
OP JINDAL UNIVERSITY

Raigarh-Chhattisgarh



Scheme and Syllabus
Of
B. Tech. (01UG020)
Department of
Computer Science and Engineering
School of Engineering
Batch 2021-2025

SCHOOL OF ENGINEERING
Department of Computer Science & Engineering



Scheme for B. Tech (CSE) Programme

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Computer Science and Engineering
L: Lecture, T: Tutorial, P: Practical, C: Credit

Scheme of Teaching and Examination
B. Tech (Computer Science and Engineering) Prog. Code- 01UG020

Academic Semester V

Board of Study	Subject Code	SUBJECT	Periods per week			Scheme of Examination and Marks				Credit L+(T+P) /2
			L	T	P	PRE**		ESE*	Total Marks	(L+T+P)
						Mid Sem	TA			
CSE	SOE-B-CSE-21-501	Microrprocessor & Microcontroller	3	0	0	30	20	50	100	3
CSE	SOE-B-CSE-21-502	Computer Networks	3	0	0	30	20	50	100	3
CSE	SOE-B-CSE-21-503	Data Mining and Warehousing	3	0	0	30	20	50	100	3
CSE	SOE-B-CSE-21-504	Cloud Computing	3	0	0	30	20	50	100	3
CSE	SOE-B-CSE-21-505(X)	Professional Elective-I	3	0	0	30	20	50	100	3
CSE	SOE-B-CSE-21-506	Microrprocessor & Microcontroller Lab	0	0	2	0	30	20	50	1
CSE	SOE-B-CSE-21-507	Computer Network lab	0	0	4	0	30	20	50	2
CSE	SOE-B-CSE-21-508	Data Mining and Warehousing Lab	0	0	2	0	30	20	50	1
CSE	SOE-B-CSE-21-509(X)	Professional Elective Lab-I	0	0	2	0	30	20	50	1
CSE	SOE-B-CSE-21-510	Professional Development - V	0	0	2	0	30	20	50	1
CSE	SOE-B-CSE-21-511	Open Elective (MOOCS/SWAYAM/Certification/Liberal Arts)	-	-	-	-	30	20	50	2
Total			15	0	12	150	280	370	800	23

Professional Elective - I

Sr. No.	Subject Code	Board of Study	Subject
1	SOE-B-CSE-21-505(1)	CSE	Computer Graphics
2	SOE-B-CSE-21-505(2)	CSE	Cryptography and Information Security
3	SOE-B-CSE-21-505(3)	CSE	Optimization using Machine Learning
4	SOE-B-CSE-21-505(4)	CSE	Introduction to IoT
5	SOE-B-CSE-21-505(5)	CSE	Mobile Application Development

Professional Elective Lab - I

Sr. No.	Subject Code	Board of Study	Subject
1	SOE-B-CSE-21-509(1)	CSE	Computer Graphics Lab
2	SOE-B-CSE-21-509(2)	CSE	Cryptography and Information Security Lab
3	SOE-B-CSE-21-509(3)	CSE	Optimization using Machine Learning Lab
4	SOE-B-CSE-21-509(4)	CSE	Introduction to IoT Lab
5	SOE-B-CSE-21-509(5)	CSE	Mobile Application Development Lab

Detailed Syllabus

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme:	B.Tech.	Semester:	V
Name of the Course:	Microprocessor and Microcontrollers	Course Code:	SOE-B-CSE-21-501
Credits:	3	No of Hours :	3 Hrs. / week
Max Marks:	100		

Course Description:

The purpose of this course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a microprocessor/controller implementation. Advanced microcontrollers are often much more powerful, comparable to the very advanced microprocessors. The AVR and ARM processors are of this category.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Understand fundamental operating concepts behind microprocessors and microcontrollers.
CO2	Appreciate the advantages in using RISC microprocessors / microcontrollers in engineering applications
CO3	Design microprocessor based solutions to problems.
CO4	Understand Low-Level and Embedded C Programming.
CO5	Apply this knowledge to more advanced structures.

Course Content

Unit I.

Brief introduction to 8085 CPU Architecture, Pin configuration and description of various signals, Addressing Modes Registers, Memory Addressing Instructions Set Instruction formats. Instruction set of 8085. Addressing modes — Instruction set and assembler directives — Assembly language programming — Modular Programming — Linking and Relocation — Stacks — Procedures — Macros — Interrupts and interrupt service routines — Byte and String Manipulation.

Unit II.

THE 8086 ARCHITECTURE: Pin diagram of 8086 and description of various signals. Architecture block diagram of 8086 & description of sub-blocks such as EU & BIU & of

various registers; Description of address computations & memory segmentation; Program relocation; addressing modes; Instruction formats. Instruction set of 8086.

Unit III.

Microcontrollers: Type, processor architecture memory type, hardware features, 8051 Processor architecture, Addressing modes, 8051 Instruction Set– Data movement Instruction, arithmetic instruction, Logic instruction, Branch group Instruction

Unit IV.

8051 software and programming: Memory interfacing and address decoding, programming Input/Output port/timer/ADC/DAC, Serial data communication controller and interrupt controller for different application with respect to instrumentation & control. ARM Processor Fundamentals.

Unit V.

Programming 8051 Timers — Serial Port Programming — Interrupts Programming — LCD & Keyboard Interfacing — ADC, DAC & Sensor Interfacing — External Memory Interface- Stepper Motor and Waveform generation — Comparison of Microprocessor, Microcontroller, PIC and ARM processors

Text Books:

- Ramesh S.Gaonkar, Microprocessor Architecture, Programming, and Applications with 8085, Prentice Hall
- Brey, The Intel Microprocessors 8086- Pentium processor, PHI
- A.K.Ray and K.M.Bhurchandi, “Advanced Microprocessors and Peripherals”, Tata McGrawHill, 2000.
- Badri Ram, Advanced Microprocessors and Interfacing, TMH
- Triekel & Singh, The 8088 & 8086 Microprocessors- Programming, Interfacing, Hardware & Applications: PHI.
- D.B.Hall, Microprocessor and Interfacing, McGrawHill
- Andrew N. Sloss, Dominic Symes, Chris Wright and John Rayfield, “ARM System Developer’s Guide, Designing and Optimizing System Software”, Elsevier, 2004.

Reference books:

- Yu-Chang Liu & Glenn, A Gibson, Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design, PHI.
- Microsoft MASM Reference Manual– Published by Microsoft Corporation (Softcopy of Document available with MASM Software)
- Assembler Inside & Out; Harley Hahn Pub. Osborn McGrawHill, Burklely USA.

