



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Department of Computer Science and Engineering

Minutes of 4th BoS Meeting
(PG)

Venue : Centre V Lab,
Department of CSE,
Sri Manakula Vinayagar Engineering College

Date & Time : 12th Feb, 2022 at 02:30 P.M



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

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



Madagadipet, Puducherry - 605 107

Department of Computer Science and Engineering

Minutes of 4th Board of Studies Meeting (PG)

The Fourth Board of Studies meeting of Computer Science and Engineering Department was held on **12th February 2022 at 02:30 P.M** at Centre V lab, Department of CSE, Sri Manakula Vinayagar Engineering College, with Head of the Department in the Chair.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS
1	Dr. N. Danapaquiam, Professor and Head, Department of CSE, SMVEC	Chairman
2	Dr. S. R. Balasundaram, Professor and Head Department of Computer Applications, National Institute of Technology, Trichy.	Subject Expert (Pondicherry University Nominee)
3	Dr. Chokkalingam Subramanian, Professor & Head, Department of Information Technology, Saveetha University, Chennai.	Subject Expert (Academic Council Nominee)
4	Dr.S.Udhayakumar, Professor, Department of Computer Science and Engineering, Saveetha University, Chennai.	Subject Expert (Academic Council Nominee)
5	S.Diwarhar, M.Tech., Senior Engineer, Dell Technologies, Bangalore	Representative from Industry
6	R.Sakthi Murugan, Director, Interjet India Pvt. Ltd., Puducherry.	Postgraduate Alumnus (nominated by the Principal)
7	Dr. K.Premkumar, Professor, Department of CSE, SMVEC.	Internal Member
8	Dr.E.Kodhai, Professor, Department of CSE, SMVEC.	Internal Member
9	Dr.P.Iyappan, Associate Professor, Department of CSE, SMVEC	Internal Member
10	Dr.V.Vijayakumar, Associate Professor, Department of CSE, SMVEC	Internal Member
11	Dr.M.A.Ishrath Jahan Associate Professor, Department of English, SMVEC	Internal Member
12	Dr.T.Jayavarthanam Professor, Department of Physics, SMVEC	Internal Member
13	Dr.S.Deepa, Professor, Department of Chemistry, SMVEC	Internal Member
14	Prof.K.Raja, Asst. Prof., Department of Mathematics, SMVEC	Internal Member

N-19/22

Agenda of the Meeting

Item No. : BoS/ PG/ CSE 4.1	Confirmation of minutes of 3 rd BoS meeting held on 21.08.2021 and the Curriculum Structure of M.Tech Computer Science and Engineering of R-2020 Regulations – for any Modifications.
Item No. : BoS/ PG / CSE 4.2	To approve and Discuss the Modifications in Regulation, Curriculum and approve electives syllabus from I to II semesters under R2020 Regulations for M.Tech – Computer Science and Engineering.
Item No. : BoS/ PG / CSE 4.3	To discuss and recommend the panel of examiners to the Academic Council
Item No. : BoS/ PG / CSE 4.4	Any other item with the permission of chair.

Minutes of the Meeting

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

Item No. : BoS/ PG/ CSE 4.1

Confirmation of minutes of 3rd BoS meeting held on 21.08.2021 and the Curriculum Structure of M.Tech Computer Science and Engineering of R-2020 Regulations – for any Modifications.

Chairman, BoS, apprised the minutes of 3rd BoS meeting, its implementation and then it is confirmed with the approval without any modifications.

Item No. : BoS/ PG/ CSE 4.2

To approve and Discuss the Modifications in Regulation, Curriculum and approve electives syllabus from I to II semesters under R2020 Regulations for M.Tech – Computer Science and Engineering.

The M.Tech. Degree curriculum and syllabus modification of Electives for I and II semesters under Autonomous Regulations 2020 for the M.Tech Programme were discussed and recommended with the following modifications.

S. No	Regulation	Semester	Subject Name with code	Unit	Particulars
1	R-20	I	Professional Elective I- Service Oriented Architecture	III	The typing error " software – as – service", need to be corrected.
2	R-20	I	Professional Elective I- Advance Java Programming	III, V	Re-modify both the units.
3	R-20	II	Professional Elective II- Web Analytics and Development	-	Change the title of the course name from "Web Analytics and Development" to "Web Analytics"

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4	R-20	II	Professional Elective II – Advances in Compiler Construction	V	Need to include the differences of various compilers.
5	R-20	II	Professional Elective II – Social Network Analysis	V	Visualization is repeated. Update it.
6	R-20	II	Professional Elective III – Semantic Web and Knowledge Management	III, V	Same title for Unit III and V. Modify it.
				V	Include two more tools.

The above correction was incorporated and approved by BoS members in 4th BoS meeting, and the details are enclosed in Annexure - I.

Item No. : BoS/ PG/ CSE 4.3

To discuss and recommend the panel of examiners to the Academic Council

The list of question paper setters and Evaluators (given in Annexure-II) was presented and recommended by the BoS members to the academic council.

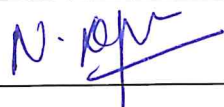
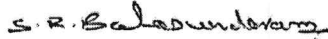
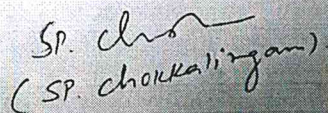

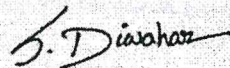
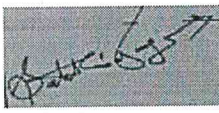
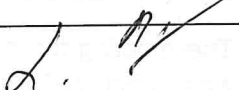



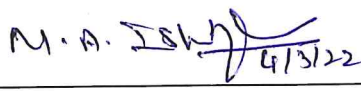


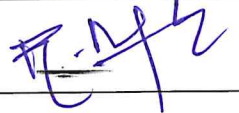
Item No. : BoS/ PG/ CSE 4.4

Any other item with the permission of chair.

The BoS members were satisfied with the PG Syllabus, and there were no more issues to address or incorporate.

The meeting for the above Agenda regarding B.Tech – Computer Science and Engineering was concluded by 3:30 pm with by **Dr. N. Danapaquiame**, Chairman-BoS and Head of Department, Department of Computer Science and Engineering, Sri Manakula Vinayagar Engineering College.

N. Danapaquiame

SI.No	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	Dr. N. Danapaquiame, Professor and Head, Department of CSE, SMVEC	Chairman	
External Members			
2	Dr. S. R. Balasundaram, Professor and Head Department of Computer Applications, National Institute of Technology, Trichy.	Subject Expert (Pondicherry University Nominee)	
3	Dr. Chokkalingam Subramanian, Professor & Head, Department of Information Technology, Saveetha University, Chennai.	Subject Expert (Academic Council Nominee)	
4	Dr. S. Udhayakumar, Professor, Department of Computer Science and Engineering, Rajalakshmi College of Engineering, Chennai.	Subject Expert (Academic Council Nominee)	
5	S. Diwahar, M.Tech., Senior Engineer, Dell Technologies, Bangalore	Representative from Industry	
6	R. Sakthi Murugan, Director, Interjet India Pvt. Ltd., Puducherry.	Postgraduate Alumnus (nominated by the Principal)	
Internal Members			
7	Dr. K. Premkumar, Professor, Department of CSE, SMVEC.	Internal Member	
8	Dr. E. Kodhai, Professor, Department of CSE, SMVEC.	Internal Member	
9	Dr. P. Iyappan, Associate Professor Department of CSE, SMVEC	Internal Member	
10	Dr. V. Vijayakumar, Associate Professor, Department of CSE, SMVEC	Internal Member	
Co-opted Members			
11	Dr. M.A. Ishrath Jahan Associate Professor, Department of English, SMVEC	Internal Member	
12	Dr. T. Jayavarthanam Professor, Department of Physics, SMVEC	Internal Member	
13	Dr. S. Deepa, Professor, Department of Chemistry, SMVEC	Internal Member	
14	Prof. K. Raja, Assistant Professor, Department of Mathematics, SMVEC	Internal Member	

Annexure I

(Semester I & II – Professional Electives R-2020)

