per the textbook considered) Include Containerization vs. Virtualization to differentiate between traditional VMs and modern containerized solutions. Add Hypervisors (Type 1 &amp; Type 2) (e.g., VMware, KVM,</p>	Syllabus reframed with the suggestions	

				Xen, Hyper-V) to explain how virtualization is implemented.	
	3.	Six Sigma	PE	Unit- IV Cloud Programming and Software Environments The most used cloud service provider AWS is not included  Course Outcome statements are to be rephrased in line with the syllabus	Course Outcome statements are rephrased
The details of all the courses in VII Semester are given in <b>Annexure I</b>					
Item:2025.9.4	To discuss the B.Tech. Degree, Professional and Open Elective Courses selected for the VII semester under Regulation 2023 along with assessment methodologies				
	Professional Elective - IV (Offered in Semester VII)				
	Sl. No.	Course Code	Course Title		
	1	U23ITE714	Six Sigma		
	2	U23ITE715	Cyber Security and Forensics		
	3	U23ECEC01	Digital Image Processing		
	4	U23ITE716	Intrusion Detection System		
	5	U23ITEC03	Robotic Process Automation		
	Open Elective – II (Offered in Semester VII)				
	S. No	Course Code	Course Title		
	1	U23ITOC03	Essentials of Data Science		
	2	U23ITOC04	Big Data Technologies		
	The details of the Professional and Open Elective courses are given in <b>Annexure II</b> The assessment methodology for the Theory Courses, Practical Courses, Internship/Inplant Training, Project Phase I has been stated as per the regulation R23.				



Item:2025.9.5	To discuss the Syllabus of courses offered for Honors and Minor Degree Programme											
	The Chairperson discussed about the Honors/Minor Degree (Advanced Web Development) to be floated by the department and showcased the syllabus of the subject listed under Honors Degree.											
	COURSE DETAILS											
	Sl. No.	Sem	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
						L	T	P		CAM	ESM	Total
	Theory											
	1	IV	U23WXT401	Front-End Development	PC	3	0	0	3	25	75	100
	2	V	U23WXB501	Advanced Databases	PC	3	0	2	4	50	50	100
	3	VI	U23WXB502	Microservices and Spring Boot	PC	3	0	2	4	50	50	100
	4	VII	U23WXT702	Container Orchestration and Security	PC	3	0	0	3	25	75	100
	5	VIII	U23WXT803	Cloud Management	PC	3	0	0	3	25	75	100
	6	VIII	U23WXW801	Project Phase	PW	0	0	4	2	50	50	100
	Total								19*	225	375	600
	Equivalent NPTEL courses##											
	1	IV to VII	U23WXNX01	Web Development Equivalent NPTEL Courses					3	12 WEEK Course		
Details of Honors/Minor Degree and Syllabus in Annexure III												
Item:2025.9.6	To discuss the Assessment Methodology for the Honors and Minors Degree											
	The assessment methodology for the Honors degree has been discussed as follows											
	Assessment Procedure and passing criteria for the courses under Honours and Minor Degree Programmes											
	The total marks for each course (comprising of two components namely Continuous Assessment Marks (CAM) and End Semester Examination Marks (ESM). Assessment and Examination procedures for the theory courses, theory cum practical and project courses under Honours / Minor Degree programmes shall be assessed as per Table 1, 2 and 3.											
	1. Theory Courses:											
	Table 1. Assessment Procedure for Theory Courses for Honours and Minor Degree Programmes											
		Continuous Assessment Marks (CAM)					End Semester Examination**	Total Marks (CAM+ESE)				
	Portion for Test	CAT 1	CAT 2	Model**	Assignment*	Attendance**	All 5 Units					
	Assessment Methodology	MCQ Test	MCQ Test	Written Exam	Individual Task #		Written Exam					
		50 Questions for Analytical Course 75 Questions for Theory Course										
	Duration of the Test	1 hour 30 Minutes	1 hour 30 Minutes	3 hours			3 hours					
Test Marks	50*	50*	75*	20*	5	75						
Weightage for CAM	5	5	5	5	5							
CAM / ESE Marks	CAM Marks = 25					ESE Marks = 75	100					
# Open Book Analytical Exam/Analyse Real world problems and propose solutions/ Tool or Subject Proficiency Analysis – Test the Students skill by giving individual task/ Paper Presentation/Micro Project Presentation/Idea Presentation for the Societal Problem:(Questions standard shall be of level 3 or more in Blooms Taxonomy)												
## Distribution of Marks for Attendance, the Question Paper Pattern for Model and ESE are same as given in B. Tech. Regulations R2023 for Theory Courses.												



## 2. Theory cum Practical Courses:

**Table 2. Assessment Procedure for Theory cum Practical Courses for Honours and Minor Degree Programmes**

Table 2: Assessment Procedure for Honours and Minor Degree Programmes													
Assessment	Continuous Assessment Marks (CAM) – Maximum 50 Marks										**End Semester Examination (ESE) Marks (Theory)	Total Marks (CAM+ ESE)	
	Continuous Assessment (Theory)					Continuous Assessment (Practical)							
	CAT 1	CAT 2	Model**	Attendan ce**	Total	Conducti on of Practical	Report	Viva	Total	End Semester Examination (ESE) Marks (Practical)			
Portion for Test	1 ¼ Units	1 ¼ Units	All 3 Units								All 3 Units		
Assessment Methodolog y	MCQ Test	MCQ Test	Written Exam								Practical Exam		Written Exam
	50 Questions for Analytical Course 75 Questions for Theory Course												
Duration of the Test	1 hour 30 Minutes	1 hour 30 Minutes	3 hours										
Marks	50	50	75	5		15	10	5	30*	30	75 (To be weighted for 50 Marks)		
Weightage of CAM	2.5	2.5	2.5	2.5	10	*To be weighted for 10 Marks				10	30		
CAM / ESE Marks	CAM Marks =10+10+30=50										ESE Marks = 50	100	

\*\* Distribution of Marks for Attendance, the Question Paper Pattern for Model and ESE are same as given in B. Tech. Regulations R2023 for Theory cum practical Courses

### Item:2025.9.7 Details of Students Registered for Honors and Minors Degree

The Chairperson showcased the registered list of students for the Honors Degree courses - Advanced Web Development & Artificial Intelligence and Machine Learning. The student list is given in **Annexure IV**

### Item:2025.9.8 To appraise about the methods to be adopted for Internship / Inplant Training

#### 7.14. Industrial Training / Internship

The student is required to undergo 'internship' in industry / research laboratory / higher learning institution for a minimum period of 4 weeks during vacations and shall complete the internship before the completion of 7<sup>th</sup> semester.

- The internship carries 1 credit.
- Each spell of internship shall be for a period not less than 2 weeks.
- The main purpose of internship is to enhance the general professional outlook and capability of the student to advance his/her chances of improving the career opportunities. The student should get prior approval from the Head of the Department and Training and Placement cell in the college before undertaking the internship and need to submit a detailed report after completion for the purpose of assessment. The internship marks will be given in 7<sup>th</sup> semester mark sheet.

#### Assessment Procedure

#### 9.5. Industrial Training / Internship

9.5.1. The evaluation of 'Internship' is through internal assessment only (continuous assessment) as per Table 9.14.

9.5.2. A committee comprising of two faculty members appointed by Head of the Department will assess the internship for 100 marks.

**Table 9.14 Assessment method for Industrial Training / Internship**

Assessment	Continuous Assessment Marks (CAM)		Total Marks
	Report	Presentation	
Marks	50	50	100

### Item:2025.9.9 To Apprise about the Department Research Activities

The Chairperson apprised about the recent research activities carried through Journal, Conference, Books/Chapters Publications, Patents and Consultancy work carried by the Faculties

### Item:2025.9.10 To Apprise about the End Semester Examination Results


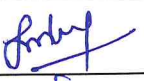

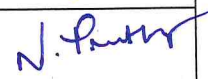

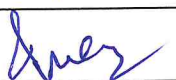


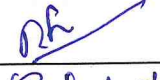
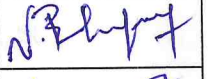
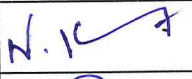

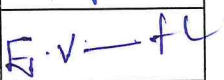
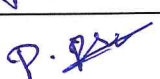
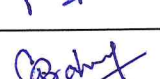
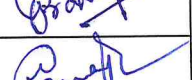



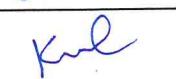

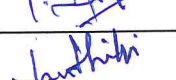
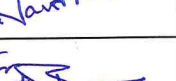
<b>Item:2025.9.10</b>	<b>To Apprise about the End Semester Examination Results</b>
	The Chairperson proudly stated that we are continuously maintaining more than 95% pass percentage in the previous years and the same has been continued this year also.
<b>Item:2025.9.11</b>	<b>To discuss about the remarkable Achievements of Faculty and Students</b>
	The Board of Studies Chairperson briefed the recent achievements of the College, Department Faculty and Students, along with the Placement track of the year 2024-2025
<b>Item:2025.9.12</b>	<b>Any other items to be discussed with the permission of the Chair</b>
	-


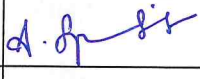
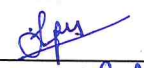
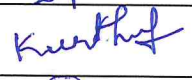
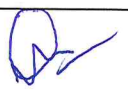


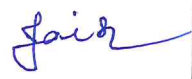





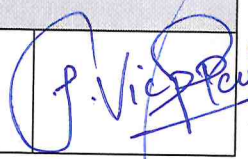
The meeting for the above Agenda regarding B.Tech - Information Technology was concluded by 4:30 pm by **Dr. R.Raju**, Chairperson-BoS and Head of Department, Department of Information Technology, Sri Manakula Vinayagar Engineering College.





### Members Present

S.NO.	Name of the Member	Designation	Signature
<b>1.Head of the Department Concern (Chairperson)</b>			
1	<b>Dr. R. Raju</b> Professor & Head	Chairperson	
<b>2.All faculty members of the Department</b>			
2	<b>Dr. S. Balaji</b> Associate Professor	Member Secretary	
3	<b>Dr. R. Saravanan</b> Professor	Member	
4	<b>Dr. N. Thilagavathi</b> Associate Professor	Member	
5	<b>Dr. B. Vijayakumar</b> Associate Professor	Member	
6	<b>Dr. Puspita Dash</b> Associate Professor	Member	
7	<b>Dr. R. Anandkumar</b> Assistant Professor	Member	
8	<b>Dr. B. Ananth</b> Assistant Professor	Member	
9	<b>Mr. R. Suresh</b> Associate Professor	Member	
10	<b>Mrs. V. Padmapriya</b> Associate Professor	Member	
11	<b>Mrs. N. Kalaiselvi</b> Assistant Professor	Member	
12	<b>Mrs. M. Lakshmiprabha</b> Assistant Professor	Member	
13	<b>Mrs. E. Valarmathi</b> Assistant Professor	Member	
14	<b>Mr. P. Praveenkumar</b> Assistant Professor	Member	
15	<b>Mr. G. Prabu</b> Assistant Professor	Member	
16	<b>Mrs. C. Vanaja</b> Assistant Professor	Member	
17	<b>Ms. L. Durgadevi</b> Assistant Professor	Member	
18	<b>Mr. T. Periasamy</b> Assistant Professor	Member	
19	<b>Ms. K. Poornambigai</b> Assistant Professor	Member	
20	<b>Mr. T. Maheswaran</b> Assistant Professor	Member	
21	<b>Mrs. N. Nandhini</b> Assistant Professor	Member	
22	<b>Mr. R. Vijayaprabhu</b> Assistant Professor	Member	
23	<b>Mr. D. Prabhu</b> Assistant Professor	Member	