CO-PO & PSO Correlation

Course Name: Microprocessor and Microcontrollers												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	3	3	2	2	2	2	1	1	3	3	2	2
CO2:	3	3	3	3	2	2	2	2	3	3	3	3
CO3:	3	3	2	2	2	2	1	1	3	3	2	2
CO4:	3	3	2	2	2	2	1	1	3	3	2	2
CO5:	3	3	3	3	2	2	2	2	3	3	3	3

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	:	B.Tech.	Semester	:	V
Name of the Course	:	Computer Networks	Course Code:	:	SOE-B-CSE-21-502
Credits	:	3	No of Hours :	:	3 Hrs. / week
Max Marks	:	100			

Course Description:

This course offers lectures, tutorials, case studies, laboratory, and online interaction to provide a foundation in software engineering concepts. It includes representing information with the traditional and modern approaches in software engineering including knowledge of CASE tools. This course further explains concepts of software development process, agile, scrum and DevOps development process, software project management, software requirement and design engineering, development, quality assurance, automated testing, operational support and software maintenance.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Develop fundamental communication systems with customize requirement(s).
CO2	Design computer network as per the specifications given.
CO3	Acquire analytical ability to identify the problems area in the hardware planning of computer network with possible trouble shooting technique.
CO4	Diagnose the possible Bugs in the software application and to provide the possible trouble shoot.
CO5	Understand the basic concept to Project planning, Network planning, design, selection of hardware components and its configuration.

Syllabus:

Unit - I Network Fundamentals and Reference Models:

Protocol Hierarchies, Design Issues for the Layers, Connection-Oriented and Connectionless Services, Service Primitives, The Relationship of Services to Protocols. Reference Models: The OSI Reference Model. The TCP/IP Reference Model. A Comparison of the OSI and TCP/IP Reference Model.

Unit - II The Physical Layer and Flow Control:

Guided Transmission Media: Magnetic Media, Twisted Pair, Coaxial Cable, and Fiber Optics. Data Link Layer Design Issues: Service Provided to the Network Layer, Framing,

Error detection and corrections, Elementary Data Link Protocols: Stop-and-Wait Protocol, Sliding Window Protocol, Go Back N etc.

Unit - III Medium Access Control Sub-layer:

The Channel Allocation Problem: Static and Dynamic Channel Allocation in LANs and MANs. Multiple Access Protocols: ALOHA, Carrier Sense Multiple Access Protocols (CSMA), Collision-Free Protocols. Ethernet Cabling and Manchester Encoding. Data Link Layer Switching: Basic Concepts of networking devices, Virtual LAN.

Unit - IV Network Layer: Network Layer Design Issues:

Store-and-Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless & Connection-Oriented Service, Comparison of Virtual-Circuit and Datagram, Subnets. Routing Algorithms and Congestion Control algorithm, IP Addressing .

Unit - V Transport and Application Layer:

Services Provided to the Upper Layers, Transport Service Primitives, Berkeley Sockets. Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery. The Internet Transport Protocols: TCP Service Model, TCP Segment Header, Application layer protocols.

Text Books:

- “Computer Networks” by Andrew S Tananbaum 4th Edition by Pearson Publication.
- “Computer Networking with Internet Protocols and Technology” by William Stallings Pearson’s.
- “Data Communications and Computer Networks” 2nd Edition by Prakash C Gupta PHI.

Reference Books:

- “Internetworking with TCP/IP, Principles Protocols and Architecture” 5th Edition Vol1 by Duglas E Comer by PHI.
- “TCP/IP Protocol Suit” 4th Edition by Behrouz a Forouzen Tata McGraw Hills.
- “Computer Network - a Systems Approach” by Larry L Peters and Bruce S Davie 5th Edition by Morgan Kaufmabb Elsevier.
- “Data Networks” 2nd Edition by Dimitri Betsekas Robert Gallager by PHI.

CO-PO & PSO Correlation

Course Name: Computer Networks												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2	1				3						
CO2:	2	1				1			2	2		1
CO3:	1		1			2	2	2	1	2		
CO4:	1	2	1				3	3	1	1		2
CO5:	1	1				1				2	1	

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	:	B.Tech.	Semester	:	V
Name of the Course	:	Datamining & Warehousing	Course Code:	SOE-B-CSE-21-503	
Credits	:	3	No of Hours	:	3 Hrs. / week
Max Marks	:	100			

Course Description:

This course provides the student with in depth knowledge of Data Warehousing principles, Data Warehouse techniques, and Business Intelligence systems. The course introduces the topics of Data Warehouse design, Extract-Transform-Load (ETL), Data Cubes, and Data Marts. Students will create Business Intelligence using Data Warehouses with several OLAP and analytical tools.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Understand the functionality of the various data mining and data warehousing component
CO2	Appreciate the strengths and limitations of various data mining and data warehousing models
CO3	Explain the analyzing techniques of various data
CO4	Describe different methodologies used in data mining and data warehousing.

Syllabus:

Unit-I: Introduction

Data Warehousing – Introduction, Overview and Concepts: Need for data warehousing, Basic elements of data warehousing, Architecture and Infrastructure, Data Design and Data Representation, OLAP in data warehouse – ROLAP, MOLAP, HOLAP, Various Data Warehouse Schemas.

Unit-II: Introduction to Data Mining

Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing- Data Cleaning, Missing Data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation , Data Transformation; Measures of similarity and dissimilarity-Basics.

Unit-III: Association Rules:

Problem Definition, Frequent Item Set Generation, Support and Confidence Measures, Association Rule Generation, APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms etc.

Unit-IV: Classification:

General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision trees, Methods for expressing attribute test conditions, Measures for Selecting the Best split, Naïve-Bayes Classifier, Bayesian Belief Networks; K-nearest neighbor Classification-Algorithm and characteristics.

Unit-V: Clustering Techniques

Overview, features of cluster analysis, Types of Cluster Analysis Methods, Partitioned Methods, Hierarchical Methods, Density Based Methods.

Text Books:

- J. Han & M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Ed, 2006.
- Data Mining Techniques – Arun K Pujari, University Press.

Reference Books

- W. H. Inmon, "Building the Data Warehouse", 3rd edition.
- Anahory and Murray, Data warehousing in the real world , Pearson Education/Addison Wesley.
- Margaret Dunham, Data Mining: Introductory and Advanced Topics, Published by Prentice Hall.