Semester I - Professional Elective - I

S.No	Course Code	Course Title
1.	P20CSE101	Robotic Process Automation(RPA)
2.	P20CSE102	Web Services and Internet Engineering
3.	P20CSE103	Service Oriented Architecture
4	P20CSE104	Advanced Java Programming
5	P20CSE105	Cryptography & Information Security

Semester II- Professional Elective - II

S.No	Course Code	Course Title
1.	P20CSE206	Web Analytics
2.	P20CSE207	Advances in Compiler Construction
3.	P20CSE208	Quantum Computing
4	P20CSE209	Social Network Analysis
5	P20CSE210	Data Compression

Semester II- Professional Elective - III

S.No	Course Code	Course Title
1.	P20CSE211	Business Intelligence and Reporting
2.	P20CSE212	Ethical Hacking and Digital Forensics
3.	P20CSE213	Trusted Internet
4	P20CSE214	Soft Computing
5	P20CSE215	Semantic Web and Knowledge Management

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**PROFESSIONAL
ELECTIVES SYLLABUS
I & II SEMESTER**

P20CSE101	ROBOTIC PROCESS AUTOMATION	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To outline the fundamental concepts of Automation and its tools.
- To Understand types of workflows and data manipulation.
- To Learn Error handling and logging in Robotic software.
- To understand orchestrator server and its bots.
- To implement automation by using RE Framework.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Extend the robotic process automation and its essential tools. (K2)

CO2 - Describe sequencing of flows in RPA. (K2)

CO3 - Interpret the Exception handling in Automation. (K4)

CO4 - Illustrate overview of orchestration server and its controls. (K4)

CO5 - Demonstrate RE framework for software automation. (K4)

UNIT I INTRODUCTION TO AUTOMATION (9 Hrs)

Robotic process automation: RPA - Benefits of RPA - Components of RPA - RPA platforms – UiPath - Blue Prism - Work Fusion - UiPath: UiPath Robot - UiPath Orchestrator.

UNIT II SEQUENCING WORKFLOWS (9 Hrs)

Sequences, flowcharts Control Flow: Control Flow Activities - The Assign activity - The Delay activity - The While activity - The Do while activity - For each activity - The If activity. Data Manipulation: variables and scope collections – arguments - data tables – file operation – conversion of CSV/Excel to data table and vice versa.

UNIT III TRIGGERS, DEBUGGING AND LOGGING (9 Hrs)

Event Triggers: Hotkey trigger - mouse trigger - system trigger – Debugging: techniques – Error Handling – Logging: Client logging - Server logging – Extensions – Project Organization.

UNIT IV ORCHESTRATION SERVER AND OTHER RPA TOOLS (9 Hrs)

Overview of Orchestration Server: Queues – Assets – Process - Control Bots: Robot statuses - editing the Robot - deleting Robot - Displaying logs of Robot-Deploy Bots- Other RPA tools.

UNIT V IMPLEMENTING RE FRAMEWORK (9 Hrs)

Introduction to RE Framework – Purpose of RE framework – using state machine layout – states of the state machine – workflows Involved – Workflows of the Framework – Exception Handling & Logging .

Text Books

1. Tripathi Alok Mani, "Learning Robotic Process Automation", Packt Publishing, First Edition, 2018.
2. Richard Murdoch, "Robotic Process Automation: Guide to Building Software Robots, Automate Repetitive Tasks & Become an RPA Consultant", First Edition, 2020.
3. M.P.Groover, M.Weiss, R.N. Nageland N. G.Odrej, Industrial Robotics, McGrawHill Singapore, 1996.

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Reference Books

1. S. Muhkerjee, "Essentials of Robotics Process Automation", Khanna Books, Second Edition, 2019.
2. Nandan Mullakara, "Robotic Process Automation Projects: Build real-world RPA solutions using UiPath and Automation Anywhere", Packt Publishing, First edition, 2020.
3. M.P.Groover, M.W, "Learning Robotic Process Automation", Packt Publishing Limited, ISBN: 9781788470940,
4. "The Simple Implementation Guide to Robotic Process Automation", iUniverse Publisher, ISBN: 9781532045882.
5. JohnJ.Craig, "Introduction to Robotics Mechanics and Control", Pearson Education, Third edition, 2009.

Web References

1. <https://www.tutorialspoint.com/uiopath>
2. <https://asha24.net/learn/robotic-process-automation>
3. <https://book.akij.net/learningrobotics automation>
4. <https://www.javatpoint.com/robotics-tutorial>
5. <http://www.robotictutorials.com/>

COs/POs/PSOs Mapping

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

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

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P20CSE102	WEB SERVICES AND INTERNET ENGINEERING	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To understand the major components of internet and associated with protocols.
- To study the XML structure and schema.
- To study of components and containers.
- To understand the security concepts.
- To design an innovative web service application and search engine.

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Identify the working protocols of Internet. **(K1)**
- CO2** - Develop XML Infrastructure for Web Service Applications. **(K4)**
- CO3** - Choose the components and containers for Web Applications. **(K1)**
- CO4** - Utilize the standards, policy of Web Services. **(K3)**
- CO5** - Construct the Web Services and its Composition. **(K5)**

UNIT I INTERNET PROTOCOLS

(9 Hrs)

Web Technology - Web 2.0 technologies - Introduction to Ajax - Ajax Design Basics - Introduction to WWW - TCP/IP – HTTP – ARP – ICMP – FTP – UDP - Routing protocols (RIP, OSPF, BGP) - Network Management Protocols (SNMP) and Application-level protocols (FTP, TELNET, SMTP) – URL -Web Browsers - Web Servers.

UNIT II XML INFRASTRUCTURE

(9 Hrs)

Web services - Evolution and differences with Distributed computing - XML - Name Spaces - Structuring With Schemas and DTD - Transformation - XML Infrastructure WSDL – SOAP – UDDI - XML - SOAP And Web Services in E-Com - Overview of .NET And J2EE.

UNIT III WEB COMPONENTS

(9 Hrs)

Platform for Web Services Development - MVC Design Pattern - Web services - EJB, .NET, J2EE Architecture - J2EE Components & Containers – Specification - Application servers – Strut - Introduction to JSON.

UNIT IV WEB STANDARDS & SECURITY

(9 Hrs)

Web Transactions – Coordination - Orchestration and Choreography – tools BPEL - WS – CDL - Overview of Web service standards - BPEL4WS. WS-Security and the Web services security specifications - WS Reliable Messaging - WS-Policy - WS-Attachments.

UNIT V WEB SERVICE DISCOVERY, COMPOSITION & INTEGRATION

(9 Hrs)

Web Service Case Study - Web Service Search Engine - Web Service Discovery - Web Service Composition. Web Service – SOAP vs Web Service – REST.



Text Books

1. Achyut Godbole & Atul Kahate, "Web Technologies: TCP/IP to Internet Application Architectures" , McGraw Hill Education publications, Third Edition, 2016.
2. Ralph Moseley & M. T. Savaliya, "Developing Web Applications", Wiley publications, Second Edition, 2014.
3. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.

Reference Books

1. R. Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2004.
2. Frank. P. Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002.
3. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
4. Deitel, and Nieto, "Internet and World Wide Web – How to program", Pearson Education Publishers, 2000.
5. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.

Web References

1. https://www.tutorialspoint.com/internet_technologies/internet_useful_resources.htm
2. https://www.tutorialspoint.com/webservices/what_are_web_services.htm
3. <https://www.oreilly.com/library/view/programming-web-services/0596000952/ch01.html>
4. <https://www.tutorialspoint.com/webservices/index.htm>
5. https://www.w3schools.com/xml/xml_services.asp

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	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	3	2	-	1	-	-	2	-
2	2	3	2	-	1	-	-	-	-
3	2	2	-	2	1	2	3	2	-
4	2	2	1	2	1	2	1	2	-
5	2	1	2	1	1	1	-	-	-

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

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P20CSE103	SERVICE ORIENTED ARCHITECTURE	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To understand Software Architecture and various Patterns used to construct.
- To understand the analysis and design of service oriented architecture business models.
- To understand SOA Governance and best practices.
- To understand XML and security framework involved in SOA.
- To understand Transaction Management in SOA.