24	<b>Ms. M. Madhumitha</b> Assistant Professor	Member	
25	<b>Ms. A. Sowbarnika</b> Assistant Professor	Member	
26	<b>Mr. A. Ranjeeth</b> Assistant Professor	Member	
27	<b>Ms. V. Keerthana</b> Assistant Professor	Member	
28	<b>Dr.N.S.N. Cailassame</b> Professor & Dean Placement Department of Management Studies	Member	
29	<b>Dr. K. Karthikeyan</b> Associate Professor Department. of Chemistry	Member	
30	<b>Prof. M. Devanathan</b> Assistant Professor Department of Mathematics	Member	
31	<b>Dr. P. Jaichitra</b> Professor and Head Department of English	Member	
32	<b>Dr.T.Jayavarthan</b> Professor Department. of Physics	Member	
<b>3. Two subject experts from outside the Parent University</b>			
33	<b>Dr. R.Manoharan, M. Tech., Ph.D.</b> Professor, Department of CSE Puducherry Technological University, Puducherry rmanoharan@pec.edu, 9443468480	Subject Expert	
34	<b>Dr. N.Pughazendi,</b> Professor, Department of CSE Panimalar Engineering College, Chennai pughazendi@gmail.com, 9962969429	Subject Expert	
<b>4. Expert nominated by the Vice-Chancellor recommended by the Autonomous college Principal as a University Nominee</b>			
35	<b>Dr. S. Kanmani</b> Professor, Department of Information Technology Puducherry Technological University, Puducherry kanmani@ptuniv.edu.in , 9443206299	Subject Expert	
<b>5. One representative from industry areas to nominated by the Principal</b>			
36	<b>Mr. Ashin Antony, CTO,</b> IGNITHO Technologies, Chennai-600018 ashin.antony@ignitho.com, 9444150791	Member	
<b>6. One member of the College Alumni to be nominated by the principal</b>			
37	<b>Dr. P. Victor Paul,</b> Senior Assistant Professor, Department of Computer Science and Engineering, Indian Institute of Information Technology, Kottayam victorpaul@iiitkottayam.ac.in , 9944913170	Member	

Dr. R. Raju  
Chairperson - BoS (IT)





## **Annexure I**

**The details of all the courses in VII Semester**

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# CURRICULUM R23

## B.TECH. – INFORMATION TECHNOLOGY – VII SEMESTER

SEMESTER – VII										
Sl. No.	Course Code	Course Title	Cate- gory	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23ITT710	Neural Network and Deep Learning	PC	3	0	0	3	25	75	100
2	U23ITT711	Cloud Computing and Virtualization	PC	3	0	0	3	25	75	100
3	U23ITT712	IT Operations and Management	PC	3	0	0	3	25	75	100
4	U23ITE7XX	Professional Elective IV #	PE	3	0	0	3	25	75	100
5	U23XXO7XX	Open Elective III \$	OE	3	0	0	3	25	75	100
Practical										
6	U23ITP707	Neural Network and Deep Learning Laboratory	PC	0	0	2	1	50	50	100
7	U23ITP708	Cloud Computing and Virtualization Laboratory	PC	0	0	2	1	50	50	100
Project										
8	U23ITW703	Project Phase - I	PA	0	0	4	2	50	50	100
9	U23ITW704	Internship / Inplant Training	PA	0	0	2	1	100	-	100
							20	375	525	900



Department	Information Technology			Programme: <b>B.Tech.</b>							
Semester	VII			Course Category Code: <b>PC</b>			*End Semester Exam Type: <b>TE</b>				
Course Code	<b>U23ITT710</b>			Periods / Week			Credit	Maximum Marks			
				L	T	P	C	CAM	ESE	TM	
Course Name	<b>Neural Network and Deep Learning</b>			<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>25</b>	<b>75</b>	<b>100</b>	
IT											
Prerequisite	Computer Networks										
Course Outcomes	<b>On completion of the course, the students will be able to</b>								BT Mapping (Highest Level)		
	CO1	To understand Neural Network basics and Types								K2	
	CO2	To understand various neural network models								K2	
	CO3	Implement the deep learning techniques using software tools.								K3	
	CO4	To analyze the Spin Glass Model and Deep Belief Networks								K2	
	CO5	To Develop smart applications for various domains								K3	
Unit- I	Neural Networks						Periods: 09				
Overview of biological neurons: Structure of biological neuron - neurobiological analogy - Biological neuron equivalencies to artificial neuron model - Evolution of neural network. Terminologies: Learning rate - Bias - Variance - underfitting - Overfitting. Activation Function: Binary step – Linear – ReLU – LeakyReLU – Sigmoid – Tanh – Softmax – Gradient Descent and Stochastic Gradient Descent - ANN Architecture: Feed forward network - Feed backward network - Single and multilayer network - fully recurrent network										CO1	
Unit- II	Models of Neural Network						Periods: 09				
McCulloch and Pits Neural Network (MCP Model): Architecture - Solution of AND, OR function using MCP model - Hebb Model: Architecture - training and testing - Hebb network for AND function. Perceptron Network: Architecture – training – Testing - single and multi-output model - Perceptron for AND function										CO2	
Unit- III	Deep Learning						Periods: 09				
Deep Learning - Different types of Deep Neural Networks - CNN - RNN - LSTM - forward propagation - Cost function - backpropagation. APIs using Softwares Tensorflow and Keras										CO3	
Unit- IV	Boltzmann Machines						Periods: 09				
Introduction to Boltzmann Machine - Energy-Based Models - Restricted Boltzmann Machine - Contrastive Divergence - Deep Belief Networks - Deep Boltzmann Machine - Basics of Generative adversarial Networks and Autoencoders										CO4	
Unit- V	Smart Applications						Periods: 09				
Smart Agriculture - Smart Transportation and Autonomous Vehicles - Smart Homes - Smart Cities - Image Processing - Natural Language Processing - Speech Recognition - Video Analytics										CO5	
Lecture Periods: 45			Tutorial Periods: -			Practical Periods: -			Total Periods: 45		
Text Books											
1. Aston Zhang, Zack C. Lipton, Mu Li, Alex J. Smola, “Dive into Deep Learning”, Amazon Science,2022. 2. Francois Chollet, “Deep Learning with Python”, Manning Publications, 2018. 3. Ian J. Goodfellow, Yoshua Bengio, Aaron Courville, “Deep Learning”, MIT Press, 2017. 4. AurélienGéron, Hands on Machine Learning with Scikit-Learn and TensorFlow [Concepts, Tools, and Techniques to Build Intelligent Systems], Published by O'Reilly Media,2017.											
Reference Books											
1. Ragav Venkatesan, Baoxin Li, “Convolutional Neural Networks in Visual Computing”, CRC Press, 2018. 2. Navin Kumar Manaswi, “Deep Learning with Applications Using Python”, Apress, 2018. 3. Joshua F. Wiley, “R Deep Learning Essentials”, Packt Publications, 2016.											
Web References											
1. <a href="https://www.geeksforgeeks.org/artificial-neural-networks-and-its-applications/">https://www.geeksforgeeks.org/artificial-neural-networks-and-its-applications/</a> 2. <a href="https://www.coursera.org/learn/neural-networks-deep-learning">https://www.coursera.org/learn/neural-networks-deep-learning</a> 3. <a href="https://onlinecourses.nptel.ac.in/noc20_cs62/preview">https://onlinecourses.nptel.ac.in/noc20_cs62/preview</a>											

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	-	-	-	-	-	-	-	3	3	3
2	3	3	3	-	3	2	-	-	-	-	-	-	3	2	2
3	3	3	2	2	2	-	-	-	-	-	-	-	3	2	1
4	3	2	2	2	-	-	-	-	-	-	-	-	3	1	1
5	3	2	2	-	-	-	-	-	-	-	-	-	3	1	1

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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





Department	Information Technology	Programme: <b>B.Tech.</b>						
Semester	VII	Course Category Code: <b>PC</b>				*End Semester Exam Type: <b>TE</b>		
Course Code	<b>U23ITT711</b>	Periods / Week			Credit	Maximum Marks		
Course Name	<b>Cloud Computing and Virtualization</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CAM</b>	<b>ESE</b>	<b>TM</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>25</b>	<b>75</b>	<b>100</b>
IT								
Prerequisite	Internet Programming, Data communication and Computer Networks							
<b>Course Outcomes</b>	<b>On completion of the course, the students will be able to</b>							<b>BT Mapping (Highest Level)</b>
	<b>CO1</b>	To understand the fundamentals of Cloud Computing and its evolution						<b>K2</b>
	<b>CO2</b>	To understand the cloud infrastructures						<b>K2</b>
	<b>CO3</b>	To gain knowledge on the concept of virtualization that is fundamental to cloud computing						<b>K3</b>
	<b>CO4</b>	To learn programming and software environments for cloud						<b>K2</b>
	<b>CO5</b>	To understand the security issues in cloud computing						<b>K3</b>
<b>Unit- I</b>	<b>Introduction</b>				<b>Periods: 09</b>			
Technologies for Network based systems - System Models for Distributed and Cloud Computing - NIST Cloud Computing Reference Architecture - Reference Architectural Components - Cloud Computing and Service Models - Cloud Computing Characteristics - Cloud Services - Cloud Models (IaaS, PaaS, SaaS) - Cloud Ecosystem and enabling technologies								<b>CO1</b>
<b>Unit- II</b>	<b>Cloud Infrastructure</b>				<b>Periods: 09</b>			
Architectural Design of Compute and Storage Clouds - Layered Cloud Architecture Development - Design Challenges - Inter Cloud Resource Management - Resource Provisioning and Platform Deployment - Global Exchange of Cloud Resources								<b>CO2</b>
<b>Unit- III</b>	<b>Virtualization</b>				<b>Periods: 09</b>			
Introduction - Implementation Levels of Virtualization - Virtualization Structures/Tools and Mechanisms - Virtualization of CPU - Memory and I/O Devices - Virtual Cluster and Resource Management - Virtualization for Data Center Automation – Hypervisor- VMware								<b>CO3</b>
<b>Unit- IV</b>	<b>Cloud Programming and Software Environments</b>				<b>Periods: 09</b>			
Parallel and Distributed Programming paradigms – Programming on Amazon AWS and Microsoft Azure – Programming support of Google App Engine – Emerging Cloud software Environment.								<b>CO4</b>
<b>Unit- V</b>	<b>Security</b>				<b>Periods: 09</b>			
Security management in Peer-to-Peer networks - Peer trust and Reputation Systems - Trust overlay and DHT implementation - Power Trust - Securing Overlays. Cloud Security and Trust Management - Defense Strategies - Distributed Intrusion Detection - Data and Software Protection Techniques								<b>CO5</b>
<b>Lecture Periods: 45</b>		<b>Tutorial Periods: -</b>		<b>Practical Periods: -</b>		<b>Total Periods: 45</b>		
<b>Text Books</b>								
1. Douglas Comer, “The Cloud Computing Book - The Future of Computing Explained”, CRC Press, 1 <sup>st</sup> Edition, 2021. 2. Kai Hwang, Geoffrey C. Fox and Jack J. Dongarra, “Distributed and cloud computing from Parallel Processing to the Internet of Things”, Morgan Kaufmann, Elsevier, 2012. 3. Barrie Sosinsky, “Cloud Computing Bible”, John Wiley & Sons, 2010. 4. Tim Mather, Subra Kumaraswamy, and Shahed Latif, “Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance”, O’Reilly, 2009.								
<b>Reference Books</b>								
1. Chris Dotson ,”Practical Cloud Security: A Guide For Secure Design and Deployment”,1 <sup>st</sup> Edition,2019. 2. Michael Wittig and Andreas Wittig,” Amazon Web Services in Action”,2 <sup>nd</sup> Edition,2018. 3. Arshdeep Bahga and Vijay Madiseti,” Cloud Computing: A Hands-On Approach”,1 <sup>st</sup> Edition,2013.								
<b>Web References</b>								
1. <a href="https://www.simplilearn.com/tutorials/cloud-computing-resources/cloud-computing-material/">https://www.simplilearn.com/tutorials/cloud-computing-resources/cloud-computing-material/</a> 2. <a href="https://www.ncsc.gov.uk/collection/cloud/choosing-a-cloud-provider/">https://www.ncsc.gov.uk/collection/cloud/choosing-a-cloud-provider/</a>								