CO-PO & PSO Correlation

Course Name: Datamining & Warehousing												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	1	2	1			1			1	2		
CO2:	1	2				1			1	2		
CO3:	1	2	1			1			1	2		
CO4:	1		2			1			1	2		

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	: B.Tech.	Semester	: V
Name of the Course	: Cloud Computing	Course Code:	SOE-B-CSE-21-504
Credits	: 3	No of Hours	: 3 Hrs. / week
Max Marks	: 100		

Course Description:

This course is aims to understand the basics of cloud computing and its working. The concept of virtualization in cloud computing will be explained, and the types of virtualization and hypervisor will be covered. In all, the difference services and deployment models will be covered, and the trust over cloud computing and security challenges will be discussed.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Understand the basic concept of the cloud computing
CO2	Understand the concept of virtualization, hypervisor and implementation of virtual machines
CO3	Gain the knowledge of the Cloud Delivery Models like IaaS, PaaS and SaaS with reference to Services.
CO4	Understanding of Cloud Computing Reference Architecture with reference to relationships between various functional units and Security issues

Syllabus:

Unit-I: Introduction:

Cloud Computing, Layers and Types of Clouds, Cloud Infrastructure Management, Challenges and Applications. Cloud Services: Introduction to Cloud Services IaaS, PaaS and SaaS. Cloud Architecture: Public, Private, Hybrid, and Community Cloud.

Unit-II: Virtualization:

Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Type of Hypervisor, Understanding Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Provisioning in the Cloud Context, Virtualization of CPU, Memory, I/O Devices, Virtual Clusters and Resource management.

Unit-III: Cloud Services:

Software as a Service (SaaS): Evolution of SaaS, Challenges of SaaS Paradigm, SaaS Integration Services, SaaS Integration of Products and Platforms. Infrastructure as a Services (IaaS): Introduction, Background & Related Work. Virtual Machines Provisioning and Manageability. Platform as a service (PaaS): Integration of Private and Public Cloud, Technologies and Tools for Cloud Computing, Resource Provisioning services.

Unit-IV: Cloud Deployment Models:

Private Cloud: Illustration of Private Cloud, Advantages of Private Cloud, Limitations of Private Cloud, Service Management, Journey into Private Cloud, Planning and Strategy. Standardization, Virtualization, Automation, Cloud, Case study – VMware.

Public Cloud: Illustration of Public Cloud, Why Public Cloud, Advantages of Public Cloud, Limitations of Public Cloud, Low degree of security and control, Lack of control on infrastructure, configuration, Network latency and accessibility concerns, Highest long term cost, Public v/s Private.

Hybrid Cloud: Why Hybrid Cloud, Illustration of Hybrid Cloud, Advantages of Hybrid Cloud, Challenges of Hybrid Cloud, Develop and manage hybrid workloads, developing applications for hybrid cloud, develop applications using PaaS, Managing hybrid workloads.

Unit-V: Cloud Security:

Architectural Considerations, General Issues, Trusted Cloud Computing, Secure Execution environments and Communications, Micro architectures, Identity Management and Access Control, Autonomic Security.

Text Books:

- Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010
- John W. itinghouse james F.Ransome, “Cloud Computing Implementation, Management and Security”, CRC Press.

Reference Books:

- Cloud Computing (Principles and Paradigms), Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc. 2011
- Cloud Security: A Comprehensive Guide to secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley

CO-PO & PSO Correlation

Course Name: Cloud Computing												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	1								3			
CO2:		3	1		1						3	1
CO3:		3			1					1	2	
CO4:	1	3			1					1	2	

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	: B.Tech.	Semester	: V
Name of the Course	: Computer Graphics	Course Code:	SOE-B-CSE-21-505(1)
Credits	: 3	No of Hours :	3 Hrs. / Week
Max Marks	: 100		

Course Description:

The objectives of this course are to equip students with the fundamental knowledge and basic technical competence in the field of computer graphics, emphasize on implementation aspect of Computer Graphics Algorithms and advance areas like Image Processing. Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Define basics of Computer Graphics, display devices along with output primitives
CO2	Design and implement model and viewing transformations
CO3	Use the underlying algorithms, mathematical concepts, supporting computer graphics
CO4	Use and select among current models for surfaces (e.g., geometric; polygonal; hierarchical; mesh; curves, splines).
CO5	Discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications

Syllabus:

Unit 1: Introduction and Overview of Graphics System

Introduction of Coordinate representation and Pixel Graphics output devices: CRT, Raster Scan & Random Scan systems; Color CRT monitors, DVST, flat-panel displays, video controller and raster scan display processor. Graphics Input Devices: Keyboard, Mouse, Track-ball, space ball, Joysticks, data Glove, Light Pen, Digitizer, Image scanners, touch panels, voice systems; Graphics software

Unit 02: Output Primitives

Point, line, circle and Bresenham algorithm for line drawing, midpoint algorithm for ellipse generating algorithm, Aliasing, Antialiasing techniques like Pre and post filtering, super sampling and pixel phasing. Filled Area Primitive: Scan line Polygon Fill algorithm, inside outside tests, Boundary Fill and Flood fill algorithm.

Unit 03: Two Dimensional Geometric Transformations, Viewing and Clipping

Basic transformations: Translation, Scaling, Rotation Matrix representation and Homogeneous Coordinate Composite transformation. Other transformations: Reflection and Shear Raster method for transformation.

Viewing transformation pipeline and Window to Viewport coordinate transformation, Clipping operations – Point clipping, Line clipping algorithms: Cohen – Sutherland, Liang – Barsky, Polygon Clipping Algorithms: Sutherland – Hodgeman, Weiler – Atherton, Text Clipping.

Unit 04: Three Dimensional Object Representations, Geometric Transformations and 3D Viewing

Boundary Representation and Space partitioning representation: Polygon Surfaces, Bezier Curve, Bezier Surface, B-Spline Curve, Sweep Representation, Constructive Solid Geometry, Octree, Fractal-Geometry. 3D Transformations: Translation, Rotation, Scaling and Reflection. Composite transformations, Transformation Function, Modeling and coordinate transformation pipeline, Projections – Parallel, Perspective, 3D clipping.