Course Outcomes

After completion of the course, the students will be able to

- CO1 - Identify type of architecture and its patterns. (K2)
- CO2 - Identify Service oriented Analysis and Design activity. (K2)
- CO3 - Identify the Governance strategy adopted and development of architecture. (K2)
- CO4 - Know about Meta data management, security and issues. (K1)
- CO5 - Know about the Transaction Management using SOA. (K1)

UNIT I ARCHITECTURE AND PATTERNS

(9 Hrs)

Software Architecture – Types of IT Architecture – SOA – Evolution – Key components –Patterns for SOA – Architectural Patterns – The Unified Process: Use Case Driven - Architecture Centric - Iterative, and Incremental – SOA programming models.

UNIT II SOA ANALYSIS AND DESIGN

(9 Hrs)

Service Oriented Analysis and Design – Design of Activity – Data - Client and business process services – Technologies of SOA – SOAP – WSDL – JAX – WS – XML WS for .NET – Service integration with ESB – Scenario – Business case for SOA – stakeholder objectives – benefits of SPA – Cost Savings.

UNIT III SOA GOVERNANCE

(9 Hrs)

SOA implementation and Governance – strategy – SOA development – SOA governance – trends in SOA – event-driven architecture – Software as a service(SAAS) – SOA technologies – proof-of-concept – process orchestration – SOA best practices

UNIT IV SOA AND XML

(9 Hrs)

Meta data management – XML security – XML signature – XML Encryption – SAML – XACML – XKMS – WS-Security – Security in web service framework - advanced messaging.

UNIT V SOA TRANSACTION MANAGEMENT

(9 Hrs)

Transaction processing – Paradigm – protocols and coordination – transaction specifications – SOA in mobile – research issues.

Text Books

1. Shankar Kambhampaty, "Service –Oriented Architecture for Enterprise Applications", Wiley India Pvt Ltd, Second Edition, 2008.
2. Eric Newcomer and Greg Lomow, "Understanding SOA with Web Services", Pearson Education. 2006.
3. Mark O' Neill, et al., "Web Services Security", Tata McGraw-Hill Edition, 2003.

Reference Books

1. Kapil Pant and Matiaz Juric, "Business Process Driven SOA using BPMN and BPEL: From Business Process Modeling to Orchestration and Service Oriented Architecture", Packt Publishing, 2008.

Academic Curriculum and Syllabi R-2020

2. George Mentzas and Andreas Frezen (Eds), "Semantic Enterprise Application Integration for Business Processes: Service-oriented Frameworks", Business Science Reference, 2009.
3. Ivar Jacobson, Grady Booch, and James Rumbaugh, "The Unified Software Development Process", Addison Wesley Longman, Second Edition, 2002.
4. Frank Buschmann, "Pattern Oriented Software Architecture", Wiley, 2002.
5. Steven Graham, Dong Davis, "Building Web Services with Java", Pearson, Second Edition -2005.

Web References

1. <https://www.tutorialspoint.com/soa/index.htm>
2. <https://www.javatpoint.com/service-oriented-architecture>
3. <https://tekslate.com/oracle-soa-11g>
4. <https://www.ibm.com/developerworks/webservices/tutorials/ws-soa-ibmcertified/ws-soa-ibmcertified.html>
5. <https://tutorialseye.com/soa>

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2	1	2	2	2	2	2	2	1	2
3	3	3	3	3	3	3	3	1	3
4	3	3	3	3	3	1	3	3	3
5	2	1	2	1	2	2	2	2	2

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

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P20CSE104

ADVANCED JAVA PROGRAMMING

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To understand the Core JAVA concepts.
- To study about the Java – RMI concepts including Distributed concepts.
- To understand about the JDBC.
- To study about Swings.
- To understand about the Servlet and JSP.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Create applications using core concepts of JAVA. **(K4)**

CO2 - Work with Remote Method Invocation (RMI). **(K2)**

CO3 - Understand about the JDBC. **(K2)**

CO4 - Get the knowledge in Swings. **(K5)**

CO5 - Understand the Servlet and JSP. **(K2)**

UNIT I CORE CONCEPTS OF JAVA

(9 Hrs)

JAVA Basics - Java streaming - Networking - Event handling - Multithreading - Byte code Interpretation - Customizing application - Data Structures - Collection classes.

UNIT II DISTRIBUTED COMPUTING CONCEPTS USING RMI AND CORBA

(9 Hrs)

Distributed Computing: Custom sockets - Remote Method Invocation - Activation - Object serialization - Distributed garbage collection - RMI - IIOP - Interface definition language - CORBA - JINI overview.

UNIT III DATABASE CONNECTIVITY USING JDBC

(9 Hrs)

Relational Databases – SQL – Manipulating Databases with JDBC – RowSet Interface – PreparedStatement – Stored Procedures – Transaction Processing.

UNIT IV SWINGS

(9 Hrs)

Fundamentals of Swings – Labels, Buttons and Borders – Scroll Bars, Sliders and Progress Bars – Panels, Panes and Tooltips – Text Components – Menus.

UNIT V SERVLET AND JSP

(9 Hrs)

Servlets and Session Tracking – Application Event Listeners – HTTP and JSP-SERVLET Technology – Components of a JSP – Implicit Objects of JSP.

Text Books

1. Deitel&Deitel, "Java How to program", Prentice Hall, Eighth Edition, 2009.
2. Herbert Schildt, "Swing - A Beginner's Guide", McGraw Hill Education, First Edition, 2006.
3. Mahesh P. Matha, "JSP and Servlets - A Comprehensive Study", PHI publications, 2013.

Reference Books

1. Gary Cornell and Cay S. Horstmann, "Core Java", Vol 1 and Vol 2, Sun Microsystems Press, 1999.
2. Stephen Asbury and Scott R. Weiner, "Developing Java Enterprise Applications", Wiley, 1998.
3. John Zukowski, "The Definitive Guide to Java Swing", Apress Publications, 2004.
4. Gary Cornell and Cay S. Horstmann, "Core Java", Vol 1 and Vol 2, Sun Microsystems Press, 1999.
5. Stephen Asbury and Scott R. Weiner, "Developing Java Enterprise Applications", Wiley, 1998.

M.Tech. Computer Science and Engineering

N. APS

Web References

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2. <https://www.tutorialspoint.com/java/index.htm>
3. <https://www.w3schools.com/JAVA/default.asp>
4. <https://www.udemy.com/course/advanced-java-programming/>
5. <https://www.tutorialspoint.com/java/index.htm>

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2	3	2	2	2	1	2	2	2	1
3	3	1	1	1	2	1	1	1	2
4	3	1	1	2	2	1	2	1	2
5	3	2	2	2	3	2	2	2	3

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

N. APD

P20CSE105	CRYPTOGRAPHY AND INFORMATION SECURITY	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To define the fundamental ideas behind Cryptography.
- To define Modern Symmetric Encryption Algorithms.
- To define the concepts of Digital Signature.
- To define the fundamental ideas behind Information Security.
- To provide an overview Cyber Security.

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Explain the basic concepts of cryptography and cryptographic algorithms. **(K4)**
- CO2** - Explain the Modern Symmetric Encryption Algorithms. **(K4)**
- CO3** - Illustrate the concepts of Digital Signature. **(K4)**
- CO4** - Explain the concepts of Information Security. **(K4)**
- CO5** - Illustrate the Cyber Security concepts. **(K5)**

UNIT – I INTRODUCTION TO CRYPTOGRAPHY (9 Hrs)

Data Encryption Standard - Block cipher principles - Advanced Encryption Standard (AES) -Triple DES - Blowfish - RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography. Hash function.

UNIT – II MODERN SYMMETRIC ENCRYPTION ALGORITHMS (9 Hrs)

Modern Symmetric Encryption Algorithms: IDEA, CAST, Blowfish, Two fish, RC2, RC5, Rijndael (AES) Key Distribution. Stream Ciphers and Pseudo Random Numbers: Pseudo random sequences - Linear Congruential Generators - Cryptographic Generators - Design of Stream Cipher - One Time Pad.