**COs/POs/PSOs Mapping**


COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	2	2	-	2	-	-	-	-	-	3	3	3
2	3	3	3	2	2	2	-	-	-	-	-	2	3	2	2
3	3	3	2	2	2	2	-	-	-	-	-	2	3	2	1
4	3	2	2	2	3	2	-	-	-	-	-	2	3	1	1
5	3	2	2	2	3	3	2	-	-	-	-	3	3	2	2

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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





Department	Information Technology			Programme: <b>B.Tech.</b>							
Semester	VII			Course Category Code: <b>PC</b>		*End Semester Exam Type: <b>TE</b>					
CourseCode	U23ITT712			Periods/Week		Credit	Maximum Marks				
Course Name	IT Operations and Management			L	T	P	C	CAM	ESE	TM	
	IT			3	0	0	3	25	75	100	
Prerequisite	Operating Systems, Database Management Systems										
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)		
	CO1	Identify the commands to manage user and group administrative structure, File system, devices and kernels in a standalone or network system								K1	
	CO2	Apply the essential Windows administration concepts for given scenario.								K3	
	CO3	Describe the functionalities, Configuration, monitoring and Power budget for different types of servers								K2	
	CO4	To Explain various storage networking and virtualization technologies								K2	
	CO5	Review backup and restore strategy used in a system or enterprise								K2	
Unit-I	Linux Administration						Periods:09				
Essential duties of system admin-Scripting – Shell - Shell Configuration - Access control and Root powers- Adding new users- Controlling Process- File system- Devices- Modules- Drivers and kernel - Network file system - sharing system files											
Unit-II	Windows Administration						Periods:09				
Managing account policies and service accounts- Configuring Name resolution- Active directory- Network policies- Remote access- Managing File services											
Unit-III	Server Management						Periods:09				
Types of servers - Roles of Server - Web Server Management – Mail server Management - Setup - Monitoring - Optimization - Power and Heat budgeting											
Unit-IV	Storage Management						Periods:09				
Information availability - Networked Storage Infrastructures (NAS, SAN) - RAID - Storage Virtualization											
Unit-V	Business Continuity						Periods:09				
System Backup management- Enterprise Back-up and Recovery: Considerations , Operations - Backup Granularity, Methods, Technologies - Replication - Business Continuity Planning											
Lecture Periods:45			Tutorial Periods:		Practical Periods:-			Total Periods:45			
Text Books											
1. Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, “UNIX and Linux System Administration Handbook”, 5th edition, Pearson education,2017.											
2. Orin Thomas, “Administering Windows Server 2012 – Training guide”, O'Reilly Media, 2014											
3. EMC Education Services,” Information Storage and Management”, Wiley, 2nd edition, 2012											
4. Gilbert Held, "Server Management (Best Practices Book 9)", Auerbach Publications, 1st edition.2000											
Reference Books											
1. Robert Spalding, “Storage Networks :The Complete Reference”, Tata McGraw Hill,Osborne,2017.											
2. Matthias KalleDalheimer, Matt Welsh, ”Running Linux”, Om books, Fifth Edition, 2006.											
3. Nicholas Wells, “Guide to Linux Installation and Administration”, Course Technology Inc; 2nd Revised edition, 2003.											
Web References											
1. Backup management- <a href="https://www.baculasystems.com/training">https://www.baculasystems.com/training</a>											
2. System administration and engineering training - <a href="https://www.cb nuggets.com/it training/systems-administration-engineering">https://www.cb nuggets.com/it training/systems-administration-engineering</a>											
3. System administration certification - <a href="https://www.ko enig solutions.com/specialization/system-administration-training-courses.aspx">https://www.ko enig solutions.com/specialization/system-administration-training-courses.aspx</a>											

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	2	-	3	-	-	-	-	-	-	1	2	2
2	3	2	1	-	-	2	-	1	-	-	-	-	1	2	2
3	3	2	1	-	-	2	-	-	-	-	-	-	1	2	2
4	3	2	1	-	-	3	-	-	-	-	-	-	1	2	2
5	3	2	1	-	-	-	2	2	-	2	-	-	1	2	2

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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



Department	Information Technology	Programme: B.Tech.						
Semester	VII	Course Category Code: PC				*End Semester Exam Type: LE		
Course Code	U23ITP707	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	Neural Network and Deep Learning Laboratory	-	-	2	1	50	50	100
IT								
Prerequisite	Machine Learning							
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)
	CO1	Implement various Activation functions						K3
	CO2	Develop various NN models						K3
	CO3	Design and configure Neural Networks for various real world applications						K3
	CO4	To design various neural networks						K3
	CO5	To create convolution neural network model for image classification						K3
List of Exercise								
<ol style="list-style-type: none"> <li>Plotting of Activation Functions: Threshold functions, Signum function, Sigmoid function, Tan-hyperbolic function, Ramp function, Identity function.</li> <li>Implementation of some basic model like MCP with suitable example.</li> <li>Implementation of Hebb model with suitable example.</li> <li>Write a program for Time-Series Forecasting with the LSTM Model.</li> <li>Build a feed forward neural network for prediction of logic gates.</li> <li>Write a program to implement deep learning Techniques for image segmentation</li> <li>Write a program to predict a caption for a sample image using LSTM.</li> <li>Write a program for character recognition using CNN.</li> <li>Build a Convolutional Neural Network for Cat vs Dog Image Classification</li> <li>Implement un-regularized and regularized versions of the neural network cost function and compute gradients via the backpropagation algorithm.</li> </ol>								
Lecture Periods: -		Tutorial Periods: -		Practical Periods: 30		Total Periods: 30		
Text Books								
<ol style="list-style-type: none"> <li>Aston Zhang, Zack C. Lipton, Mu Li, Alex J. Smola, "Dive into Deep Learning", Amazon Science, 2022.</li> <li>Francois Chollet, "Deep Learning with Python", Manning Publications, 2018</li> <li>Aurélien Géron, Hands on Machine Learning with Scikit-Learn and TensorFlow [Concepts, Tools, and Techniques to Build Intelligent Systems], Published by O'Reilly Media, 2017</li> <li>Ian J. Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press, 2017</li> </ol>								
Reference Books								
<ol style="list-style-type: none"> <li>Ragav Venkatesan, Baoxin Li, "Convolutional Neural Networks in Visual Computing", CRC Press, 2018</li> <li>Navin Kumar Manaswi, "Deep Learning with Applications Using Python", Apress, 2018</li> <li>Joshua F. Wiley, "R Deep Learning Essentials", Packt Publications, 2016</li> </ol>								
Web References								
<ol style="list-style-type: none"> <li><a href="https://www.geeksforgeeks.org/artificial-neural-networks-and-its-applications/">https://www.geeksforgeeks.org/artificial-neural-networks-and-its-applications/</a></li> <li><a href="https://www.coursera.org/learn/neural-networks-deep-learning">https://www.coursera.org/learn/neural-networks-deep-learning</a></li> <li><a href="https://onlinecourses.nptel.ac.in/noc20_cs62/preview">https://onlinecourses.nptel.ac.in/noc20_cs62/preview</a></li> </ol>								



**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	-	2	-	-	1	2	-	-	3	3	3	3
2	3	3	2	-	2	-	-	2	2	-	-	3	3	3	3
3	3	3	3	-	2	-	-	2	2	-	-	3	3	3	3
4	3	3	3	-	3	-	-	2	2	-	-	3	3	3	3
5	3	3	3	2	3	-	-	2	2	-	-	3	3	3	3

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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



Department	Information Technology	Programme: <b>B.Tech.</b>						
Semester	VII	Course Category Code: <b>PC</b>				*End Semester Exam Type: <b>LE</b>		
Course Code	U23ITP708	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	Cloud Computing and Virtualization Laboratory	-	-	2	1	50	50	100
IT								
Prerequisite	Computer Networks, Virtualization							
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)
	CO1	To provide hands-on experience with cloud computing platforms, virtualization technologies						K3
	CO2	To provide hands-on experience with cloud-based software development						K3
	CO3	To learn how to configure, deploy, and manage cloud services						K3
	CO4	To provide hands-on experience with virtualization tools						K3
	CO5	To understand the security Policies in Cloud Environments						K3
List of Exercise								
1. Installation and Configuration of CloudSim 2. Exploring Cloud Service Models 3. Exploring and Setting up a Private Cloud using OpenStack 4. Implement Resource Provisioning in the Cloud 5. Installation and Configuration of Virtual Machine Creation using VMware/Virtual Box 6. Working with Docker Containers 7. Implement Kubernetes for Container Orchestration 8. Build a Hadoop and HDFS environment 9. Write a MapReduce Programs 10. Deploying Applications on Microsoft Azure and Google Cloud 11. Configuring security groups and IAM roles in AWS/Azure 12. Implementing multi-factor authentication.								
Lecture Periods: -		Tutorial Periods: -		Practical Periods: 30		Total Periods: 30		
Text Books								
1. Kris Jamsa ,Cloud Computing, Jones & Bartlett Learning,2022. 2. Dac-Nhuong Le, “Cloud Computing and Virtualization”, Wiley-Scrivener, 2018 3. Tom Fifield, Diane Fleming, Anne Gentle, Lorin Hochstein, Jonathan Proulx, Everett Toews, Joe Topjian, OpenStack Operations Guide, O'Reilly Media,2014. 4. Matthew Portnoy, Virtualization Essentials, Published by Sybex,2012.								
Reference Books								
1. Rodrigo N. Calheiros, Rajiv Ranjan, Anton Beloglazov, Cesar A. F. De Rose, and Rajkumar Buyya, CloudSim: A Toolkit for Modeling and Simulation of Cloud Computing Environments and Evaluation of Resource Provisioning Algorithms, Software: Practice and Experience, Volume 41, Number 1, Pages: 23-50, ISSN: 0038-0644, Wiley Press, New York, USA, January 2011. 2. Rajkumar Buyya, Rajiv Ranjan and Rodrigo N. Calheiros, Modeling and Simulation of Scalable Cloud Computing Environments and the CloudSim Toolkit: Challenges and Opportunities, Proceedings of the 7th High Performance Computing and Simulation Conference (HPCS 2009, ISBN: 978-1-4244-4907-1, IEEE Press, New York, USA), Leipzig, Germany, June 21 - 24, 2009.								
Web References								
1. <a href="https://www.openstack.org">https://www.openstack.org</a> 2. <a href="https://hadoop.apache.org">https://hadoop.apache.org</a> 3. <a href="https://hadoop.apache.org/docs/r1.2.1/mapred_tutorial.html">https://hadoop.apache.org/docs/r1.2.1/mapred_tutorial.html</a> 4. <a href="https://aws.amazon.com/free/">https://aws.amazon.com/free/</a> 5. <a href="https://azure.microsoft.com/en-us/free/">https://azure.microsoft.com/en-us/free/</a> 6. <a href="https://cloud.google.com/free">https://cloud.google.com/free</a>								