Unit 5: Visible Surface Detection

Classification of Visible Surface Detection algorithm, Back Surface detection method, Depth Buffer method, Depth Sorting method, Scan line method, Area Subdivision method

Text Books:

- “Computer Graphics C version”, Hearn D. & Baker M. P. 2nd Ed. Pearson.
- “Computer Graphics Principles and Practice in C”, Foley J. D., Dam A. V., Feiner S. K. & Hughes J. F. 2nd Ed. Pearson.
- “Computer Graphics”, Maurya R. K. Wiley India Publication.
- “Computer Graphics”, Bhattacharya S. Oxford Publication.

Reference Books:

- “Procedural Elements for Computer Graphics”, Rogers D.. Tata McGraw-Hill Publications.
- “Computer Graphics”, Xiang Z. & Plastock R. Schaum’s Outlines. McGraw-Hill Education.

- “Computer Graphics using OpenGL”, Hill F. S., 3rd Ed. Pearson Publications.

CO-PO & PSO Correlation

Course Name: Computer Graphics												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2											
CO2:	2			2								
CO3:	2	2	2									
CO4:	2	2	2									
CO5:	2	2	2		2							

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	: B.Tech.	Semester	: V
Name of the Course	: Cryptography and Information Security	Course Code:	SOE-B-CSE-21-505(2)
Credits	: 3	No of Hours :	3 Hrs. / Week
Max Marks	: 100		

Course Description:

The course covers fundamental aspects of security in a modern networked environment with the focus on system design aspects and cryptography in the specific context of network / internetwork security. It also dwells into basics of cryptographic techniques, algorithms and protocols required to achieve these properties; computational issues in implementing cryptographic protocols and algorithms; and system/application design issues in building secure networked systems.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Classify the symmetric encryption techniques and Illustrate various Public key cryptographic techniques
CO2	Understand security protocols for protecting data on networks and be able to digitally sign emails and files.
CO3	Understand vulnerability assessments and the weakness of using passwords for authentication
CO4	Be able to perform simple vulnerability assessments and password audits
CO5	Summarize the intrusion detection and its solutions to overcome the attacks

Syllabus:

Unit-I:

Introduction to security attacks, services and mechanism, Classical encryption techniques, substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers. Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion, fiestal structure, Data encryption standard (DES), Strength of DES, block cipher modes of operations, Triple DES

Unit-II:

Introduction to group, field, finite field of the form $GF(p)$, modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm, Advanced Encryption Standard (AES) encryption and decryption, Fermat's and Euler's theorem, Primarily testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA.

Unit-III:

Message Authentication Codes: Authentication requirements, authentication functions, message authentication code, Hash functions, birthday attacks, security of hash functions, Secure hash algorithm (SHA), Digital Signatures: Digital Signatures, RSA Digital Signature, Elgamal Digital Signature, Digital signature standards (DSS).

Unit-IV:

Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, X.509 Certificates, Public key Infrastructure. Authentication Applications: Kerberos. Electronic mail security: pretty good privacy (PGP), S/MIME.

Unit-V:

IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Introduction to Secure Socket Layer, Secure electronic, transaction (SET) System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, firewalls.

Text Books:

- William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education.
- Behrouz A. Frouzan: Cryptography and Network Security, McGraw Hill .
- C K Shyamala, N Harini, Dr. T.R.Padmnabhan Cryptography and Security ,Wiley
- Bruce Schiener, "Applied Cryptography". John Wiley & Sons
- Bernard Menezes," Network Security and Cryptography", Cengage Learning.
- Atul Kahate, "Cryptography and Network Security", McGraw Hill

Reference Books:

- C K Shyamala, N Harini, Dr T R Padmanabhan, "Cryptography and Network Security", 1st Edition, Wiley India
- Forouzan Mukhopadhyay, "Cryptography and Network Security", 3rd Edition, Mc Graw Hill
- Mark Stamp, "Information Security, Principles, and Practice", Wiley India.
- WM. Arthur Conklin, Greg White, "Principles of Computer Security", TMH.

- Neal Krawetz, “Introduction to Network Security”, CENGAGE Learning.
- Bernard Menezes, “Network Security and Cryptography”, CENGAGE Learning.

CO-PO & PSO Correlation

Course Name: Cryptography and Information Security												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	3	2	1						2			
CO2:	2	2								1		
CO3:						2			1			
CO4:	2	2										
CO5:	2	2							1			

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	:	B.Tech.	Semester	:	V
Name of the Course	:	Optimization using Machine Learning	Course Code:	:	SOE-B-CSE-21-505(3)
Credits	:	3	No of Hours	:	3 Hrs. / Week
Max Marks	:	100			

Course Description:

It is a subject that teaches students how to apply optimization techniques to solve engineering problems. The course covers both theoretical concepts and practical applications of optimization techniques in various engineering domains.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Acquire knowledge about optimization methods to model real-life problems
CO2	Apply the knowledge of optimization techniques to solve engineering optimization problems.
CO3	Understand the notion of multi variable optimization algorithms
CO4	Design and develop a solution to complex engineering problem with the help of suitable optimization technique.
CO5	Apply multi-objective optimization algorithms to various engineering problems

Syllabus:

Unit-I: Introduction

Optimal Problem Formulation: Design Variables, Constraints, Formulation of objective function, Variable Bounds, Incorporating constraints in objective function, Engineering Optimization Problems, Classification of Optimization algorithms.

Unit-II: Single Variable Optimization Algorithm

Bracketing methods, Region elimination methods; Interval halving method, Fibonacci search method, Point-estimation method; Successive quadratic estimation method. Gradient-based methods: Newton-Raphson method, Bisection method, Secant method

Unit-III: Multi Variable Optimization Algorithm

Optimality criteria, Unidirectional search, Direct search methods: Evolutionary optimization method, Simplex search method, Hooke-Jeeves pattern search method

Unit-IV: Non-Traditional and Evolutionary Optimization Algorithms

Differential Evolution, Particle Swarm Optimization, Ant Colony Optimization, Crow Search Algorithm, Teaching Learning Based Optimization. Application of evolutionary optimization algorithms in Computer Science

Unit-V: Multi-Objective Optimization

Formulation of optimization problem with multiple objectives, Pareto Optimality, NSGA (Nondominated-sorted genetic algorithm).

Text Books:

- Kalyanmoy Deb, Optimization for Engineering Design, Algorithms and Examples, Prentice Hall, 1995.
- Kalyanmoy Deb, Multiobjective Optimization Using Evolutionary Algorithms, Wiley.

Reference Books:

- S S Rao, Engineering Optimization- Theory and Practice, New Age International, 1996.