UNIT – III DIGITAL SIGNATURES (9 Hrs)

Digital Signatures – Certificates- User Authentication - Digital Signature Standard (DSS and DSA) - Security Handshake Pitfalls - Elliptic Curve Cryptosystems. Authentication of Systems: Kerberos V4 and V5, X.509 Authentication Service. Digital Watermarking and Steganography.

UNIT – IV INFORMATION SECURITY (9 Hrs)

Security mindset - Computer Security Concepts (CIA) – Threats - Attacks and Assets-Software Security: Vulnerabilities and protections – malware - program analysis – Encryption – authentication – hashing - symmetric and asymmetric cryptography- Digital Signatures and Certificates. Network Security: Network security issues – Sniffing - IP spoofing - Common threats - E-Mail security – IPsec – SSL – PGP – Intruders – Virus – Worms - Firewalls-need and features of firewall - Types of firewall - Intruder Detection Systems.

UNIT – V CYBER SECURITY (9 Hrs)

Cyber Crime and security, Security tools - Introduction to Digital Forensic - OS fingerprinting - TCP/IP stack masking - Social Engineering- Web application Security - Privacy and Anonymity - public policy.

Text Books

1. Douglas R. Stinson, "Cryptography: Theory and Practice", Chapman & Hall /CRC Press, Third Edition, 2005.
2. Wenbo Mao, "Modern Cryptography: Theory and Practice", Prentice Hall, 2004.

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3. Douglas Robert Stinson and Maura Paterson, "Cryptography: Theory and Practice", CRC press, 2018.

Reference Books

1. Alfred J. Menezes, "Handbook of Applied Cryptography", CRC Press, 1996.
2. Richard A. Mollin, "An Introduction to Cryptography", Chapman and Hall/CRC, 2001.
3. R. Oppliger, "Internet and Intranet Security", ArtechHouse, Second edition, 2002.
4. Atul Kahate, "Cryptography and Network Security", Tata McGraw Hill, 2003.
5. William Stallings, "Cryptography and Network Security", Pearson Education, Third Edition, 2003.

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1. <https://www.geeksforgeeks.org/introduction-to-crypto-terminologies>
2. <https://searchsecurity.techtarget.com/definition/information-security-infosec>.
3. <https://digitalguardian.com/blog/what-cyber-security>
4. <https://www.khanacademy.org/computing/computer-science/cryptography>
5. <https://www.geeksforgeeks.org/cryptography-introduction/>

COs/POs/PSOs Mapping

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

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

P20CSE206

WEB ANALYTICS

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To Learn the fundamentals of web Analytics
- To understand the web analytics tools
- To learn the concepts of web data collection.
- To acquire knowledge web analytics strategy.
- To study about connection and robustness

Course Outcomes

After completion of the course, the students will be able to

CO1 - Update the knowledge about web analytics. (K2)

CO2 - Demonstrate various web analytics tools. (K4)

CO3 - Acquire the knowledge of web data collection. (K4)

CO4 - Understand web analytics strategy. (K2)

CO5 - Familiar about making connection and robustness social involvements. (K4)

UNIT I INTRODUCTION TO WEB ANALYTICS

(9 Hrs)

A Brief history of Web Analytics – Web Analytics Terminology – Traditional Web Analytics – Web Analytics 2.0 – Capturing Data - Tools Selection – Quality Aspects – Implementing Best Practices. Social network - Web data and methods- Graph and Matrices - Basic measures for individuals and networks - Information Visualization.

UNIT II WEB ANALYTICS TOOLS

(9 Hrs)

Content organization tool – Process measurement tools - Visitor Segmentation tools- Campaign Analysis – Commerce Measurement Tools -Google Analytics – Piwik Web Analytics – Yahoo Web Analytics – Emerging Analytics: Social – Video - Mobile.

UNIT III WEB DATA COLLECTION

(9 Hrs)

Web Traffic Data – Web Transactional Data – Web Server Data – Page Weights – Usability Studies – User Submitted Information – Integrating Form based data – Web Data Sources – Server Log Files – Page Tags – Clickstream Data – Outcomes Data – Research Data – Competitive Data.

UNIT IV WEB ANALYTICS STRATEGY

(9 Hrs)

Component of Web Analytics Strategy – Customer Centric Focus – Business Problem Solving Focus – Reporting vs Analysis – IT and Business Strength – Clickstream vs Web 2.0 – Vendor Specific Options and Issues.

UNIT V CONNECTION

(9 Hrs)

Making Connection - Link Analysis - Random Graphs and Network evolution - Social Connects - Affiliation and identity Connection - Connection Search – Collapse - Robustness Social involvements and diffusion of innovation.

Text Books

1. Hansen, Derek, Ben Sheiderman, Marc Smith, "Analyzing Social Media Networks with NodeXL: Insights from a Connected World", Morgan Kaufmann, 2010.
2. Avinash Kaushik, "Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity", Sybex, First Edition, 2009.

- Brian Clifton, "Advanced Web Metrics with Google Analytics", Sybex , Third Edition 2012.

Reference Books

- Avinash Kaushik, "Web Analytics 2.0: The Art of Online Accountability", Wiley Publishers, 2009.
- Easley, D., Kleinberg, J, "Networks, Crowds, and Markets: Reasoning About a Highly Connected World. New York", Cambridge University Press, 2010.
- Eric Peterson, "Web Analytics Demystified: A Marketer's Guide to Understanding How Your Web Site Affects Your Business", Celilo Group Media, First Edition, 2004.
- Avinash Kaushik, "Web Analytics: An Hour a Day", Sybex, PAP/ CDR Edition, Sixth Edition, 2007.
- Justin Cutroni, "Google Analytics", O'Reilly Media, Second Edition, 2010.

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- https://www.tutorialspoint.com/web_analytics/index.htm
- <https://www.webanalytics.in/?p=62>
- <https://www.simplilearn.com/web-analytics-tutorial>
- <https://www.wisdomjobs.com/e-university/web-analytics-tutorial-1705.html>
- <https://www.udemy.com/topic/web-analytics/>

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3	3	1	2	3	2	0	3	3	1
4	2	1	2	3	2	0	3	3	1
5	2	1	2	2	2	1	2	2	1

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

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P20CSE207	ADVANCES IN COMPILER CONSTRUCTION	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To overview the basic principles involved in compiler design.
- To understand about the syntax and semantic analysis in depth
- To learn about all the parsing techniques
- To study all the optimizations and machine code generation.
- To learn about the advancement in compilers

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Define the language classes & grammars relationship among them. (K2)
- CO2** - Identify the different optimization techniques that are possible for a sequence of code. (K2)
- CO3** - Understand the design of a compiler and its features of the languages. (K2)
- CO4** - Gain knowledge of powerful compiler generation tools. (K2)
- CO5** - Design Compilers for the programming language. (K4)

UNIT I OVERVIEW OF COMPILER

(9 Hrs)

Definition of programming language – Lexical and syntactic structure of a language –Elements of a format language grammar – Derivation, reduction and syntax trees – A ambiguity – context free grammars – Capabilities of a context free grammar – Regular expressions – Compiler-Phases of Compiler.

UNIT II LEXICAL, SYNTAX AND SEMANTIC ANALYSIS

(9 Hrs)

Role of lexical analyzer – Finite automats –Regular expressions to finite automata – Minimizing the number of states of DFA – Implementation of a lexical analyzer –Illustrations of Lexical analysis - parsing and semantic analysis.

UNIT III PARSING TECHNIQUES

(9 Hrs)

Parse trees – Left most and right most Parsing techniques- Top down and bottom up parsing – Handles – Shift reduce Parse- Recursive descent Parser – Operator precedence and predictive Parse. Automatic Parsing techniques: LR grammars – LR Parsing – Canonical – Collection of LR (0) items – Construction of ACTION and GO TO table – Introduction to SLR – Canonical and LALR Parsing.

UNIT IV CODE GENERATION AND OPTIMIZATION

(9 Hrs)

Error recovery and intermediate code generation - Runtime storage management - Code generation Code improvement - peephole optimization, dependence analysis and redundancy elimination. Loop optimization - procedural and inter-procedural optimization - instruction scheduling - Optimization for memory hierarchy.