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	-	2	-	-	1	2	-	-	3	3	3	3
2	3	3	2	-	2	-	-	2	2	-	-	3	3	3	3
3	3	3	3	-	2	-	-	2	2	-	-	3	3	3	3
4	3	3	3	-	3	-	-	2	2	-	-	3	3	3	3
5	3	3	3	2	3	-	-	2	2	-	-	3	3	3	3

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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





Department	Information Technology	Programme: <b>B.Tech.</b>						
Semester	VII	Course Category Code: <b>PA</b>				*End Semester Exam Type: <b>LE</b>		
Course Code	<b>U23ITW703</b>	Periods / Week			Credit	Maximum Marks		
		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CAM</b>	<b>ESE</b>	<b>TM</b>
Course Name	<b>PROJECT PHASE-I</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>50</b>	<b>50</b>	<b>100</b>
Course Outcomes	<b>On completion of the course, the students will be able to</b>							<b>BT Mapping (Highest Level)</b>
	<b>CO1</b>	State the problem definition clearly.						<b>K3</b>
	<b>CO2</b>	Prepare SRS for projects.						<b>K3</b>
	<b>CO3</b>	Prepare SDS for projects.						<b>K3</b>
	<b>CO4</b>	Develop presentation skills.						<b>K3</b>
	<b>CO5</b>	Develop project management skills.						<b>K3</b>
<b>List of Exercise</b>								
<p>The project group is required to do the following</p> <ul style="list-style-type: none"> <li>• literature survey,</li> <li>• Problem formulation</li> <li>• Forming a methodology of arriving at the solution of the problem.</li> <li>• Documentation of each step</li> </ul>								
<b>Lecture Periods: -</b>		<b>Tutorial Periods: -</b>		<b>Practical Periods: 30</b>		<b>Total Periods: 30</b>		
<b>Reference Books</b>								
<ul style="list-style-type: none"> <li>• Papers published in reputed journals, conferences related to the project</li> </ul>								



Department	Information Technology	Programme: <b>B.Tech.</b>						
Semester	VII	Course Category Code: <b>PA</b>			*End Semester Exam Type: -			
Course Code	<b>U23ITW704</b>	Periods / Week			Credit	Maximum Marks		
		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CAM</b>	<b>ESE</b>	<b>TM</b>
Course Name	<b>INTERNSHIP/INPLANT TRAINING</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>100</b>	<b>-</b>	<b>100</b>
<b>IT</b>								

In the course of study, during 6<sup>th</sup> semester holidays, each student is expected to undertake a minimum of 4 Industrial visits (leading hardware manufacturing / software development companies) and 2 week training or undertake a minimum of one month of industry internship (in a reputed concern). Based on the industrial internships / training/visits, the student has to submit a report at the end of seventh semester highlighting the exposure he/she gained. The report will be evaluated by the departmental committee for 100 marks. More weightage will be given for Internship. The proofs for having undergone visits / training are to be enclosed along with report as enclosures.









## **Annexure II**

**The details of Professional and Open Elective courses in  
VII Semester**



Department	Information Technology			Programme: B.Tech.						
Semester	VII			Course Category Code: PE		*End Semester Exam Type: TE				
Course Code	U23ITE714			Periods / Week		Credit	Maximum Marks			
Course Name	Six Sigma			L	T	P	C	CAM	ESE	TM
IT				3	0	0	3	25	75	100
Prerequisite	Software Engineering and Project Management									
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)
	CO1	Identify the roles and responsibilities of different Six Sigma professionals								K2
	CO2	Identify customer requirements, select and scope Six Sigma projects								K2
	CO3	Gain proficiency in basic statistical concepts								K3
	CO4	Understand how to conduct Regression Analysis and Correlation for process improvement.								K3
	CO5	Analyze case studies on successful Six Sigma implementations and apply lessons learned to real-world scenarios.								K4
Unit- I	Introduction to Six Sigma and Quality Management						Periods: 09			
Evolution of Quality Management (TQM, Lean, Six Sigma) - Basics of Six Sigma: Definition, Principles, and Benefits - Overview of DMAIC & DMADV Methodologies - Cost of Poor Quality (COPQ) and Defect Reduction - Roles and Responsibilities in Six Sigma (Green Belt, Black Belt, Master Black Belt) - Six Sigma Metrics: DPMO, Sigma Level, Yield, RTY.										CO1
Unit- II	Define Phase						Periods: 09			
Identifying Customer Requirements (Voice of the Customer - VOC) - Project Selection and Scoping - Critical to Quality (CTQ) Characteristics - SIPOC (Suppliers, Inputs, Process, Outputs, Customers) Model - Problem-Solving Tools: Flowcharts, Pareto Charts - Project Charter and Goal Setting.										CO2
Unit- III	Measure Phase						Periods: 09			
Data Collection Techniques and Measurement Scales - Measurement System Analysis (MSA): Gage R&R - Basic Statistical Concepts: Mean, Median, Mode, Variance, Standard Deviation - Statistical Process Control (SPC) & Control Charts - Process Capability Analysis: Cp, Cpk, Pp, Ppk - Understanding Process Variability and Defect Measurement.										CO3
Unit- IV	Analyze and Improve Phase						Periods: 09			
Root Cause Analysis (5 Whys, Fishbone Diagram) - Hypothesis Testing (t-test, ANOVA, Chi-square) - Regression Analysis and Correlation - Design of Experiments (DOE) - Full Factorial and Fractional Factorial Designs - Introduction to Lean Principles: 5S, Waste Reduction, Value Stream Mapping - Improvement Strategies: Kaizen, Poka-Yoke, SMED.										CO4
Unit- V	Control Phase and Implementation						Periods: 09			
Control Plans and Documentation - Statistical Process Control (SPC) and Control Charts (X-Bar, R, P, C Charts) - Failure Mode and Effects Analysis (FMEA) - Risk Assessment and Mitigation Strategies - Six Sigma Certification Levels and Industry Applications - Case Studies on Successful Six Sigma Implementations.										CO5
Lecture Periods: 45			Tutorial Periods:		Practical Periods: -			Total Periods: 45		
Text Books										
1. Douglas C. Montgomery, "Introduction to Statistical Quality Control", 8 <sup>th</sup> Edition, Wiley, 2019.										
2. Thomas Pyzdek & Paul Keller, "The Six Sigma Handbook", 5 <sup>th</sup> Edition, McGraw Hill, 2018.										
3. Craig Gygi, Bruce Williams, Neil DeCarlo, "Six Sigma for Dummies", 2 <sup>nd</sup> Edition, Wiley, 2017.										
Reference Books										
1. John Morgan & Martin Brenig-Jones, "Lean Six Sigma for Dummies", 3 <sup>rd</sup> Edition, For Dummies, 2015.										
2. Joseph M. Juran & Joseph A. Defeo, "Juran's Quality Handbook", 6 <sup>th</sup> Edition McGraw-Hill Education, 2010.										
3. Michael L. George, "Lean Six Sigma: Combining Six Sigma Quality with Lean Production Speed", NIBM E-Library, 2002.										
Web References										
1. <a href="https://www.asq.org/">https://www.asq.org/</a>										
2. <a href="https://www.isixsigma.com/">https://www.isixsigma.com/</a>										
3. <a href="https://www.lean.org/">https://www.lean.org/</a>										
4. <a href="https://www.nist.gov/">https://www.nist.gov/</a>										
5. <a href="https://www.coursera.org/">https://www.coursera.org/</a>										

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	-	-	-	-	-	-	-	3	-	3	3	3	3
2	3	3	3	-	2	-	-	-	3	3	2	3	3	3	3
3	3	3	2	2	2	-	-	-	-	3	3	3	3	3	3
4	3	2	2	2	2	3	3	-	3	3	3	3	3	3	3
5	3	2	2	2	2	3	3	3	3	3	3	3	3	3	3

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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





Department	Information Technology			Programme: B.Tech.							
Semester	VII			Course Category Code: PE		*End Semester Exam Type: TE					
Course Code	U23ITE715			Periods / Week		Credit	Maximum Marks				
Course Name	Cyber Security and Forensics			L	T	P	C	CAM	ESE	TM	
	IT			3	0	0	3	25	75	100	
Prerequisite	Data Communication and Computer Networks										
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)	
	CO1	Apply appropriate security controls and authentication measures to protect computer systems and user data, considering common threats and vulnerabilities.									K2
	CO2	Understand and implement privacy measures in cyberspace, incorporating principles of confidentiality, integrity, and availability.									K2
	CO3	Identify and mitigate cyber threats and understanding of various attack methods, tools, and security measures. Develop strategies to secure networks, cloud environments and web applications.									K2
	CO4	Acquire knowledge and skills in utilizing different types of computer forensics, Understand the importance of data recovery, backup, and evidence capture in forensic investigations.									K2
	CO5	Develop the ability to conduct effective computer forensics analysis and validation.									K2
Unit- I	Introduction to Cybersecurity						Periods: 09				
Introduction -Computer Security - Threats -Harm - Vulnerabilities - Controls - Authentication -Access Control and Cryptography - Web—User Side - Browser Attacks - Web Attacks Targeting Users - Obtaining User or Website Data - Email Attacks											
Unit- II	Privacy in Cyberspace						Periods: 09				
Identifying Customer Requirements (Voice of the Customer - VOC) - Project Selection and Scoping - Critical to Quality (CTQ) Characteristics - SIPOC (Suppliers, Inputs, Process, Outputs, Customers) Model - Problem-Solving Tools: Flowcharts, Pareto Charts - Project Charter and Goal Setting.											
Unit- III	Cyber Crimes and Cyber Security						Periods: 09				
Cyber Crime and Information Security – classifications of Cyber Crimes – Tools and Methods – Password Cracking, Keyloggers, Spywares, SQL Injection – Network Access Control – Cloud Security – Web Security – Wireless Security.											
Unit- IV	Types of Computer Forensics Technology						Periods: 09				
Types of Computer Forensics Technology: - Types of Business Computer Forensic Technology. Types of Military Computer Forensic Technology, Types of Law Enforcement- Computer Forensic Technology, Types of Business Computer Forensic Technology. Computer Forensics Evidence and capture: Data Recovery Defined-Data Back-up and Recovery-The Role of Back -up in Data Recovery-The Data Recovery Solution.											
Unit- V	Computer Forensics Analysis and Validation						Periods: 09				
Computer Forensics Evidence and capture: Data Recovery Defined-Data Back-up and Recovery-The Role of Back -up in Data Recovery-The Data Recovery Solution. Computer forensic analysis and validation: Determining what data to collect and analyse, validating forensic data, addressing data-hiding techniques, performing remote acquisitions..											
Lecture Periods: 45			Tutorial Periods:			Practical Periods: -		Total Periods: 45			
Text Books											
1. Charles P. Pleegeer Shari Lawrence Pleegeer Jonathan Margulies, Security in Computing, 7th Edition , Pearson Education , 2022											
2. Computer Forensics, Computer Crime Investigation by John R,Vacca, Firewall Media, New Delhi. First Edition 2015											
3. George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.											
Reference Books											
1. Martti Lehto, Pekka Neittaanmäki, Cyber Security: Analytics, Technology and Automation edited, Springer International Publishing Switzerland 2015.											
2. George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.											
3. Nelson Phillips and Eninger Steuart, —Computer Forensics and InvestigationsI, Cengage Learning, New Delhi, 2009.											
Web References											
1. <a href="https://www.nist.gov/cyberframework">https://www.nist.gov/cyberframework</a>											
2. <a href="https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/">https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/</a>											
3. <a href="https://www.cisa.gov/">https://www.cisa.gov/</a>											
4. <a href="https://owasp.org/">https://owasp.org/</a>											
5. <a href="https://www.eff.org/">https://www.eff.org/</a>											