CO-PO & PSO Correlation

Course Name: Optimization using Machine Learning												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	1	1	2								1	1
CO2:	2	1	2						1	1	1	1
CO3:	1	2	2							2	2	1
CO4:	2	3	3						1		2	1
CO5:	2	3	2								2	1

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	:	B.Tech.	Semester	:	V
Name of the Course	:	Introduction to IoT	Course Code:	SOE-B-CSE-21-	505(4)
Credits	:	3	No of Hours :	3 Hrs. / Week	
Max Marks	:	100			

Course Description:

In this course, introduce evolution of internet technology and need for IoT. Discuss on IoT reference layer and various protocols and software. Train the students to build IoT systems using sensors, single board computers and open source IoT platforms. Make the students to apply IoT data for business solution in various domain in secured manner.

Course Outcomes:

At the end of this course, the student will be able:

CO Number	Course Outcome
CO1	Identify the IoT networking components with respect to OSI layer.
CO2	Build schematic for IoT solutions.
CO3	Design and develop IoT based sensor systems.
CO4	Select IoT protocols and software.
CO5	Evaluate the wireless technologies for IoT.
CO6	Appreciate the need for IoT Trust and variants of IoT..

Syllabus:

Unit-I

Evolution of IoT, Review of computer communication concepts (OSI layers, components, packet communication, Networks, TCP-IP, subnetting, IPV4 addressing and challenges). IPV6 addressing. IoT architecture reference layer.

Unit-II

Introduction to IoT components, Characteristics IoT sensor nodes, Edge computer, cloud and peripheral cloud, single board computers, open source hardware's, Examples of IoT infrastructure

Unit-III

IoT protocols and software's, MQTT, UDP, MQTT brokers, publish subscribe modes, HTTP, COAP, XMPP and gateway protocols, IoT point to point communication technologies, IoT Communication Pattern, IoT protocol Architecture, Selection of

Wireless technologies (6LoWPAN, Zigbee, WIFI, BT, BLE,SIG,NFC, LORA, Lifi, Widi),
Introduction to Cloud computation and Big data analytics.

Unit-IV

IoT security, Need for encryption, standard encryption protocol, light weight cryptography, Quadruple Trust Model for IoT-A – Threat Analysis and model for IoT-A, Cloud security

Unit-V

IoT application and its Variants, Case studies: IoT for smart cities, health care, agriculture, smart meters.M2M, Web of things, Cellular IoT, Industrial IoT, Industry 4.0, IoT standards.

Text Books:

- Alessandro Bassi, Martin Bauer, Martin Fiedler, Thorsten Kramp, Rob van Kranenburg, Sebastian Lange, Stefan Meissner, “Enabling things to talk – Designing IoT solutions with the IoT Architecture Reference Model”, Springer Open, 2016
- Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, “From Machine to Machine to Internet of Things”, Elsevier Publications, 2014.
- "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press).
- "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti (Universities Press).

Reference Books

- LuYan, Yan Zhang, Laurence T. Yang, Huansheng Ning, The Internet of Things: From RFID to the Next-Generation Pervasive Network, Aurbach publications, March,2008.
- Vijay Madisetti , Arshdeep Bahga, Adrian McEwen (Author), Hakim Cassimally “Internet of Things A Hands-on-Approach” Arshdeep Bahga & Vijay Madisetti, 2014.
- Asoke K Talukder and Roopa R Yavagal, “Mobile Computing,” Tata McGraw Hill, 2010.
- Barrie Sosinsky, “Cloud Computing Bible”, Wiley-India, 2010
- RonaldL. Krutz, Russell Dean Vines,Cloud Security: A Comprehensive Guide to Secure Cloud Computing,Wiley-India, 2010

CO-PO & PSO Correlation

Course Name: Introduction to IoT												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2			1	3		2		2			
CO2:		1				2		3		1		
CO3:			3	2							3	2
CO4:							1			1		
CO5:				3		1		2	2			

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	: B.Tech.	Semester	: V
Name of the Course	: Mobile Application Development	Course Code:	SOE-B-CSE-21-505(5)
Credits	: 3	No of Hours :	3 Hr. / Week
Max Marks	: 100		

Course Description:

Mobile Application development is becoming need of the day as webpage development was about ten years ago. Most companies are developing their mobile applications so that customers may interact with them on mobiles itself. Android is most popular mobile operating system of today. Android application development course is therefore designed to enable the diploma information technology students to build mobile applications on this platform. This course covers the basics of Android along with required programming codes for developing necessary programming skills for mobile applications. Thus, this course is an important course for IT students with possibilities of self employment.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Interpret feature of mobile operating system.
CO2	Configure android environment and development tools.
CO3	Develop rich user interface using layout and controls.
CO4	Use User Interface component for android application development.
CO5	Create android application using database and publish application.

Syllabus:

Unit-I: Android OS:

Mobile technology: Overview of Android - An Open Platform for Mobile development, Open Handset Alliance, Use Android for mobile app development, Android Marketplaces, Android Development Environment setup, Android development Framework - Android-SDK, Eclipse Emulators / Android AVD., Creating & setting up custom Android emulator, Android Project Framework and its applications

Unit-II: Android Architecture:

Linux Kernel, Libraries, Android Runtime, Application Framework, Applications, Android Startup and Zygote, Android Debug bridge, Android Permission model, Android Manifest File

Unit-III: Android Activities and UI Design:

Design Android UI Layout :Android application components Intent, Activity, Activity Lifecycle, Broadcast receivers, Services and Manifest ,Create Application and new Activities, Expressions and Flow control, Android Manifest Simple UI -Layouts and Layout properties, Fundamental Android UI Design Introducing Layouts, Creating new Layouts, Drawable Resources, Resolution and density independence (px,dp,sp),Use GUI Objects to develop applications, XML Introduction to GUI objects viz.,Push Button, Text / Labels, EditText, ToggleButton WeightSum, Padding,LayOut Weight

Unit-IV: Advanced UI Programming:

Event driven Programming in Android (Text Edit, Button clicked etc.), Creating a splash screen, Android Activity Lifecycle, Introduction to threads in Android, Menu: Custom Vs. System Menus, Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Android Manifest.xml File

Unit-V: Working with Database:

SQLite: Open Helper and create database, Open and close a database

Text Books:

- Professional Android 2 Application Development Reto Meier Wiley India Pvt Ltd
- Beginning Android Mark L Murphy Wiley India Pvt Ltd
- Professional Android Sayed Y Hashimi and Satya Komatineni Wiley India Pvt Lt