UNIT V COMPILER CONSTRUCTION IN JAVA**(9 Hrs)**

The Phases of Compilation by Java compiler- An Overview of the j-- to JVM Compiler- Celebrity Compilers: Java HotSpot Compiler-Eclipse Compiler for Java (ECJ)- GNU Java Compiler (GCJ)- Microsoft C# Compiler for .NET Framework – Comparison of Compilers.

Text Books

1. V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers: Principles, Techniques and Tools", Addison-Wesley, Second Edition, 2006.
2. Michael L. Scott, "Programming Language Pragmatics", Morgan Kaufmann; Fourth edition, 2015
3. Andrew W. Appel, "Modern Compiler Implementation in C/Java", Cambridge University Press, Second edition, 2002.

Reference Books

1. Keith D. Cooper and Linda Torczon, "Engineering a Compiler", Elsevier, Second edition, 2011.
2. Allen I. Holob, "Compiler Design in C, Prentice-Hall", Second Revised edition, 1993.
3. Steven S. Muchnik, "Advanced Compiler Design and Implementation", Elsevier, 2003.
4. Randy Allen and Ken Kennedy, "Optimizing Compilers for Modern Architectures", Elsevier, 2001.
5. Bill Campbell, Swami Iyer, Bahar Akbal-Delibas, "Introduction to Compiler Construction in a Java World", Chapman and Hall/CRC, First Edition, 2012.

Web References

1. https://researcher.watson.ibm.com/researcher/view_group.php?id=1440
2. <https://cs.lmu.edu/~ray/notes/compilerarchitecture/>
3. https://www.tutorialspoint.com/compiler_design/index.htm

COs/POs/PSOs Mapping

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3	1	2	3	3	2	-	2	1	1
4	2	3	3	3	2	-	1	1	2
5	2	3	3	3	2	-	2	1	2

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

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P20CSE208

QUANTUM COMPUTING

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To know the specific properties of quantum computing in comparisons with randomized computing.
- To know the basic models of one-way and two-way quantum algorithms
- To learn the method of quantum computers.
- To learn the elements of quantum operations and information's.
- To practice the error correction.

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Plan the elements of classic reversible computing. (K1)
CO2 - Apply the basic experiments and principles of algorithms. (K3)
CO3 - Extend the computation to advance standards. (K4)
CO4 - Make use of quantum information for complexity problems. (K3)
CO5 - Apply the error correction mechanisms. (K3)

UNIT I FUNDAMENTAL CONCEPTS

(9 Hrs)

Global Perspectives - Quantum Bits - Quantum Computation - Quantum Algorithms - Quantum Information - Postulates of Quantum Mechanisms.

UNIT II QUANTUM COMPUTATION

(9 Hrs)

Quantum Circuits – Quantum algorithms - Single Orbit operations - Control Operations - Measurement - Universal Quantum Gates - Simulation of Quantum Systems - Quantum Fourier transform - Phase estimation – Applications - Quantum search algorithms – Quantum counting – Speeding up the solution of NP – Complete problems – Quantum Search for an unstructured database.

UNIT III QUANTUM COMPUTERS

(9 Hrs)

Guiding Principles - Conditions for Quantum Computation - Harmonic Oscillator Quantum Computer - Optical Photon Quantum Computer – Optical cavity Quantum electrodynamics - Ion traps - Nuclear Magnetic resonance.

UNIT IV QUANTUM INFORMATION

(9 Hrs)

Quantum noise and Quantum Operations – Classical Noise and Markov Processes - Quantum Operations - Examples of Quantum noise and Quantum Operations – Applications of Quantum operations - Limitations of the Quantum operations formalism - Distance Measures for Quantum information.

UNIT V QUANTUM ERROR CORRECTION

(9 Hrs)

Introduction - Shor code - Theory of Quantum Error – Correction - Constructing Quantum Codes - Stabilizer codes - Fault – Tolerant Quantum Computation - Entropy and information – Shannon Entropy - Basic properties of Entropy, - Von Neumann - Strong Sub Additivity - Data Compression - Entanglement as a physical resource.

Text Books

1. Micheal A. Nielsen. & Issac L. Chiang, "Quantum Computation and Quantum Information", Cambridge University Press, Fint South Asian edition.

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2. Eleanor G. Rieffel, Wolfgang H. Polak, "Quantum Computing - A Gentle Introduction" (Scientific and Engineering Computation) Paperback – Import, 2014.
3. Emily Grumbling, Mark Horowitz, "Quantum Computing Progress and Prospects", National Academies Press, 2019.

Reference Books

1. Jozef Gruska, "Quantum Computing", McGraw-Hill, Second Edition, 2005.
2. Colin P. Williams, "Explorations in Quantum Computing", Springer London, 2011.
3. Phillip Kaye, Institute for Quantum Computing Phillip Kaye, Raymond Laflamme, Michele Mosca, Institute for Quantum Computing Michele Mosca, "An Introduction to Quantum Computing", OUP Oxford, 2007.
4. Joachim Stolze, Dieter Suter, "Quantum Computing A Short Course from Theory to Experiment", Wiley, 2008.
5. Chris Bernhardt, "Quantum Computing for Everyone", MIT Press, 2019.

Web References

1. <https://hackernoon.com/16-best-resources-to-learn-quantum-computing-in-2019-e5d8b797aeb6>
2. <http://www.mit.edu/~aram/advice/quantum.html>
3. https://qosf.org/learn_quantum/

COs/POs/PSOs Mapping

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3	1	1	2	2	-	-	1	2	1
4	1	1	-	3	2	-	1	2	1
5	3	2	2	1	2	3	1	2	1

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

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P20CSE209	SOCIAL NETWORK ANALYSIS	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To understand the components of current web development in the era of Social Web
- To model and visualize the knowledge representation of Social Network
- To mine the users in the social network.
- To understand the human behavior and trust disputes of the social network.
- To know the applications in real time systems.

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Work on the internal components of the social network. (K2)
- CO2** - Model and visualize the social network. (K4)
- CO3** - Apply the algorithm for Mining the behavior of the users in the social network. (K3)
- CO4** - Predict the possible next outcome of the social network. (K2)
- CO5** - Apply social network in real time applications. (K3)

UNIT I INTRODUCTION TO SOCIAL NETWORK ANALYSIS (9 Hrs)

Introduction to Web – Limitations of current Web – Development of Semantic Web – Emergence of Social Web – Social Network analysis: Development of Social Network Analysis – Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks - Blogs and online communities – Web based networks.

UNIT II MODELING AND VISUALIZATION (9 Hrs)

Visualizing Online Social Networks – A Taxonomy of Visualizations – Graph Representation – Centrality – Clustering – Node-Edge Diagrams – Visualizing Social Networks with Matrix – Based Representations – Node-Link Diagrams – Hybrid Representations – Modelling and aggregating social network data – Random Walks and their Applications – Ontological representation of social individuals and relationships.

UNIT III MINING COMMUNITIES (9 Hrs)

Aggregating and reasoning with social network data - Advanced Representations – Extracting evolution of Web Community from a series of Web Archive – Detecting Communities in Social Networks – Evaluation Communities – Core Methods for Community Detection & Mining – Applications of Community Mining Algorithms – Node Classification in Social Networks.

UNIT IV PREDICTING HUMAN BEHAVIOR AND PRIVACY ISSUES (9 Hrs)

Understanding and Predicting Human Behavior for Social Communities – User Data Management – Inference and Distribution – Enabling New Human Experiences: Reality Mining – Context Awareness – Privacy in Online Social Networks: Trust in Online Environment – Trust Models Based on Subjective Logic – Trust Network Analysis – Trust Transitivity Analysis – Combining Trust and Reputation – Trust Derivation Based on Trust Comparisons.

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS (9 Hrs)

Graph Theory – Matrix representation - Visualizing Online Social Networks – Matrix-Based Representations: Matrix and Node-Link Diagrams – Applications of social network analysis: Covert Networks – Community Welfare – Collaboration Networks.

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Text Books

1. Borko Furht, "Handbook of Social Network Technologies and Applications", Springer, First edition, 2011.
2. Guandong Xu , Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", Springer, First edition, 2012.
3. Ajith Abraham, Aboul Ella Hassanien, Václav Snášel, "Computational Social Network Analysis: Trends, Tools and Research Advances", Springer, 2012.