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	-	-	3	-	-	-	-	3	-	3	3	3	3
2	3	3	-	-	2	2	-	2	3	3	2	3	3	3	3
3	3	3	-	2	2	3	3	3	-	3	3	3	3	3	3
4	3	3	3	3	2	3	-	3	3	3	3	3	3	3	3
5	3	2	2	2	2	3	-	3	3	3	3	3	3	3	3

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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





Department	Electronics and Communication Engineering				Programme: B.Tech.					
Semester	VII				Course Category: PE			End Semester Exam: TE		
Course Code	U23ECEC01				Periods/Week		Credit	Maximum Marks		
					L	T	P	C	CAM ESE TM	
Course Name	Digital Image Processing				3	-	-	3	25 75 100	
Common to ECE and IT										
Prerequisite	Basic Electronics, Computer Networks, Embedded Systems and Programming Knowledge.									
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)		
	CO1	Describe the basics of digital image processing, including acquisition and sampling.							K1	
	CO2	Explain image transforms like Fourier, Walsh, and Discrete Cosine Transform.							K2	
	CO3	Apply spatial and frequency domain methods for image enhancement.							K3	
	CO4	Explain techniques for image restoration and segmentation.							K2	
	CO5	Describe compression methods, including error-free and lossy techniques.							K1	
UNIT-I	DIGITAL IMAGE FUNDAMENTALS							Periods:9		
Digital Image Fundamentals: Origins of Digital Image Processing- Fundamental Steps in Digital Image Processing- Components of an Image Processing System- Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels.									CO1	
UNIT-II	IMAGE TRANSFORMS							Periods:9		
2-D Fourier Transform-Walsh Transform-Hadamard Transform- Discrete Cosine Transform-Haar transform- Slant transform-Hotelling transform.									CO2	
UNIT-III	IMAGE ENHANCEMENT							Periods:9		
Enhancement in Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering- Smoothing and Sharpening Filters. Enhancement in Frequency Domain: Introduction to Fourier Transform: Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering.									CO3	
UNIT-IV	IMAGE RESTORATION AND SEGMENTATION							Periods:9		
Image Restoration- Model of the Image Degradation/Restoration Process, Noise Models, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering.									CO4	
Image Segmentation-Detection of discontinuities - Edge linking and boundary detection - Thresholding: Global and Optimal Thresholding – Region based segmentation.										
UNIT-V	IMAGE COMPRESSION							Periods:9		
Fundamentals: Coding, Interpixel, Psycho visual Redundancies, Fidelity Criteria – Image Compression Models- Error Free Compression: Arithmetic coding, Huffman coding- Lossy and Lossless Predictive Coding-JPEG 2000 Standards.									CO5	
Lecture Periods: 45		Tutorial Periods: -		Practical Periods: -		Total Periods: 45				
Textbooks										
1. Kenneth R. Castleman, Digital Image Processing Pearson, 2 <sup>nd</sup> Edition, 2020.										
2. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", 2 <sup>nd</sup> Edition, PHI Learning Pvt. Ltd., 2019.										
3. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing Pearson, 4 <sup>th</sup> Edition, 2018.										
Reference Books										
1. John C. Russ, F. Brent Neal-The Image Processing Handbook, 7 <sup>th</sup> Edition, CRC Press, Taylor & Francis Group. 2016										
2. William K. Pratt, Digital Image Processing John Wiley, New York, 2002										
3. Milan Sonka et al Image processing, analysis and machine vision Brookes/Cole, Vikas Publishing House, 2nd edition, 1999										
4. D.E.Dudgeon and RM. Mersereau, Multidimensional Digital Signal Processing Prentice Hall Professional Technical Reference, 1990.										
Web References										
1. <a href="http://eeweb.poly.edu/~onur/lectures/lectures.html">http://eeweb.poly.edu/~onur/lectures/lectures.html</a>										
2. <a href="http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html">http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html</a> 3. <a href="https://nptel.ac.in/courses/117/105/117105079/">https://nptel.ac.in/courses/117/105/117105079/</a>										
3. <a href="https://nptel.ac.in/courses/117/105/117105135/">https://nptel.ac.in/courses/117/105/117105135/</a>										
4. <a href="https://www.csie.nuk.edu.tw/">https://www.csie.nuk.edu.tw/</a>										

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	-	-	-	-	-	-	-	3	2	3
2	3	2	2	2	-	-	-	-	-	-	-	-	3	2	3
3	3	2	2	3	-	-	-	-	-	-	-	-	3	2	3
4	3	2	3	2	-	-	-	-	-	-	-	-	3	2	3
5	3	2	3	2	-	-	-	-	-	-	-	-	3	2	3

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

**Evaluation Methods**

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

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





Department	Information Technology	Programme: <b>B.Tech.</b>						
Semester	VII	Course Category Code: <b>PE</b>				*End Semester Exam Type: <b>TE</b>		
Course Code	U23ITE716	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	Intrusion Detection System	3	0	0	3	25	75	100
IT								
Prerequisite	Operating Systems and Computer Networks							
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)
	CO1	Explain the basic concepts of intrusion detection systems.						K2
	CO2	Understand Intrusion Prevention Systems, Network IDs protocol and model for intrusion analysis.						K2
	CO3	Understand when, where, how, and why to apply Intrusion Detection tools and techniques in order to improve the security posture of an enterprise.						K2
	CO4	Apply knowledge of the fundamentals and history of Intrusion Detection in order to avoid common pitfalls in the creation and evaluation of new Intrusion Detection Systems.						K3
	CO5	Build agent development for intrusion detection and architectural models of IDs and IPs.						K3
Unit- I	Introduction				Periods: 09			
History of Intrusion Detection: Audit, Concept and definition, Internal and external threats to data, attacks, Need and types of IDS, Information sources Host based information sources, Network based information sources.								CO1
Unit- II	Intrusion Prevention Systems				Periods: 09			
Network IDs protocol based IDs ,Hybrid IDs, Analysis schemes, thinking about intrusion. A model for intrusion analysis , techniques Responses requirement of responses, types of responses mapping responses to policy Vulnerability analysis, credential analysis non credential analysis.								CO2
Unit- III	Introduction to Snort				Periods: 09			
Snort Installation Scenarios, Installing Snort, Running Snort on Multiple Network Interfaces, Snort Command Line Options. Step-By-Step Procedure to Compile and Install Snort Location of Snort Files, Snort Modes Snort Alert Modes.								CO3
Unit- IV	Snort Rules				Periods: 09			
Rule Headers, Rule Options, The Snort Configuration File etc. Plugins, Preprocessors and Output Modules, Using Snort with MySQL.								CO4
Unit- V	Snort Snarf with Snort				Periods: 09			
Using ACID and Snort Snarf with Snort, Agent development for intrusion detection, Architecture models of IDs and IPs.								CO5
Lecture Periods: 45		Tutorial Periods: -		Practical Periods: -		Total Periods: 45		
Text Books								
1. Rafeeq Ur Rehman : “ Intrusion Detection with SNORT, Apache, MySQL, PHP and ACID,” 1 <sup>st</sup> Edition, Prentice Hall , 2003.								
Reference Books								
1. Christopher Kruegel,Fredrik Valeur, Giovanni Vigna: “Intrusion Detection and Correlation Challenges and Solutions”, 1 <sup>st</sup> Edition, Springer, 2005.								
2. Carl Endorf, Eugene Schultz and Jim Mellander “ Intrusion Detection & Prevention”, 1 <sup>st</sup> Edition, Tata McGraw-Hill, 2004.								
3. Stephen Northcutt, Judy Novak : “Network Intrusion Detection”, 3 <sup>rd</sup> Edition, New Riders Publishing, 2002.								
4. T. Fahringer, R. Prodan, “A Text book on Grid Application Development and Computing Environment”. 6 <sup>th</sup> Edition, KhannaPublihsers, 2012.								
Web References								
1. <a href="https://www.udemy.com/course/snort-ids/">https://www.udemy.com/course/snort-ids/</a>								
2. <a href="https://www.coursera.org/articles/intrusion-detection-system">https://www.coursera.org/articles/intrusion-detection-system</a>								
3. <a href="https://en.wikipedia.org/wiki/Intrusion_detection_system">https://en.wikipedia.org/wiki/Intrusion_detection_system</a>								
4. <a href="https://www.techtarget.com/searchsecurity/definition/intrusion-detection-system">https://www.techtarget.com/searchsecurity/definition/intrusion-detection-system</a>								

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	1	-	3	-	2	2	-	-	-	-	2	2	2	2
2	2	2	2	3	-	3	2	-	-	-	-	2	2	2	2
3	2	2	2	3	2	2	3	-	-	-	-	2	3	2	2
4	2	2	2	3	2	2	3	-	-	-	-	2	3	2	2
5	2	2	2	3	2	-	-	-	-	-	-	2	3	2	2

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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



Department	Information Technology	Programme: <b>B.Tech.</b>						
Semester	VII	Course Category Code: <b>PE</b>				*End Semester Exam Type: <b>TE</b>		
Course Code	U23ITEC03	Periods/Week			Credit	Maximum Marks		
Course Name	Robotic Process Automation	L	T	P	C	CAM	ESE	TM
	Common to IT and CCE	3	-	-	3	25	75	100
Prerequisite	IT Essentials							
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)
	CO1	Understand the basics of Robotic Process Automation and UiPath Studio						K2
	CO2	Apply the different types of variables, control flow and data manipulation techniques						K3
	CO3	Manipulate the controls available in UiPath and extract data						K3
	CO4	Use events handling and exception handling						K3
	CO5	Explain the code management, deployment and maintenance of the bot						K2
UNIT-I	Introduction to Robotic Process Automation				Periods:9			
Scope and techniques of automation, Robotic process automation - Benefits of RPA - Components of RPA - RPA platforms - The future of automation - UiPath stack- Learning UiPath Studio- Task Recorder								CO1
UNIT-II	Automation Process Activities				Periods:9			
Sequence, Flowchart & Control Flow: Sequencing the Workflow – Activities – Flowchart - Control Flow for Decision making. Data Manipulation: Variables – Collection – Arguments - Data Table - Clipboard management - File operations - CSV/Excel to data table and vice versa								CO2
UNIT-III	Controls				Periods:9			
Finding and attaching windows - Finding the control - waiting for a control - Act on a control - UiExplorer - Handling Events - Recorder: Desktop recording - Web recording - Screen Scraping - OCR								CO3
UNIT-IV	Handling Events and Exceptions				Periods:9			
Assistant bots, Monitoring triggers - Launching an assistant bot on a keyboard event. Exception Handling - Common exception handling - Login and taking screenshots - Debugging techniques - Collecting crash dumps - Error reporting.								CO4
UNIT-V	Code Management, Deployment and Maintenance				Periods:9			
Project Organization, Nesting workflows - Reusability of workflows – Templates - Commenting techniques - State Machine. Publishing using publish utility - Orchestration Server - Control bots - Orchestration Server to deploy bots - License management - Publishing and managing updates.								CO5
Lecture Periods:45		Tutorial Periods: -		Practical Periods:-		Total Periods:45		
Text Books								
1. Tom Taulli , “The Robotic Process Automation Handbook: A Guide to Implementing RPA Systems”, Apress publications, 2020.								
2. Alok Mani Tripathi, Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath, Packt Publishing, 2018.								
Reference Books								
1. Nandan Mullakara, Arun Kumar Asokan, Robotic Process Automation Projects, Packt Publishing, ISBN: 9781839217357, May 2020								
2. Frank Casale (Author), Rebecca Dilla (Author), Heidi Jaynes (Author), Lauren Livingston (Author), Introduction to Robotic Process Automation: a Primer, Institute of Robotic Process Automation, Amazon Asia-Pacific Holdings Private Limited, 2018								
3. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant, Amazon Asia-Pacific Holdings Private Limited, 2018								
Web References								
1. <a href="https://www.scribd.com/document/442266295/Sanet-st-Learning-Robotic-Proc-pdf">https://www.scribd.com/document/442266295/Sanet-st-Learning-Robotic-Proc-pdf</a>								
2. <a href="https://www.uipath.com/rpa/robotic-process-automation/">https://www.uipath.com/rpa/robotic-process-automation/</a>								
3. <a href="https://www.academy.uipath.com/">https://www.academy.uipath.com/</a>								