Reference Books:

- Android Wireless Application Development by Lauren Darcey and Shane Conder, Pearson Education, 2nd Edition.
- Unlocking Android Developer's Guide by Frank Ableson and Charlie Collins and Robi Sen, Manning Publication Co.
- Android Studio Development Essentials by Neil Smyth
- The Definitive Guide to SQL Lite by Michael Owens

CO-PO & PSO Correlation

Course Name: Mobile Application Development												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	3	2	2	1	3				2	2	1	1
CO2:	3	3	3	2	2				1	1	1	1
CO3:	3	3	3	2	2				2	2	1	1
CO4:	3	3	2	2	2				2	2	1	1
CO5:	3	3	3	2	3				1	1	1	1

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering



Programme	: B.Tech.	Semester	: V
Name of the Course:	Microprocessor & Microcontroller Lab	Course Code:	SOE-B-CSE-21-506
Credits	: 1	No of Hours	: 2 Hrs. / week
Max Marks	: 50		

Course Description:

The purpose of this course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a microprocessor/controller implementation.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Understand fundamental operating concepts behind microprocessors and microcontrollers.
CO2	Appreciate the advantages in using RISC microprocessors / microcontrollers in engineering applications
CO3	Design microprocessor based solutions to problems.
CO4	Understand Low-Level and Embedded C Programming.
CO5	Apply this knowledge to more advanced structures.

The following concepts will be covered in the lab:

- 8085 CPU Architecture, Pin configuration and description of various signals, Addressing Modes Registers,
- Pin diagram of 8086 and description of various signals. Architecture block diagram of 8086
- Instruction set of 8085.
- Instruction set of 8086.
- 8051 Instruction Set- Data movement Instruction, arithmetic instruction, Logic instruction, Branch group Instruction

Text Books:

- Ramesh S.Gaonkar, Microprocessor Architecture, Programming, and Applications with 8085, Prentice Hall
- Brey, The Intel Microprocessors 8086- Pentium processor, PHI
- A.K.Ray and K.M.Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGrawHill, 2000.

- Badri Ram, Advanced Microprocessors and Interfacing, TMH
- Triekel & Singh, The 8088 & 8086 Microprocessors- Programming, Interfacing, Hardware & Applications: PHI.
- D.B.Hall, Microprocessor and Interfacing, McGrawHill
- Andrew N. Sloss, Dominic Symes, Chris Wright and John Rayfield, “ARM System Developer's Guide, Designing and Optimizing System Software”, Elsevier, 2004.

Reference books:

- Yu-Chang Liu & Glenn, A Gibson, Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design, PHI.
- Microsoft MASM Reference Manual– Published by Microsoft Corporation (Softcopy of Document available with MASM Software)
- Assembler Inside & Out; Harley Hahn Pub. Osborn McGrawHill, Burkley USA.

CO-PO & PSO Correlation

Course Name: Microprocessor & Microcontroller Lab												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	3	3	2	2	2	2	1	1	3	3	2	2
CO2:	3	3	3	3	2	2	2	2	3	3	3	3
CO3:	3	3	2	2	2	2	1	1	3	3	2	2
CO4:	3	3	2	2	2	2	1	1	3	3	2	2
CO5:	3	3	3	3	2	2	2	2	3	3	3	3

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

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Programme	: B.Tech.	Semester	: V
Name of the Course:	Computer Network Lab	Course Code:	SOE-B-CSE-21-507
Credits	: 2	No of Hours	: 4 Hrs. / week
Max Marks	: 50		

Course Descriptions:

This lab is designed to Learn basic concepts of computer networking and acquire practical notions of protocols with the emphasis on TCP/IP. A lab provides a practical approach to Ethernet/Internet networking: networks are assembled, and experiments are made to understand the layered architecture and how do some important protocols work.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	The students will be able to develop fundamental communication systems with customize requirement(s).
CO2	The students will be able to design computer network as per the specifications given.
CO3	The students will acquire analytical ability to identify the problems area in the hardware planning of computer network with possible trouble shooting technique.
CO4	The students will be able to diagnose the possible Bugs in the software application and to provide the possible trouble shoot.
CO5	Project planning Network planning, design, selection of hardware components and its configuration.

The following concepts will be covered in the lab:

Part-I Application Development:

- Experiment on ECHO Program as per TCP specifications.
 - Part-I: Develop an echo program with Client and Iterative Server using TCP.
 - Part-II: Develop and echo program with Client and Concurrent Server using TCP.
- Experiment on ECHO Program as per UDP specifications.
- Development of ECHO program with client and concurrent server using UDP.
- Experiment on Chat application Development.
- Develop a chatting program following client – server model
- Systems Information Retrieval Program

- Develop a program to retrieve date as well as time using TCP and UDP.
- Experiment on Stream Socket and Datagram Socket.
 - Part-I: Develop an Echo client and Server program using UNIX domain stream socket.
 - Part-II: Develop an Echo Client and server program using UNIX domain Datagram Socket.
- File Transfer Application:
- Develop a program to implement file transfer using TCP from Client to Server in JAVA.

Part-II: Case Study

The students would take up a study project to understand a real network environment. It is recommended to take up the existing networks around the campus. The identified areas are OPJU computer network or the networks of the organizations/ industries all around the university campus.

Text Books :

- “Internetworking with TCP/IP, Principles Protocols and Architecture” 5th Edition Vol1 by Duglas E Comer by PHI.
- “TCP/IP Protocol Suit” 4th Edition by Behrouz A Forouzen Tata MGrav Hills.
- “Computer Network - a Systems Approach” by Larry L Petersnand Bruce S Davie 5th Edition by Morgan Kaufmabb Elsevier.
- “Data Networks” 2nd Edition by Dimitri Betsekas Robert Gallager by PHI.

CO-PO & PSO Correlation

Course Name: Computer Network Lab												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2	2	2						1		2	
CO2:	2									2		1
CO3:	2	3	2								1	2
CO4:		2										1
CO5:	1	1										

Note: 1.: Low 2.: Moderate 3.: High

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Programme	:	B.Tech.	Semester	:	V
Name of the Course:		Data Mining and Warehousing Lab	Course Code:		SOE-B-CSE-21-508
Credits	:	1	No of Hours	:	2 Hrs. / week
Max Marks	:	50			

Course Descriptions:

This course provides the student with in depth knowledge of Data Warehousing principles, Data Warehouse techniques, and Business Intelligence systems. The course introduces the topics of Data Warehouse design, Extract-Transform-Load (ETL), Data Cubes, and Data Marts. Students will create Business Intelligence using Data Warehouses with several OLAP and analytical tools.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Ability to understand the various kinds of tools.
CO2	Demonstrate the classification, clustering and etc. in large data sets.
CO3	Ability to add mining algorithms as a component to the exiting tools.
CO4	Ability to apply mining techniques for realistic data.