Reference Books

1. Peter Mika, "Social Networks and the Semantic Web", Springer, First edition, 2007.
2. Charu C. Aggarwal, "Social Network Data Analytics", Springer; 2014.
3. Dion Goh and Schubert Foo, "Social information retrieval systems: Emerging technologies and applications for searching the Web effectively", IGI Global snippet, 2008.
4. Max Chevalier, Christine Julien and Chantal Soul-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved User Modelling", IGI Global snippet, 2009.
5. Giles, Mark Smith, John Yen, "Advances in Social Network Mining and Analysis", Springer, 2010.

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1. https://www.sagepub.com/sites/default/files/upm-binaries/35208_Chapter1.pdf
2. <http://www.analytictech.com/networks/whatis.htm>
3. <https://www.slideshare.net/gcheliotis/social-network-analysis-3273045>

COs/POs/PSOs Mapping

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2	2	2	3	-	-	1	-	-	-
3	2	1	1	-	2	-	-	-	-
4	2	3	-	2	1	3	-	-	2
5	1	1	2	2	-	2	-	-	2

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

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P20CSE210

DATA COMPRESSION

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To build a fundamental understanding of data compression methods for text, images, and video, and related issues in the storage, access, and use of large data sets.
- To select, giving reasons that are sensitive to the specific application and particular circumstance, most appropriate compression techniques for text, audio, image and video information.
- To illustrate the concept of various algorithms for compressing text, audio, image and video information.
- To infer the concepts of source coding and applications.
- To relate different compression techniques.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Program, analyze Huffman coding: Loss less image compression, Text compression, Audio Compression. **(K4)**

CO2 - Illustrate and analyze various Image compression and dictionary based techniques like static Dictionary, Diagram Coding, and Adaptive Dictionary. **(K5)**

CO3 - Explain the statistical basis and performance metrics for lossless compression. **(K4)**

CO4 - Define the conceptual basis for commonly used lossless compression techniques, and understand how to use and evaluate several readily available implementations of those techniques. **(K4)**

CO5 - Develop the structural basis for and performance metrics for commonly used lossy compression techniques and conceptual basis for commonly used lossy compression techniques. **(K5)**

UNIT I COMPRESSION TECHNIQUES

(9 Hrs)

Compression - Definition – Lossless compression - Lossy compression - Modeling and coding – Compression measure - Shannon's source coding and channel coding theorems – Types of redundancy - Transform coding – Predictive coding – Simple applications.

UNIT II TEXT COMPRESSION

(9 Hrs)

Text Compression - Information theory concepts – Entropy - Shannon- Fano coding – Huffman coding – Arithmetic coding – Dictionary based coding – LZ77 – LZ78 – LZW – BWT – Context based coding.

UNIT III AUDIO COMPRESSION

(9 Hrs)

Audio Compression - Basics of digital audio – Audio file formats (WAV, MIDI) - ADPCM in speech coding – Vocoders – LPC – CELP – MELP – Scalar quantization – Vector quantization – Linde-Buzo-Gray algorithm - DPCM – MPEG audio compression.

UNIT IV IMAGE COMPRESSION

(9 Hrs)

Image Compression - Basics of digital image – Image file formats (BMP, GIF, TIFF) – Color models in images - Discrete Fourier Transform – Discrete Cosine Transform – Discrete Wavelet Transform – Sub band coding - EZW – SPIHT – EBCOT - Image compression standards: JBIG, JPEG and JPEG 2000

UNIT V VIDEO COMPRESSION

(9 Hrs)

Video Compression - Basics of digital video – Video file formats (AVI, YUV) – Color models in video – Motion estimation and compensation - Video compression standards: MPEG-1, MPEG-2, MPEG-4, H.261, H.263 and H.264/AVC.

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Text Books

1. David Salomon, "Data Compression: The Complete Reference", Springer International Edition, Third Edition, 2005.
2. K. R. Rao and J. J. Hwang, "Techniques and standards for image, Video and Audio coding", Prentice Hall Inc., 1996.
3. Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia", Pearson Education, 2004.

Reference Books

1. Khalid Sayood, "Introduction to Data Compression", Harcourt India Private Ltd., Second edition, 2000.
2. Mark Nelson and Jean-Loup Gailly, "The Data Compression Book", M&T Books, Second Edition, 1996.
3. David Salomon, Giovanni Motta, D. Bryant, "Handbook of Data Compression", Springer, 2010.
4. Colt McAnlis, Aleks Haecky, "Understanding Compression Data Compression for Modern Developers", O'Reilly Media, 2016.
5. David Salomon, "A Guide to Data Compression Methods", Springer, 2002.

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3. <https://www.keycdn.com>
4. <https://www.mistralsolutions.com/articles/video-compression-standards-pros-cons/>
5. <https://blog.video.ibm.com/streaming-video-tips/>

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2	1	1	1	2	1	2	1	-	3
3	2	3	1	2	1	2	1	2	-
4	1	3	1	1	-	1	-	2	1
5	2	3	1	2	-	-	-	-	1

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

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M.Tech. Computer Science and Engineering

P20CSE211	BUSINESS INTELLIGENCE AND REPORTING	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- Understand the essentials of Business Intelligence and the corresponding terminologies
- understand the reporting aspects behind Business Intelligence
- Be familiar with the steps involved in the efficiency
- Decide on appropriate technique.
- Apply business Engineering methods to various Marketing strategies

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Understanding the need for BI in most competitive markets. **(K2)**
- CO2** - Explain the data analysis and knowledge delivery stages. **(K3)**
- CO3** - Evaluate efficiency techniques used to protect system and user data. **(K4)**
- CO4** - Understanding of tasks accomplished by different accounting. **(K4)**
- CO5** - Develop a practical understanding of the current Marketing Management. **(K5)**

UNIT I BUSINESS INTELLIGENCE (9 Hrs)

Effective and timely decisions – Data - Information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT II KNOWLEDGE DELIVERY (9 Hrs)

The business intelligence user types - Standard reports - Interactive Analysis and Ad Hoc Querying - Parameterized Reports and Self-Service Reporting - dimensional analysis - Alerts/Notifications - Visualization: Charts – Graphs - Widgets - Scorecards and Dashboards - Geographic Visualization - Integrated Analytics - Considerations: Optimizing the Presentation for the Right Message.

UNIT III EFFICIENCY (9 Hrs)

Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices - cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis - outlier analysis

UNIT IV COST ACCOUNTING AND CONTROL (9 Hrs)

Introduction - Terms in Cost Accounting – Product and Service Costing – Activity based Costing - Survey of ABC use in Companies – Practical Tips – Applications of ABC in industry – ABC in Health care and Government – Target Costing

UNIT V MARKETING MANAGEMENT (9 Hrs)

Fundamentals of Marketing – Sales versus Marketing – Marketing Process – Product and Service Marketing – Key Elements in Marketing – Market Forecast – Market Segmentation – Market Mix - Customer Feedback

Text Books

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", Pearson Education, Ninth Edition, 2013.
2. C.M Chang, "Business Fundamental for Engineering Managers", Momentum Press, 2014.
3. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.

Reference Books

1. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
2. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager's Guide", Second Edition, 2012.
3. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.

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5. K.P. Soman, Shyam Diwakar and V. Aja, "Insight into Data Mining Theory and Practice", Prentice Hall of India, Eastern Economy Edition, 2006.

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2. http://ebooks.lpude.in/computer_application/mca/term_6/DCAP606_BUSINESS_INTELLIGENCE.pdf
3. <https://mopinion.com/business-intelligence-bi-tools-overview/>
4. <https://ppcexpo.com/Content/lecture02.pdf>
5. <http://www.tgp cet.com/CSE-QP/7SEM/Big-Data-Unit-4-5-6.pdf>

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2	3	3	2	2	1	2	3	2	2
3	2	2	1	2	3	1	2	1	1
4	1	1	3	2	2	3	2	2	3
5	3	2	3	2	3	3	2	3	2

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

N. 10/25

P20CSE212	ETHICAL HACKING AND DIGITAL FORENSICS	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To learn various hacking techniques and attacks.
- To understand the benefits of strategic planning process.
- To evaluate where information networks are most vulnerable.
- To perform penetration tests into secure networks for evaluation purposes.
- To enable students to understand issues associated with the nature of forensics.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Solve hacking attacks and protect data assets. **(K3)**

CO2 - Illustrate a computer against a variety of different types of security attacks using a number of hands-on techniques. **(K3)**

CO3 - Construct a LAN against a variety of different types of security attacks using a number of hands-on techniques. **(K3)**

CO4 - Apply and use safe techniques on the World Wide Web. **(K4)**

CO5 - Plan computer Digital forensics. **(K4)**

UNIT I ETHICAL HACKING

(9 Hrs)

Hacking windows – Network hacking – Web hacking – Password hacking - A study on various attacks – Input validation attacks – SQL injection attacks – Buffer overflow attacks - Privacy attacks.