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	2	-	-	-	-	-	-	-	2	2	-
2	3	2	-	-	3	-	-	-	-	-	-	-	3	3	-
3	3	2	-	-	3	-	-	-	-	-	-	-	3	3	-
4	3	2	-	-	3	-	-	-	-	-	-	-	3	3	-
5	2	1	-	-	2	-	-	-	-	-	-	-	2	2	-

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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



Department	Information Technology		Programme: B.Tech.	
Semester	VII		Course Category Code: OE	
Course Code	U23ITOC03		*End Semester Exam Type: TE	
Course Name	Essentials of Data Science		Periods/Week	Credit
	EEE, ECE, ICE, CCE, BME, CIVIL, MECH, MCTR		L	T
			3	0
Prerequisite	Mathematics		P	C
			0	3
				CAM
				25
				ESE
				75
				TM
				100
Course Outcomes	On completion of the course, the students will be able to			
	CO1	Ability to have a broad insight, understanding and intuition of the data science life cycle		
	CO2	Create artful graphs to visualize complex data sets and functions.		
	CO3	Discuss in depth a variety of data mining techniques, and their applicability to various problem domains		
	CO4	Select and apply data mining technique to a practical case study		
	CO5	Understand the concept, challenge and technology of big data		
Unit-I	Introduction to Data Science			
	Introduction: Need for data science – Benefits and uses – Facets of data-Data science process: Retrieving data – Cleansing, integrating, and transforming data – Data analysis – Build the models -Epicyles of Analysis- Exploratory Data Analysis- Using Models to Explore Data- Inference: A Primer- Formal Modeling-Inference vs. Prediction : Implications for Modeling Strategy -Interpreting results.			Periods:09
Unit-II	Data Analytics Using R			
	Introduction to R: Data structures, vectors, matrices, data frames–Exploratory Data Analysis: Descriptive statistics, Data visualization with ggplot2, Correlation and covariance analysis Statistical – Hypothesis testing- Analysis of variance (ANOVA)- Regression analysis- Processing and analyzing text data -Association rule mining - Clustering techniques			Periods:09
Unit-III	Supervised Learning			
	Regression - Linear Regression - Logistic Regression - Reasons to Choose and Cautions - Additional Regression Models - Classification - Decision Trees – Na'ive Bayes – Diagnostics of Classifiers – Additional Classification Methods – Time Series Analysis – Overview of Time Series Analysis – ARIMA Model			Periods:09
Unit-IV	Unsupervised Learning			
	Clustering - Overview of Clustering – K-means - Additional Algorithms –Association Rules- Overview - A priori Algorithm - Evaluation of Candidate Rules - Applications of Association Rules - Validation and Testing – Diagnostics - Text Analysis – Text Analysis Steps – Collecting Raw Text – Representing Text – Term Frequency-Inverse Document Frequency (TFIDF) - Categorizing Documents by Topics –Determining Sentiments – Gaining Insights			Periods:09
Unit-V	Big Data Analytics			
	Data science in a Big Data world - Benefits and uses of data science and Big Data - Facets of data - The Big Data ecosystem and data science – Introduction of Hadoop - Handling large data on a single computer - The problems in handling large data - General techniques for handling large volumes of data - General programming tips for dealing with large datasets- Case study : Predicting malicious URLs, Recommender system - Steps in Big Data - Distributing data storage and processing with frameworks - Case study: Assessing loan risk.			Periods:09
Lecture	Periods:45	Tutorial	Periods:	Practical
TextBooks	1. Peng, R. D., & Matsui. E, The Art of Data Science- A Guide for Anyone Who Works with Data, Skybrude Consulting, 2015.			
	2. David Dietrich, Barry Heller & Beibei Yang, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, John Wiley & Sons, 2015.			
	3. Norman Matloff, "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press, 2011.			
ReferenceBooks	1. Steven S. Skiena, The Data Science Design Manual, First Edition, Springer, 2017.			
	2. Davy Cielen, Arno Meysman, Mohamed Ali, Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools, Manning Publications, 2016.			
	3. Joel Grus, Data science from scratch: first principles with python, O'Reilly Media, Inc., 2015.			
	4. Martin Czygan, Phuong Vo.T.H, Getting Started with Python Data Analysis, Packt Publishing, 2015.			

**Web References**

1. [www.ibm.com/Data Analytics/](http://www.ibm.com/Data Analytics/)
2. <https://www.coursera.org/learn/r-programming>
3. <https://www.ijser.org/researchpaper/Importance-of-Clustering-in-Data-Mining.pdf>
4. <https://datafloq.com/read/7-innovative-uses-of-clustering-algorithms/6224>
5. <https://publications.waset.org/10011058/improving-fake-news-detection-using-k-means-and-support-vector-machine-approaches>
6. <https://statisticsbyjim.com/regression/when-use-regression-analysis/>

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	1	-	-	-	-	-	-	-	-	3	3	3
2	3	3	3	2	2	2	-	-	-	-	-	-	3	2	3
3	3	3	3	2	2	3	3	-	-	-	-	-	3	2	1
4	3	2	2	2	2	3	-	-	-	-	-	-	3	2	1
5	3	2	2	2	2	3	-	-	-	-	-	-	3	2	1

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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





Department	Information Technology	Programme: B.Tech.						
Semester	VII	Course Category Code: OE			*End Semester Exam Type: TE			
Course Code	U23ITOC04	Periods/Week			Credit	Maximum Marks		
Course Name	Big Data Technologies	L	T	P	C	CAM	ESE	TM
	EEE, ECE, ICE, CCE, BME, CIVIL, MECH, MCTR	3	0	0	3	25	75	100
Prerequisite	Fundamental knowledge in Computing Technologies							
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)
	CO1	Build distributed data processing applications using Apache Hadoop and Spark						K3
	CO2	Develop a streaming application using Apache Spark in teams						K3
	CO3	Experiment with Apache Kafka for processing stream data						K3
	CO4	Big Data Frameworks in teams applying best practice						K3
	CO5	Integrating Machine Learning Integration and Data Security						K2
Unit-I	INTRODUCTION TO BIG DATA TECHNOLOGY				Periods: 09			
Introduction – Understanding Big Data – Big Data: Benefiting – Managing – Organizing and Analyzing Big Data: Learning and Analytics; Technology Challenges for Big Data- Distributed File System – HDFS Design Goals – MapReduce Overview – Writing and Testing MapReduce Programs – Installing Spark and Setting up Spark Cluster – Spark Shell-Creating Spark Session Object – Resilient Distributed Datasets (RDD) – Manipulating RDD – NoSQL – SparkSQL – GraphX.								CO1
Unit-II	STREAM PROCESSING				Periods: 09			
Stream Processing Concepts – Distributed Stream Processing – Stream Processing Model – Streaming Architecture – Lambda and Kappa Architecture – Structured streaming – Spark Streaming – Spark Streaming Programming Model – Other Distributed Real Time Stream Processing Systems								CO2
Unit-III	STREAMING PROCESSING USING KAFKA				Periods: 09			
Apache Kafka – Installing Kafka – Producers and Consumers – Kafka Internals – Building Data Pipelines – Cross Cluster Data Mirroring – Administering and Monitoring Kafka – Getting started with Kafka Streams – Kafka Streams Development – Applications with Kafka Streams								CO3
Unit-IV	BIG DATA FRAMEWORKS				Periods: 09			
Apache Flume – Overview and Architecture – Quick Start Guide to Flume – Basics of Sqoop Integrating Sqoop with Hadoop – Getting to Grips with Zookeeper – Getting Started with Zookeeper API – Machine Learning using Apache Mahout – Clustering & Classification Algorithms in Mahout-Extending Spark with H2O – H2O..								CO4
Unit-V	MACHINE LEARNING INTEGRATION AND SECURITY				Periods: 09			
Machine learning algorithms in autonomous system – MLlib in Apache Spark for distributed machine learning – Challenges and opportunities in deploying ML models in autonomy – Security considerations for autonomous data – Ethical implications in handling large datasets in autonomous engineering								CO5
Lecture Periods: 45		Tutorial Periods:		Practical Periods:-		Total Periods: 45		
Text Books								
1. Neha Narkhede, Gwen Shapira, and Todd Palino, "Kafka – Definitive Guide", 2017. 2. Krishna Sankar, "Fast Data Processing using Spark 2", 3rd Edition, Packt Publishers, 2016. 3. Mike Frampton, "Mastering Apache Spark", Packt Publishers, 2015.								
Reference Books								
1. Gerald Maas, Francois Gorillot, "Stream Processing with Apache Spark", O'Reilly Media, 2019. 2. William P Bejeck Jr, "Kafka Streams in Action", Manning Publications, 2018. 3. Jayani Withanawasam, "Apache Mahout Essentials", Packt Publishers, 2015. 4. Steve Hoffman, "Apache Flume: Distributed Log Collection for Hadoop", 2nd Edition, Packt Publishers, 2015. 5. Flavio Junqueira, Benjamin Reed, "ZooKeeper: Distributed Process Co-ordination Paperback", O'Reilly Media, 2014. 6. Gaurav Vaish, "Getting Started with NoSQL", Packt Publishing Ltd, 2013.								

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	-	-	-	-	-	-	-	-	-	3	3	3
2	3	3	2	-	-	2	-	-	-	-	-	-	3	2	1
3	3	3	2	2	2	3	3	-	-	-	-	-	3	2	2
4	3	2	1	2	2	3	-	-	-	-	-	-	3	1	1
5	3	2	1	2	2	3	-	-	-	-	-	-	3	1	1

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

**Evaluation Method**

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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





## **Annexure III**

**B.Tech. (Honors) - Advanced Web Development  
Course Syllabus  
(IV-VII Semester)**

A handwritten signature in blue ink, consisting of a stylized 'V' followed by a loop and a long horizontal stroke.