The following Experiments will be covered in the lab:

- Explore WEKA Data Mining/Machine Learning Toolkit.
- Create an Employee Table with the help of Data Mining Tool WEKA.
- Apply Pre-Processing techniques to the training data set of Weather Table.
- Finding Association Rules for Banking data using apriori algorithm.
- Demonstration of classification rule process on dataset weather.arff using j48 algorithm
- Write a procedure for Clustering Customer data using Simple KMeans Algorithm.
- Extract if-then rules from decision tree generated by classifier, Observe the confusion matrix and derive Accuracy, F- measure, TPrate, FPrate, Precision and recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.
- Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbor classification, Interpret the results obtained.
- Explore visualization features of weka to visualize the clusters. Derive interesting insights and explain.

- Load each dataset into Weka and perform k-Nearest Neighbor classification, Interpret the results obtained.

Text Books:

- J. Han & M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Ed, 2006.
- Data Mining Techniques – Arun K Pujari, University Press.

Reference Books

- W. H. Inmon, "Building the Data Warehouse", 3rd edition.
- Anahory and Murray, Data warehousing in the real world , Pearson Education/Addison Wesley.
- Margaret Dunham, Data Mining: Introductory and Advanced Topics, Published by Prentice Hall.

CO-PO & PSO Correlation

Course Name: Data Mining and Warehousing Lab												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:		1									2	
CO2:	1		3		1		1			1		
CO3:				2							1	2
CO4:	2				2				1			

Note: 1.: Low 2.: Moderate 3.: High

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Programme	:	B.Tech.	Semester	:	V
Name of the Course	:	Computer Graphics Lab	Course Code:	SOE-B-CSE-21-509(1)	
Credits	:	1	No of Hours	:	2 Hrs. / Week
Max Marks	:	50			

Course Descriptions:

The objectives of this course are to equip students with the fundamental knowledge and basic technical competence in the field of computer graphics, emphasize on implementation aspect of Computer Graphics Algorithms and advance areas like Image Processing.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Implement basic algorithms related to line & circle drawing.
CO2	Implement various line & circle drawing algorithms.
CO3	Hands on experiments on 2D transformations.
CO4	Conceptual implementation of clipping and other drawing algorithms.
CO5	Describe the importance of viewing and projections.

The following concepts will be covered in the lab:

- Line and Circle Drawing
- 2D Transformation
- 3D Transformation
- Polygon Filling using Scan Fill, Flood Fill and Boundary Fill Algorithm
- Line Clipping and Polygon Clipping Algorithm

Text Books :

- “Computer Graphics C version”, Hearn D. & Baker M. P. 2nd Ed. Pearson.
- “Computer Graphics Principles and Practice in C”, Foley J. D., Dam A. V., Feiner S. K. & Hughes J. F. 2nd Ed. Pearson.
- “Computer Graphics”, Maurya R. K. Wiley India Publication.
- “Computer Graphics”, Bhattacharya S. Oxford Publication.

CO-PO & PSO Correlation

Course Name: Computer Graphics												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2											
CO2:	2			2								
CO3:	2	2	2									
CO4:	2	2	2									
CO5:	2	2	2		2							

Note: 1.: Low 2.: Moderate 3.: High

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Programme	:	B.Tech.	Semester	:	V
Name of the Course	:	Cryptography and Information Security Lab	Course Code:	SOE-B-CSE-21-	509(2)
Credits	:	1	No of Hours :	2 Hrs. / Week	
Max Marks	:	50			

Course Descriptions:

To give practical exposure on basic security attacks, encryption algorithms, authentication techniques and digital signature.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Develop code for classical Encryption Techniques to solve the problems.
CO2	Build cryptosystems by applying symmetric and public key encryption algorithms.
CO3	Construct code for authentication algorithms.
CO4	Develop a signature scheme using Digital signature standard.

The following concepts will be covered in the lab:

- Symmetric key cryptography.
- Asymmetric key cryptography.
- Key exchange protocol.
- Authentication algorithms.
- Digital signature standards.

Text Books :

- William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education.
- Behrouz A. Frouzan: Cryptography and Network Security, McGraw Hill .
- C K Shyamala, N Harini, Dr. T.R.Padmnabhan Cryptography and Security ,Wiley
- Bruce Schiener, "Applied Cryptography". John Wiley & Sons
- Bernard Menezes," Network Security and Cryptography", Cengage Learning.
- Atul Kahate, "Cryptography and Network Security", McGraw Hill

CO-PO & PSO Correlation

Course Name: Cryptography and Information Security Lab												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	3	2	1						2			
CO2:	2	2								1		
CO3:						2			1			
CO4:	2	2										

Note: 1.: Low 2.: Moderate 3.: High

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Programme : **B.Tech** **Semester** : **V**
Name of the Course: **Optimization using Machine Learning Lab** **Course Code:** **SOE-B-CSE-21-509(3)**
Credits : **1** **No of Hours** : **2 Hr. / Week**
Max Marks : **50**

Course Descriptions:

This Lab teaches students how to apply optimization techniques to solve engineering problems. The course covers the theoretical concepts students have studied in the Optimization using ML course.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Apply the single variable optimization algorithms
CO2	Apply the multi variable optimization algorithms
CO3	Apply the non-traditional optimization algorithms
CO4	Apply the multi objective optimization algorithms

The following concepts will be covered in the lab:

- Implementation of single variable optimization algorithms
- Implementation of multi variable optimization algorithms
- Implementation of nature inspired optimization algorithms like PSO, CSA etc.
- Implementation of non-traditional optimization algorithms like DE, TLBO etc.
- Implementation of multi-objective optimization algorithms

Text Books :

- Kalyanmoy Deb, Optimization for Engineering Design, Algorithms and Examples, Prentice Hall, 1995.
- Kalyanmoy Deb, Multiobjective Optimization Using Evolutionary Algorithms, Wiley.