UNIT II INFORMATION SECURITY

(9 Hrs)

TCP / IP – Checksums – IP Spoofing port scanning - DNS Spoofing. Dos attacks – SYN attacks - Smurf attacks - UDP flooding - DDOS – Models. Firewalls – Packet filter firewalls - Packet Inspection firewalls – Application Proxy Firewalls - Batch File Programming.

UNIT III THREATS

(9 Hrs)

Fundamentals of Computer Fraud – Threat concepts – Framework for predicting inside attacks – Managing the threat – Strategic Planning Process.

UNIT IV WEB SECURITY

(9 Hrs)

Architecture strategies for computer fraud prevention – Protection of Web sites – Intrusion detection system – NIDS - HIDS – Penetrating testing process – Web Services– Reducing transaction risks.

UNIT V DIGITAL FORENSICS

(9 Hrs)

Forensics – Computer Forensics – Journaling and its requirements – Standardized logging criteria – Journal risk and control matrix – Neural networks – Misuse detection and Novelty detection.

Text Books

1. Ankit Fadia, "Ethical Hacking", Macmillan India Ltd, Second edition, 2000.
2. Michael T. Simpson, "Hands-on Ethical Hacking & Network Defense", Course Technology, 2010.
3. Marjie T. Britz, "Computer Forensics and Cyber Crime: An Introduction", Prentice Hall, Third Edition, 2013.

Reference Books

1. Kenneth C. Brancik, "Insider Computer Fraud", Auerbach Publications Taylor & Francis Group, 2008.
2. Kimberly Graves, "Certified Ethical Hacker", Wiley India Pvt Ltd, 2010.
3. Ramachandran V, "BackTrack 5 Wireless Penetration Testing Beginner's Guide", Packt Publishing, Third Edition, 2011.
4. Thomas Mathew, "Ethical Hacking", OSB publishers, 2003.
5. Rajat Khare, "Network Security and Ethical Hacking", Luniver Press, 2006.

N. P. S.

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1. <https://blog.eccouncil.org/an-introduction-to-computer-forensics-and-how-to-become-a-computer-hacking-forensic-investigator/>
2. <https://www.udemy.com/course/ethical-hacking-cyber-security-course/>
3. <https://lecturenotes.in/download/material/40413-note-of-ethical-hacking-and-digital-forensics-by-sejal-sarma>

COs/POs/PSOs Mapping

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

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

N.APS

P20CSE213	TRUSTED INTERNET	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To understand the Internet's underlying architecture.
- To analyze Security Issues and Real Threats that Impact Security.
- To understand network security controls.
- To acquire knowledge in e-commerce transactions.
- To understand security development life cycle.

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Understand Internet security and its policies. (K2)
- CO2** - Interpret E-Commerce security. (K3)
- CO3** - Identify Secure Internet programming. (K2)
- CO4** - Understand the Web Server and Web Browser policies. (K3)
- CO5** - Identify Trusted Internet Security services. (K3)

UNIT I INTRODUCTION (9 Hrs)

Introduction: Understanding the Internet's underlying architecture-connecting to the internet-Internet Service Providers (ISP) - TCP/IP Suite and Internet Stack Protocols-Web Client Server Architecture-Internet Security Evolution.

UNIT II INTERNET SECURITY (9 Hrs)

Internet Security: Security Issues - Real Threats that Impact Security-Securing the Web Client - Protecting Your Web Browser - Enhancing Web server security - Controlling Access - Extended Web Site Security Functionality - Securing Web Communications with SSL - VPNS.

UNIT III TRUSTED SYSTEMS AND SECURITY POLICIES (9 Hrs)

Trusted Systems and Security Policies: Trusted System Design-Trusted OS- Secure System Models. Security in Networks: Network Security Controls- IDS-Firewalls-Secure E-Mail. Internet Security Policies: Web Server and Web Browser policies.

UNIT IV E-COMMERCE SECURITY (9 Hrs)

Commerce Security: SET for E-Commerce Transactions - Business requirements for SET-SET System Participants- Dual Signature - Authentication and Message Integrity - Payment Processing.

UNIT V SECURE INTERNET PROGRAMMING (9 Hrs)

Secure Internet Programming - Security development life cycle - Internet Security Standards and Internet Security Products-Trusted Internet Security services.

Text Books

1. Charles Pfleeger and Shari Lawrence Pfleeger, "Security in Computing", Pearson Education Pvt Ltd, Fourth Edition, 2006.
2. Man Young Rhee, "Internet Security Cryptographic Principles, Algorithms and Protocols", John Wiley & Sons Ltd, 2003.
3. John R. Vacca, "Practical Internet Security", Springer, 2007.



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Reference Books

1. Preston Gralla and Michael Troller, "How the Internet Works", Que Publishers, Eighth Edition, 2006.
2. Matt Bishop, "Introduction to Computer Security", Addison-Wesley, 2004.
3. Michael Whitman, Herbert J. Mattord, "Management of Information Security", Course Technology, Third Edition, 2010.
4. William Stallings, "Cryptography and Network Security : Principles and Practices", Prentice Hall, Fifth Edition, 2010.
5. Michael Howard, David LeBlanc, John Viega, "24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them", Mc Graw Hill Osborne Media, First Edition, 2009.

Web References

1. MIT OpenCourseWare MIT 6.858 Computer Systems Security, Fall 2014 View the complete course: <http://ocw.mit.edu/6-858F14> Instructor: Nikolai Zeldovich
2. Cryptography and Network Security by Prof. D. Mukhopadhyay, Department of Computer Science and Engineering, IIT Kharagpur. <http://nptel.iitm.ac.in>
3. https://www.pcisecuritystandards.org/security_standards/pci_dss.shtml.
4. <http://cwe.mitre.org/top25/index.html>.

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)						Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	2	2	2	2	2	1	2	2	2
2	2	2	3	2	2	1	2	2	2
3	2	2	2	0	2	1	2	2	2
4	2	2	2	2	2	0	2	2	2
5	2	2	2	2	2	1	2	2	2

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

N. P. P.

P20CSE214	SOFT COMPUTING	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To learn the basics of an evolutionary computing paradigm.
- To understand the evolutionary algorithms in genetic algorithm using machine learning.
- To understand the fundamental concepts of neural networks.
- To learn the fuzzy set operations involved in various systems.
- To understand the knowledge representation using adaptive fuzzy inference systems and clustering algorithms.

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Outline the evolutions of computing. (K2)
- CO2** - Develop machine learning software for solving practical problems. (K3)
- CO3** - Utilize the fundamental concepts of neural networks to solve complexities. (K3)
- CO4** - Demonstrate the fuzzy set operations. (K4)
- CO5** - Make use of adaptive fuzzy inference systems for clustering algorithms. (K4)

UNIT I EVOLUTION OF COMPUTING (9 Hrs)

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics .

UNIT II GENETIC ALGORITHM (9 Hrs)

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT III MACHINE LEARNING USING NEURAL NETWORK (9 Hrs)

Machine Learning Using Neural Network - Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT IV FUZZY SETS (9 Hrs)

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT V FUZZY INFERENCE SYSTEMS (9 Hrs)

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-Fuzzy Control – Case studies.

Text Books

1. J.S. R. JANG,C.T. SUN, E. MIZUTANI "Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence" Pearson Edition, 1997.
2. S.N. Sivanandam , S. N. Deepa, "Introduction to Genetic Algorithms" Springer Publications, 2008.
3. Klir, George J.,Folger, Tina A "Fuzzy Sets, Uncertainty and Information", Prentice hall publication, 2009.