**Honours Programme**  
**Advanced Web Development**

COURSE DETAILS											
Sl. No.	Sem	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
					L	T	P		CAM	ESM	Total
Theory											
1	IV	U23WXT401	Front-End Development	PC	3	0	0	3	25	75	100
2	V	U23WXB501	Advanced Databases	PC	3	0	2	4	50	50	100
3	VI	U23WXB602	Microservices and Spring Boot	PC	3	0	2	4	50	50	100
4	VII	U23WXT702	Container Orchestration and Security	PC	3	0	0	3	25	75	100
5	VIII	U23WXT803	Cloud Management	PC	3	0	0	3	25	75	100
6	VIII	U23WXW801	Project Phase	PW	0	0	4	2	50	50	100
	Total							19	225	375	600
Equivalent NPTEL courses <sup>##</sup>											
1	IV to VII Semester	U23WXNX01	Web Development Equivalent NPTEL Courses					3	12 WEEK Course		





Department	Information Technology	Name of the Programme: <b>B.Tech. (Honors) - Advanced Web Development</b>						
Semester	IV	Course Category Code: <b>PC</b>			*End Semester Exam Type: <b>TE</b>			
Course Code	<b>U23WXT401</b>	Periods / Week			Credit	Maximum Marks		
Course Name	<b>Front-End Development</b>	L	T	P	C	CAM	ESE	TM
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>25</b>	<b>75</b>	<b>100</b>
Prerequisite	Basic knowledge of programming concepts, HTML, and CSS.							
Course Outcome	<b>On completion of the course, the students will be able to</b>							BT Mapping (Highest Level)
	<b>CO1</b>	Explain the fundamentals of HTML and CSS and their role in web development.						<b>K2</b>
	<b>CO2</b>	Understand the principles of responsive design and learn to use Bootstrap for creating responsive web pages.						<b>K2</b>
	<b>CO3</b>	Implement database operations using DML and DDL commands in a relational database.						<b>K3</b>
	<b>CO4</b>	Understand the basics of Node.js and learn to build server-side applications that connect to a database.						<b>K2</b>
	<b>CO5</b>	Build an Event Management System						<b>K3</b>
<b>Unit- I</b>	<b>HTML and CSS</b>				<b>Periods: 09</b>			
Introduction to Web Development - HTML Basics - CSS Basics - Advanced HTML and CSS - Hands-on Projects: Building a static web page, Creating a responsive portfolio site.								<b>CO1</b>
<b>Unit- II</b>	<b>Bootstrap and Database Commands</b>				<b>Periods: 09</b>			
Introduction to Bootstrap - Advanced Bootstrap - Database Fundamentals - Database Commands (DDL, DML) - Hands-on Projects: Building a web page with Bootstrap, Basic CRUD operations in a database.								<b>CO2</b>
<b>Unit- III</b>	<b>Connecting Database using Node js</b>				<b>Periods: 09</b>			
Introduction to Node.js - Node.js Basics - Building a Server with Node.js - Database Integration - Hands-on Projects: Building a RESTful API with Node.js, Connecting the API to a database.								<b>CO3</b>
<b>Unit- IV</b>	<b>Connecting Database using Angular js</b>				<b>Periods: 09</b>			
Introduction to Angular.js - Angular.js Basics - Advanced Angular.js - Database Integration - Hands-on Projects: Building a dynamic web application with Angular.js, Integrating the web app with a database.								<b>CO4</b>
<b>Unit- V</b>	<b>Case Study: Event Management System</b>				<b>Periods: 09</b>			
Project Planning - Frontend Development - Backend Development - Database Integration - Project Implementation - Deployment - Project Documentation.								<b>CO5</b>
<b>Lecture Periods: 45</b>		<b>Tutorial Periods: -</b>		<b>Practical Periods: -</b>		<b>Total Periods: 45</b>		
<b>Text Books</b>								
1. "Full-Stack React Projects: Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js", Shama Hoque, 2 <sup>nd</sup> Edition, Packt Publishing, 2020.								
2. "Node.js, MongoDB, and Angular Web Development", Brad Dayley, Brendan Dayley, and Caleb Dayley, 2 <sup>nd</sup> Edition, Addison-Wesley Professional, 2018.								
3. "HTML and CSS: Design and Build Websites", Jon Duckett, 1 <sup>st</sup> Edition, Wiley, 2011.								
<b>Reference Books</b>								
1. "Learning SQL: Generate, Manipulate, and Retrieve Data", Alan Beaulieu, 3 <sup>rd</sup> Edition, O'Reilly Media, 2020.								
2. "Pro Angular 9: Build Powerful and Dynamic Web Apps", Adam Freeman, 4 <sup>th</sup> Edition, Apress, 2020.								
3. "You Don't Know JS Yet: Get Started", Kyle Simpson, 2 <sup>nd</sup> Edition, 2020.								
4. "Web Development with Node and Express: Leveraging the JavaScript Stack", Ethan Brown, 2 <sup>nd</sup> Edition, O'Reilly Media, 2019.								
5. "Eloquent JavaScript: A Modern Introduction to Programming", Marijn Haverbeke, 3 <sup>rd</sup> Edition, No Starch Press, 2018.								
<b>Web References</b>								
1. <a href="https://developer.mozilla.org/en-US/docs/Web/HTML">https://developer.mozilla.org/en-US/docs/Web/HTML</a>								
2. <a href="https://developer.mozilla.org/en-US/docs/Web/CSS">https://developer.mozilla.org/en-US/docs/Web/CSS</a>								
3. <a href="https://getbootstrap.com/docs/">https://getbootstrap.com/docs/</a>								
4. <a href="https://nodejs.org/en/docs/">https://nodejs.org/en/docs/</a>								
5. <a href="https://angular.io/docs">https://angular.io/docs</a>								

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	2	2	2	1	-	1	-	2	2	2	3	2	2
2	2	3	3	3	2	1	-	1	-	2	2	2	3	2	2
3	3	3	3	3	3	2	-	2	-	2	2	2	3	2	2
4	3	3	3	3	3	2	-	2	-	2	2	2	3	2	2
5	3	3	3	3	3	2	-	2	2	2	2	2	3	2	2

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





Department	Information Technology				Name of the Programme: <b>B.Tech. (Honors) - Advanced Web Development</b>							
Semester	V				Course Category Code: <b>PC</b>		*End Semester Exam Type: <b>TE</b>					
Course Code	<b>U23WXB501</b>				Periods/Week		Credit	Maximum Marks				
					L	T	P	C	CAM	ESE	TM	
Course Name	<b>Advanced Databases</b>				<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>50</b>	<b>50</b>	<b>100</b>	
Prerequisite	Database Management Systems											
Course Outcome	<b>On completion of the course, the students will be able to</b>										BT Mapping (Highest Level)	
	<b>CO1</b>	Illustrate parallel and distributed databases to optimize database performance in practice.										<b>K2</b>
	<b>CO2</b>	Examine data on Active, spatial and temporal databases										<b>K3</b>
	<b>CO3</b>	Develop cloud-based and multimedia based applications.										<b>K3</b>
	<b>CO4</b>	Demonstrate hands-on proficiency in MongoDB, including installation, CRUD operations, and advanced query operations.										<b>K3</b>
	<b>CO5</b>	Implement advanced data models, replication, and sharding in MongoDB.										<b>K3</b>
<b>Unit-I</b>	<b>Parallel and Distributed DBMS</b>								<b>Periods:10</b>			
Parallel DBMS: Architecture Query evaluation - Query optimization Parallelizing individual operations. Distributed DBMS: Architecture - Storing - Data Cataloguing - Query processing - Updations - Transactions Concurrency and Recovery.												<b>CO1</b>
<b>Unit-II</b>	<b>Active, Temporal, Spatial Databases</b>								<b>Periods:10</b>			
Active Databases: Syntax and Semantics (Starburst, Oracle, DB2) - Taxonomy - Applications - Design Principles for Active Rules. Temporal Databases: Overview of Temporal Databases - TSQL2 Spatial Databases - Spatial Data Types - Spatial Relationships - Spatial Data Structures - Spatial Access Methods - Spatial DB Implementation.												<b>CO2</b>
<b>Unit-III</b>	<b>Cloud Based Databases and Emerging Technologies</b>								<b>Periods:10</b>			
Data Storage Systems on the Cloud - Cloud Storage Architectures - Cloud Data Models - Query Languages - Introduction to Big Data - Storage – Analysis Mobile Databases - Multimedia Databases - Geographical Information Systems - Genome Data Management.												<b>CO3</b>
<b>Unit-IV</b>	<b>MongoDB Installation and CRUD Operations</b>								<b>Periods:15</b>			
1. Setting Up MongoDB Environment 2. Creating collections 3. CRUD operations 4. Schema Design: Embedding vs. Referencing, Indexing, Aggregation framework 5. Query Operations: Filtering, Sorting, Aggregation, Transactions in MongoDB. 6. Data Processing: MapReduce concepts, Processing JSON data, Integrating MongoDB with applications.												<b>CO4</b>
<b>Unit-V</b>	<b>Advanced Data Model and Cloud Databases</b>								<b>Periods:15</b>			
1. Replication and Sharding: Concepts, Implementing replication, Setting up sharded clusters. 2. MongoDB and Cloud Integration: Deploying databases on cloud platforms (AWS) 3. MongoDB and Cloud Integration: Deploying databases on cloud platforms (Azure) 4. Real-time Case Study: Implementing a real-world project using MongoDB (E-commerce). 5. Real-time Case Study: Implementing a real-world project using MongoDB (IoT) 6. Real-time Case Study: Implementing a real-world project using MongoDB (Social Media Data)												<b>CO5</b>
<b>LecturePeriods:30</b>			<b>Tutorial Periods:-</b>			<b>Practical Periods:30</b>			<b>Total Periods:60</b>			
<b>Text Books</b>												
1. Thomas M. Connolly, Carolyn Begg, Database Systems: practical approach to design, implementation, and management, Pearson Education Limited, Sixth Edition, 2019 2. Shannon Bradshaw, Eoin Brazil, Kristina Chodorow, MongoDB: The Definitive Guide: Powerful and Scalable Data Storage, Third Edition, O'Reilly Media, 2019.												
<b>Reference Books</b>												
1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, - Database System Concepts, Seventh Edition, McGraw Hill, 2019. 2. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, Richard T.Snodgrass, V.S.Subrahmanian, Roberto Zicari, Advanced Database Systems, Morgan Kaufmann publishers,2006. 3. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, Third Edition., McGraw Hill Publications, 2018												

**Web References**

1. <http://www.exploredatabase.com/p/blog-page.html>
2. <http://csce.uark.edu/~cwt/COURSES/2014-01--CSCE-4543--SW-ARCH/03--CHAPTERS/Chapter09--Spatial and Temporal DBMS Extensions--Namburi.pdf>
3. <https://www.tutorialspoint.com/Mobile-Databases>
4. <https://www.mongodb.com/docs/>

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	2	2	2	1	-	1	-	2	2	2	3	2	2
2	2	3	3	3	2	1	-	1	-	2	2	2	3	2	2
3	3	3	3	3	3	2	-	2	-	2	2	2	3	2	2
4	3	3	3	3	3	3	-	3	-	3	3	2	3	2	2
5	3	3	3	3	3	2	-	3	2	3	3	2	3	2	2