CO-PO & PSO Correlation

Course Name: Optimization using Machine Learning Lab												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	1	1	2								1	1
CO2:	2	1	2						1	1	1	1
CO3:	1	2	2							2	2	1
CO4:	2	3	3						1		2	1

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

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Programme	:	B.Tech.	Semester	:	V
Name of the Course:	Introduction to IoT Lab	Course Code:	SOE-B-CSE-21-509(4)		
Credits	:	1	No of Hours	:	2 Hr. / Week
Max Marks	:	50			

Course Descriptions:

In this course, introduction of evolution of internet technology and need for IoT. Discussion on IoT reference layer and various protocols and software. Train the students to build IoT systems using sensors, single board computers and open source IoT platforms. Make the students to apply IoT data for business solution in various domain in secured manner.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Choose the sensors and actuators for an IoT application
CO2	Select protocols for a specific IoT application
CO3	Utilize the cloud platform and APIs for IoT application
CO4	Experiment with embedded boards for creating IoT prototypes
CO5	Design a solution for a given IoT application

The following concepts will be covered in the lab:

- Experiments will be completed by students on boards like arduino UNO and RaspberryPi. Under this lab they will learn to connect boards, supply data, connection with cloud etc.

Text Books :

- Alessandro Bassi, Martin Bauer, Martin Fiedler, Thorsten Kramp, Rob van Kranenburg, Sebastian Lange, Stefan Meissner, "Enabling things to talk – Designing IoT solutions with the IoT Architecture Reference Model", Springer Open, 2016
- Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, "From Machine to Machine to Internet of Things", Elsevier Publications, 2014.
- "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press).

- "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti (Universities Press).

CO-PO & PSO Correlation

Course Name: Introduction to IoT Lab												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2		3		1		3	2	2			3
CO2:		1	2	3	1	3	2			3		
CO3:	3		1	2						2	1	
CO4:					3		2	1	1			

Note: 1.: Low 2.: Moderate 3.: High

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Programme	: B.Tech.	Semester	: V
Name of the Course:	Mobile Applications Development Lab	Course Code:	SOE-B-CSE-21-509(5)
Credits	: 1	No of Hours	: 2 Hr. / Week
Max Marks	: 50		

Course Descriptions:

The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competency: Develop GUI based mobile applications with Eclipse Android SDK on open-source Android and propriety platforms with database connectivity, The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, and affective domain to demonstrate following course outcomes.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Understand the concept of open-source mobile development
CO2	Describe Android architecture frame work & Design Android UI Layout
CO3	Develop event driven programs.
CO4	Develop applications using menus and dialog boxes
CO5	Develop applications using database.

Suggested list of Exercise / Practical's:

- Installation of Android studio.
- Development Of Hello World Application.
- Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.
- Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout).
- Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity.
- Create sample application with login module. (Check username and password), validate it for login screen.

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- Create an application that will display toast (Message) at some regular interval of time.
- Design an android application Send SMS using Intent.
- Create an android application using Fragment.
- Design an android application Using Radio button.
- Design an android application for menu.
- Create a user registration application that stores the user details in a database table.

Text Books:

- Professional Android 2 Application Development Reto Meier Wiley India Pvt Ltd
- Beginning Android Mark L Murphy Wiley India Pvt Ltd
- Professional Android Sayed Y Hashimi and Satya Komatineni Wiley India Pvt Ltd
- Android Studio Development Essentials by Neil Smyth
- The Definitive Guide to SQL Lite by Michael Owens

CO-PO & PSO Correlation

Course Name: Mobile Applications Development Lab												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	3	2	2	1	3				2	2	1	1
CO2:	3	3	3	2	2				1	1	1	1
CO3:	3	3	3	2	2				2	2	1	1
CO4:	3	3	2	2	2				2	2	1	1
CO5:	3	3	3	2	3				1	1	1	1

Note: 1.: Low 2.: Moderate 3.: High

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Programme	:	B.Tech.	Semester	:	V
Name of the Course:		Managing work & others (MWO)	Course Code:		SOE-B-CSE-21-510
Credits	:	1	No of Hours	:	2 Hr. / Week
Max Marks	:	50			

Course Description:

In this course (Managing work and others-MWO), students will be taught to develop and become team player for creativity and innovation in the organization they work in. Students will be taught methods to develop cordial relation using “Johari Window”, which will help them in managing change in their organizations. Since they would be entering the world of work, special emphasis will also be given to manners, etiquettes, negotiation, stress and conflict management. Finally, students will be rigorously prepared for facing various selection tools like – GD, PI and resume preparation.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Communicating effectively in a variety of public and interpersonal settings
CO2	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of change
CO3	Analysing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships
CO4	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust
CO5	Handling difficult situations with grace, style, and professionalism

Syllabus:

Unit-I:

- Creativity and Innovation- Concept & Theory
- Creativity and Innovation- Activity
- Understanding self and others (Johari window) - Concept & Theory
- Understanding self and others (Johari window) - Activity
- Stress Management

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- Managing Change for competitive success

Unit-II:

- Handling feedback and criticism- Models & Theory
- Handling feedback and criticism- Activity
- Conflict management -Models & Theory
- Conflict management- Case study and Activity

Unit-III:

- Development of cordial interpersonal relations at all levels
- Negotiation
- Importance of working in teams in modern organisations
- Manners, etiquette and net etiquette

Unit-IV:

- Job Seeking Process and Tools
- Occupational Research- Assignment & Presentation
- Group discussion (GD)- Concept
- Group discussion (GD)- Practice
- Personal Interview- Concept
- Frequently asked questions (FAQ's)
- Personal Interview- Practice

Text Books :

- Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behavior (2018), 18th ed., Pearson Education
- Burne, Eric, Games People Play (2010), Penguin UK
- Carnegie, Dale, How to Win Friends and Influence People (2004), RHUK
- Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017), Macmillan
- Steinburg, Scott, Netiquette Essentials (2013), Lulu.com
- <https://www.hloom.com/resumes/creative-templates/>
- <https://www.mbauniverse.com/group-discussion/topic.php>

CO-PO & PSO Correlation

Course Name: Managing work & others (MWO)												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:				3	3	2	1	2		2		2
CO2:	1	2	3		2	1			1	2		3
CO3:	1	1		3	2	3	2	2		2	3	
CO4:				3	3	2	2	1	1	2		2
CO5:	2	2	2	3	2	1			1		1	2

Note: 1.: Low 2.: Moderate 3.: High