Reference Books

1. Collelo, Lament, Veldhnizer , "Evolutionary Algorithm for Solving Multi-objective Optimization Problems", Spring, Second Edition, 2010.
2. Melanic Mitchell, "An Introduction to Genetic Algorithm", MITPress, 2000
3. K. A. De Jong, "Evolutionary Computing: A Unified Approach", Prentice Hall Inc, USA, 2009.
4. D. K. Pratihari, "Soft Computing: Fundamentals and Applications", Narosa, Second Edition, 2013
5. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", Wiley, 2015.

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2. https://link.springer.com/chapter/10.1007/3-540-27335-2_1
3. https://notendur.hi.is/benedikt/Courses/ch01_2005.pdf
4. https://link.springer.com/chapter/10.1007/978-94-011-4405-6_2

COs/POs/PSOs Mapping

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1	2	3	3	3	3	3	1	2	2
2	2	3	3	3	3	3	2	2	2
3	2	3	3	3	3	3	1	2	2
4	2	3	3	3	3	3	1	1	2
5	2	3	3	3	3	3	1	2	2

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

N. P. S.

P20CSE215

**SEMANTIC WEB AND KNOWLEDGE
MANAGEMENT**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To understand Semantic web and Knowledge Management
- To learn the structure and syntactic forms of the Ontology languages
- To explore the different phases of Ontology based knowledge management
- To analyze the Resource Description Framework.
- To apply the Ontology based knowledge management in different case studies

Course Outcomes

After completion of the course, the students will be able to

CO1 - Understand the Ontology Languages for the Semantic Web, Ontology based Knowledge Management and Resource Description Framework. **(K2)**

CO2 - Make use of Ontology languages for the semantic web design and different syntactic forms. **(K3)**

CO3 - Extract Knowledge from Different phases and requirements of Ontology based knowledge management. **(K4)**

CO4 - Design Resource Description Framework. **(K5)**

CO5 - Gain practical knowledge about Ontology based Knowledge Management. **(K3)**

UNIT I INTRODUCTION

(9 Hrs)

Semantic web and Knowledge Management -roles of ontologies- Architecture for semantic web-based Knowledge Management- Tools for semantic web-based Knowledge Management

UNIT II ONTOLOGY LANGUAGES FOR THE SEMANTIC WEB

(9 Hrs)

Introduction- OIL and DAML+OIL Semantic web pyramid of languages- Design rationale for OIL- OIL language constructs- Different syntactic forms- language layering- semantics- From OIL to DAML+OIL

UNIT III ONTOLOGY BASED KNOWLEDGE MANAGEMENT

(9 Hrs)

Introduction- Feasibility Study- Kick off phase-Refinement phase- Evaluation phase- Maintenance and Evolution phase- Related Work Ontology Management- Storing, Aligning and Maintaining ontologies: The Requirement for Ontology Management- Aligning Ontologies- Supporting ontology change- organizing ontologies

UNIT IV RESOURCE DESCRIPTION FRAMEWORK

(9 Hrs)

Definition of RDF- distinction between RDF model and syntax- RDF features- RDF and XML- non-contextual modeling data modeling using RDF schema- Need for an RDFS query language Ontologies for semantic web: introduction- reading the web- information extraction knowledge generation from natural language documents. Jena Toolkit – Need for RDFS query language – SPARQL query language.

UNIT V CASE STUDIES

(9 Hrs)

Ontology based knowledge management- case studies for specific domain: Skill Management - Semantic web tools: Experimental Set-up in a Virtual Organization.

Text Books

1. John Davies, Dieter Fensel, Frank van Harmelaon, "Towards The Semantic Web Ontology-driven Management", John Wiley and Sons, Ltd., Second Edition, 2008.
2. Carrol, J. and McBride, B., "The Jena Semantic Web Toolkit", Public API, HPLabs, Bristol, 2001.
3. Alexander Maedche, "Ontology Learning for the Semantic Web", Springer; First edition, 2002.

Reference Books

1. John Davies, Paul Warren John, "Semantic Web Technologies: Trends and Research In Ontology-Based Systems", John Wiley and Sons, Ltd., 2008.



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2. Michael C. Daconta, Leo J. Obrst, and Kevin T. Smith, "The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management", Wiley Publishing, Fourth Edition, 2003.
3. Steffen Staab (Editor), Rudi Studer, "Handbook on Ontologies (International Handbooks on Information Systems)", Springer, First edition, 2004.
4. Dieter Fensel (Editor), Wolfgang Wahlster, Henry Lieberman, James Hendler, "Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential", The MIT Press, 2002.
5. Grigoris Antoniou, Frank van Harmelen, "A Semantic Web Primer (Cooperative Information Systems)", The MIT Press, 2004.

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2. <https://www.w3.org/2001/sw/wiki/Books>
3. https://link.springer.com/chapter/10.1007/1-4020-5263-4_16
4. <http://www.dcs.bbk.ac.uk/~michael/sw/sw.html>
5. <http://www.hpl.hp.com/semweb/jena-top.html>

COs/POs/PSOs Mapping

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2	3	2	3	3	3	3	3	3	3
3	3	3	3	3	3	2	3	2	2
4	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3

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

N. N. S.

ANNEXURE - II

**Department of Computer Science and Engineering****Details of Examiners for Question Paper Setter and Evaluators**

Sl.No	Name of the Examiner	Specialization	Designation, Department and Institution in which currently working	Contact number and mail id
1	Dr. K. RAJA	Computer Graphics, Computer Networks, Multimedia	Assistant Professor / IT, Annamalai University, Chidambaram	9894304053, rajak_cdm@yahoo.co.in
2	Dr.B.MURUGANANTHAM	Artificial Intelligence, Service Oriented Architecture, Webservices	Associate .Professor / CSE SRM Institute of Science and Technology, Chennai.	9940023373, muruganb@srmist.edu.in
3	Dr. V.TAMIZHAZHAGAN	Wireless Networks	Assistant Professor / IT, Annamalai University, Chidambaram	8925122220 rvtamizh@gmail.com
4	Dr. D. JAGANATHAN	Artificial Intelligence, Computer Networks	Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D institute of Science and Tecnology, Chennai	9994524148 djagannathan@veltech.edu.in
5	Mr. V. PRABHU	DBMS, Data Structures	Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D institute of Science and Tecnology, Chennai	9597739629 vprabhu@veltech.edu.in
6	Dr. LAKSHMI DHEVI	Internet of Things, Compute Organization, Computer Graphics	Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D institute of Science and Tecnology, Chennai	9551145796 blakshmidhevi@veltech.edu.in

Handwritten signature

7	Dr. MANJUNATHAN	Database Management Systems, Operating Systems	Assistant Professor / CSE, Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai	9791060024 nmanjunathan@veltech.edu.in
8	Dr. A. RAMACHANDRAN	Digital Design, Computer Design, Web Technology	Assistant Professor and Head (i/c), Department of Computer Science and Engineering, University College of Engineering, Panruti.	9790900771 ramautpc@gmail.com , ram@ucep.edu.in
9	Dr. C. NAVANEETHAN	Java, Python, Artificial Intelligence, Data Structures	Associate Professor / CSE Department of Software and Systems Engineering, School of Information Technology & Engineering, VIT, Vellore - 632014	9962327007 navaneethan.c@vit.ac.in
10	Dr. G. GUNASEKARAN.	Artificial Intelligence, AR & VR, Compiler Design	Associate Professor / CSE Department of Smart Computing, School of Information Technology & Engineering, VIT, Vellore - 632014	9443049982 ggunasekaran@vit.ac.in
11	Dr. AMRITHA SARAVANAN	Data Structures, Operating Systems	Associate Professor / CSE Department of CSE, University college of Engineering, Villupuram	9791555778 aasaravanan777@gmail.com
12	Dr. BALAJI. N	Computer Networks, Cloud Computing	Professor and Head, Department of CSE, Sri Venkateswara College of Engineering and Technology, Puducherry.	9944199803 nbalajime1983@gmail.com

N. Venkatesh