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





Department	Information Technology				Name of the Programme: B.Tech. (Honors) - Advanced Web Development							
Semester	VI				Course Category Code: PC *End Semester Exam Type: TE							
Course Code	U23WXB602				Periods / Week		Credit	Maximum Marks				
Course Name	Microservices and Spring Boot				L	T	P	C	CAM	ESE	TM	
					3	0	2	4	50	50	100	
Prerequisite	Basic understanding of Java, web technologies, Spring Framework, relational databases, Git, and IDEs											
Course Outcome	On completion of the course, the students will be able to									BT Mapping (Highest Level)		
	CO1	Understand microservices architecture and develop a basic Spring Boot microservice.									K2	
	CO2	Manage configuration, apply dependency injection, and use Spring Boot Actuator.									K2	
	CO3	Implement service discovery, inter-service communication, and containerization									K3	
	CO4	Develop Spring Boot Applications with Dependency Injection and CRUD operations									K3	
CO5	Develop and deploy Spring Boot Applications with Docker and Kubernetes									K3		
Unit- I	Microservices and Spring Boot									Periods: 10		
Microservices: Definition, core principles, advantages, and challenges, Monolithic vs. Microservices. Spring Boot: Spring Framework Basics - Key features and benefits - Building a simple Spring Boot application using Maven - Running and testing microservice										CO1		
Unit- II	Spring Boot Features and Building									Periods: 10		
Configuration Management: Properties and application.yml - Using Spring profiles for environment. Dependency Injection: Understanding Dependency Injection (DI) - Configuring beans and component scanning - @Autowired and Spring annotations. Spring Boot Actuator: Introduction, key endpoints (/health, /metrics, /info), customizing Actuator endpoints										CO2		
Unit- III	Discovery, Data Management and Containerization									Periods: 10		
Service Discovery with Eureka: Setting up a Eureka server and Client. Inter-Service Communication: RESTful web services with Spring Boot - Using Rest Template and Web Client. Spring Data JPA: Spring Data JPA - JPA repositories – Basic CRUD operations. Containerization: Docker basics, Creating and Running Docker images for Spring Boot apps. Kubernetes: Deploying microservices to Kubernetes, Service Management										CO3		
Unit- IV	Laboratory Exercises									Periods: 15		
1. Set up a Spring Boot development environment 2. Create a simple "Hello World" REST API using @RestController 3. Implement DI using @Component, @Service, and @Repository 4. Implement CRUD operations using @PostMapping annotation and @GetMapping annotation with NoSQL 5. Implement CRUD operations using @PutMapping annotation and @DeleteMapping annotation with MongoDB 6. Implement basic CRUD operations on MongoDB with Spring Data JPA										CO4		
Unit- IV	Laboratory Exercises									Periods: 15		
1. Implement Eureka Server for service discovery 2. Register a microservice with Eureka Client 3. Implement inter-service communication using RestTemplate 4. Containerize a Spring Boot app using Docker and deploy it locally 5. Deploy microservices to Kubernetes using Minikube 6. Develop and deploy a mini microservices-based application (E-commerce, Inventory)										CO5		
Lecture Periods: 30			Tutorial Periods:			Practical Periods: 3 0			Total Periods: 60			
Text Books												
1. Microservices with Spring Boot and Spring Cloud: Build Resilient and Scalable Microservices Using Spring Cloud, Istio, and Kubernetes, 2nd Edition, 2020 2. Title: "Microservices Architecture: Aligning Principles, Practices, and Culture", Author: Irakli Nadareishvili, Ronnie Mitra, Matt McLarty, and Mike Amundsen, 2019 3. Title: "Hands-On Microservices with Spring Boot and Spring Cloud: Build and deploy Java microservices using Spring Cloud, Istio, and Kubernetes", Author: Magnus Larsson, 2019												

**Reference Books**

1. "Spring Microservices in Action" by John Carnell
2. "Building Microservices" by Sam Newman
3. "Microservices Patterns: With examples in Java" by Chris Richardson
4. "Spring Boot in Action" by Craig Walls
5. "Cloud Native Java: Designing Resilient Systems with Spring Boot, Spring Cloud, and Cloud Foundry" by Josh Long and Kenny Bastani

**Web References**

1. <https://docs.spring.io/spring-boot/index.html>
2. <https://www.baeldung.com/>
3. <https://www.javaguides.net/p/spring-boot-microservices-tutorial.html>
4. <https://www.javatpoint.com/microservices>
5. <https://www.geeksforgeeks.org/java-spring-boot-microservices-example-step-by-step-guide/>

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	2	2	2	1	-	1	2	-	2	2	3	2	2
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3	3	3	3	3	3	2	-	2	3	-	3	3	3	2	2
4	3	3	3	3	3	2	-	2	3	3	3	3	3	2	2
5	3	3	3	3	3	2	-	2	3	3	3	3	3	2	2

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





Department	Information Technology			Name of the Programme: <b>B.Tech. (Honors) - Advanced Web Development</b>							
Semester	VII			Course Category Code :PC		End Semester Exam Type: TE					
Course Code	U23WXT702			Periods/Week		Credit	Maximum Marks				
				L	T	P	C	CAM	ESE	TM	
Course Name	Container Orchestration and Security			3	0	0	3	25	75	100	
Prerequisite	Computer Networks										
Course Outcome	<b>On completion of the course, the students will be able to</b>								BT Mapping (Highest Level)		
	CO1	Understand the basics of Container Orchestration and Security								K2	
	CO2	Identify Kubernetes architecture and integrating Kubernetes with CI/CD								K2	
	CO3	Overview of Orchestration with Docker Swarm and Other Tools								K3	
	CO4	Identify Security principles, encompassing authentication, authorization (RBAC).								K3	
	CO5	Understand the secure CI/CD integration with containers, utilizing tools								K2	
UNIT-I	Introduction to Container Orchestration and Security						Periods:09				
Introduction to Docker - Server virtualization - Advantages of Docker - Docker Setup - Limitations in Docker - Convergence of containerization and virtualization - Containerization innovations										CO1	
UNIT-II	Kubernetes Concepts						Periods:09				
Kubernetes Architecture - Overview of Kubernetes architecture - Integrating Kubernetes with CI/CD pipelines - Pod Lifecycle and Management - Pod states and transitions - Multi-container Pod patterns										CO2	
UNIT-III	Container Orchestration with Docker Swarm and Other Tools						Periods:09				
Docker Swarm Fundamentals - Overview of Docker Swarm - Setting up a Docker Swarm cluster - Comparison with Other Orchestration Tools - Docker Swarm vs. Kubernetes - Overview of Apache Mesos										CO3	
UNIT-IV	Kubernetes Security						Periods:09				
Kubernetes Security - Authentication and authorization in Kubernetes (RBAC) - Pod Security Policies and Network Policies- Securing: Kubernetes Data Store Security - Container Security - Securing container images and runtimes - Managing secrets and sensitive data in Kubernetes										CO4	
UNIT-V	Securing and Monitoring Containerized Environments						Periods:09				
CI/CD Integration - Continuous integration and continuous deployment with containers - CI/CD tools: Jenkins, GitLab CI, Tekton - Automating deployments with Kubernetes and Docker - Use cases and scenarios for different Orchestration tools										CO5	
LecturePeriods:45		TutorialPeriods:-		PracticalPeriods:-			TotalPeriods:45				
Text Books											
1. Up and Running by Brendan Burns, Joe Beda, Kuan-Wei Chiu, et al. , 2 <sup>nd</sup> edition, O'Reilly Media, 2019											
2. <b>The Kubernetes Book, Nigel Poulton &amp; Pushkar Joglekar , Self-published, 2018</b>											
3. Kubernetes Security, Liz Rice, Michael Hausenblas , O'Reilly Media , 2018											
Reference Books											
1. Mastering Kubernetes, Gigi Sayfan, Packt Publishing ,2020											
2. Learning Helm: Managing Apps on Kubernetes, Matt Butcher, Matt Farina, Josh Dolitsky, O'Reilly Media , 2021											
3. Kubernetes security. Guide for beginners from zero to hero, Ivan Piskunov, Self-published, 2021.											
4. Production Kubernetes , Josh Rosso, Rich Lander, Alex Brand, John Harris, O'Reilly Media, Inc. 2021											
5. Docker Orchestration, Randall Smith, Packt Publishing, 2017											
Web References											
1. <a href="https://www.cb-india.com/books/operating-systems/unix-and-linux/book-of-kubernetes/">https://www.cb-india.com/books/operating-systems/unix-and-linux/book-of-kubernetes/</a>											
2. <a href="https://www.oreilly.com/library/view/python-for-devops/9781492057680/ch12.html">https://www.oreilly.com/library/view/python-for-devops/9781492057680/ch12.html</a>											
3. <a href="https://www.powells.com/book/-9781718502642/1-0">https://www.powells.com/book/-9781718502642/1-0</a>											
4. <a href="https://dl.acm.org/doi/10.5555/3265145">https://dl.acm.org/doi/10.5555/3265145</a>											
5. <a href="https://malaysia.kinokuniya.com/The_Book_of_Kubernetes_:_A_Complete_Guide_to_Container_Orchestration/bw/9781718502642">https://malaysia.kinokuniya.com/The_Book_of_Kubernetes_:_A_Complete_Guide_to_Container_Orchestration/bw/9781718502642</a>											

**COs/POs/PSOs Mapping**

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	2	2	2	1	-	1	-	1	1	2	3	2	2
2	2	3	3	3	2	1	-	1	-	1	1	2	3	2	2
3	3	3	3	3	3	2	-	2	-	1	2	2	3	2	2
4	3	3	3	3	3	3	-	3	-	1	2	2	3	2	2
5	3	3	3	3	3	2	-	3	2	1	2	2	3	2	2

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

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## **Annexure IV**

**B.Tech. (Honors) - Advanced Web Development  
Registered Students Namelist**

*[Handwritten signature]*



### Details of Students Registered for Honors Degree – Advanced Web Development

Sl. No.	Enroll No.	Register No.	Name of the Student
1	230843	23UIT010	ANUSHA.R
2	231198	23UIT018	BAVADHARANI.R
3	230753	23UIT019	BHARATH KUMAR.M
4	230678	23UIT020	BHUVANESH.S
5	230297	23UIT023	DARSHAN.D
6	231511	23UIT028	DOMMETI PRAVEEN SATYA PRAKASH
7	231021	23UIT032	GOBIGA K
8	231571	23UIT034	GOWTHAM K
9	231268	23UIT036	GUNAL.S
10	231272	23UIT050	HONNESHAA JAIN
11	230110	23UIT053	JAMUNA E
12	230061	23UIT056	JERRICK AUSTIN MANUEL G
13	230324	23UIT060	KARTHIKEYAN.S
14	231210	23UIT067	LAKSHITA A
15	231204	23UIT079	LOKETHA M
16	231066	23UIT082	MEGHA K
17	230720	23UIT084	MOHANA PRIYA K
18	230900	23UIT096	POORNIMA R
19	230555	23UIT102	PRITIKA.V
20	231331	23UIT103	PRIYADHARSHINI E
21	230820	23UIT104	PRIYANKA S
22	231250	23UIT110	RAKSHITA K
23	230946	23UIT111	RAM KUMAR R
24	230806	23UIT129	SARANYA V
25	231427	23UIT131	SATHISHVARAN E
26	230821	23UIT132	SATHYASRI S
27	231472	23UIT133	SAVITHA.V
28	230453	23UIT137	SENDIL BALAJI.C
29	230836	23UIT138	SHANMATHY M
30	230464	23UIT139	SHARMILAA S
31	230547	23UIT150	SUDESHNAA P
32	231498	23UIT151	SWETHA S





**Details of Students Registered for Honors Degree –  
Artificial Intelligence and Machine Learning**

Sl. No.	Enroll No.	Register No.	Name of the Student
1	230991	23UIT025	DHANALAKSHMI.S
2	231323	23UIT031	GEETHAKOKILAM.R
3	230352	23UIT042	HARINI.D
4	230408	23UIT054	JANANI MURUGESAN
5	230906	23UIT075	LOKESH.S
6	230975	23UIT085	MUHAMMAD SUHAIL.A
7	230376	23UIT086	MUKESH S
8	230930	23UIT120	SABARISH S
9	230256	23UIT140	SHIFA.A

