Detailed Program

Bachelor of Technology (B.Tech.)

(Computer Science Engineering)

Semester-IV

(2023-27)

DOC20230609006

RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road,
Bikaner, Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System. Accordingly, each academic year is divided into two semesters, **Odd (July-December)** and **Even (January-June)**. Besides this, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for B. Tech (CSE) Program along for **(January- June) Even Semester, 2025** with examination pattern is as follows:

Course Scheme

Semester – IV

S. No.	Course Code	Course Title	L	T	P	Credits
1.	19005300	Optimization Techniques	3	0	0	3
2.	19006100	Advanced Numerical Techniques Computation Lab (ANTC)	0	0	4	2
3.	19015100	Introduction to Machine Learning	3	0	0	3
4.	19006000	Software Engineering	3	0	0	3
5.	19005600	Computer Networks	3	0	0	3
6.	19005700	Computer Networks Lab	0	0	2	1
7.	19015200	Python	3	0	0	3
8.	19015300	Python Lab	0	0	2	1
9.	19005400	Web Technologies	3	0	0	3
10.	19005500	Web Technologies Lab	0	0	2	1
11.	11017100	Organizational Behavior	2	0	0	2
12.	19006200	Ability and Skill Enhancement-IV	2	0	0	2
13.	99003300	Workshops/Seminar/Human Values & Social Service/NCC/NSS	-	-	-	1
Total			**22**	**0**	**10**	**28**

EVALUATION SCHEME- THEORY

The evaluation of the theory paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

Internal Assessment

The distribution of Internal Assessment Marks is as follows:

Type	Details	Marks
Mid Term	Two Mid-term Sessional of 15 marks each (15+15)	30
Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc.	Average of marks obtained	15
Attendance	75%+ : 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME -PRACTICAL

The evaluation of the practical paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	45
Attendance	75%+ : 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of each Semester.

2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of each Semester.

Bachelor of Technology – CSE (Four Years Course)

1. Vision

To deliver a high-quality education that will produce engineers of the highest caliber, equipped with the newest information and cutting-edge concepts in computer science engineering to fulfil the demands of industry and society.

2. Mission

To create an academic setting for the growth of professionals equipped with the knowledge, abilities, values, and self-assurance to assume leadership positions in the field of computer science and engineering.

To promote a culture of research that produces knowledge and cutting-edge technologies that aid in the society's sustainable development.

To improve academic collaborations for international exposure.

3. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To produce students with strong foundation of knowledge and skills in the field of computer science and engineering.

PEO2: To produce students who are employable in private/public sector/research organizations or work as an entrepreneur.

PEO3: To produce students who can provide solutions to problems in their profession by applying computer engineering theory and practices.

PEO4: To produce graduates who can provide leadership and are effective in multidisciplinary environment.

4. PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitation.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

5. PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer-based systems of varying complexity.

PSO2: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies/employability in the field of Computer Science & Engineering.

PSO3: Cultivate the field of computing and its latest trends, to pursue teaching, research & development activities and to work effectively in a team.

6. Course Outcomes

Course Codes & Course Names	After completion of these courses' students should be able to	
19005300-Optimization Techniques	**CO1**	Classify the optimization problems.
	CO2	Solve optimization problems using linear programming and apply for solving engineering optimization problems
	CO3	Simplify optimization problems using nonlinear programming (Lagrange multipliers and Kuhn-Tuker conditions) and apply for solving engineering optimization problems
	CO4	Determine optimization problems using Dynamic programming (CPM, PERT) Methods.
	CO5	Classify error detection and recovery technique.
19006100-Advanced Numerical Techniques Computation Lab (ANTC)	**CO1**	Explain Gauss elimination and Gauss- seidel methods to design linear system.
	CO2	Develop a function using trapezoidal and Simpson's rule.
	CO3	Solve the initial value problem using modified Euler's and Runge-kutta methods.
	CO4	Simplify the Regression analysis using least square principle.
	CO5	Create a solution of the complex problem using Runga-Kutta Method.
19015100-Introduction to Machine Learning	**CO1**	Able to categorize the problems as supervised or unsupervised and to apply regression algorithm for pre-diction problems.
	CO2	Select and apply supervised algorithms like Naïve bayes algorithm, decision tree and analyze the models using different evaluation parameter.
	CO3	To build ML models using KNN, SVM classifiers and to perform feature engineering and selection using PCA and LDA.
	CO4	To Apply different clustering algorithms for the unlabeled data and interpret the results.
	CO5	Understand the fundamental concepts of deep learning.
19006000-Software Engineering	**CO1**	Explain the generic models of software development process.
	CO2	Illustrate the fundamental concepts of requirements engineering and Analysis Modeling.
	CO3	Identify the different design techniques and their implementation.
	CO4	Apply the concepts of life cycle models to choose the appropriate model.
	CO5	Able to develop the SRS document for project.

19005600-Computer Networks	**CO1**	Define various components and categories of data communications, types of connections, topologies, protocols and standards, various transmission media and modems.
	CO2	Explain various switching techniques used and implement the various routing and router protocols,
	CO3	Illustrate multiplexing and demultiplexing, UDP, TCP protocols and Congestion Control mechanisms.
	CO4	Identify and correct the errors using various algorithmic techniques, be aware of the various Ethernet standards and bridges.
	CO5	Choose appropriate protocol for desired communication service
19005700-Computer Networks Lab	**CO1**	Demonstrate the client and server concepts in Network system.
	CO2	Apply Error correction method in data flow.
	CO3	Categorize the different protocols.
	CO4	Design the concept of local area networks, their topologies, protocols.
	CO5	Ability to implement client/server communication
19015200-Python	**CO1**	Understand Python syntax and semantics and be fluent in the use of Python flow control and Functions
	CO2	Develop, run and manipulate Python programs using Core data structures like Lists, Dictionaries, and use of Strings Handling methods.
	CO3	Develop, run and manipulate Python programs using File Operations and searching pattern using regular expressions.
	CO4	Interpret the concepts of object oriented programming using Python
	CO5	Determine the need for scraping websites and working with CSV, JSON and other file formats.
19015300-Python Lab	**CO1**	Develop the application specific codes using python.
	CO2	Understand Strings, Lists, Tuples and Dictionaries in Python.
	CO3	Understand Functions in Python.
	CO4	Evaluate programs using modular approach, MRO,Exception Handling.
	CO5	Construct Digital Systems using Python.
19005400-Web Technologies	**CO1**	Explain the basic concepts of Internet programming, Network Security and protocols used.
	CO2	Build a script using CSS and Java Script.
	CO3	Create webpages using HTML, HTML5, DHTML.

	CO4	Develop applications using Web Programming.
	CO5	Able to contrast server side scripting and Server side programming and develop database connectivity by make use of java and PHP.
19005500-Web Technologies Lab	**CO1**	Illustrate scripts using CSS and Java Script.
	CO2	Build applications using HTML, DHTML.
	CO3	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management.
	CO4	Design web-based application using suitable client side and server side web technologies.
	CO5	Able to develop Web applications by using JSP with Database Connectivity
11017100-Organizational Behavior	**CO1**	How the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.
	CO2	Explain the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
	CO3	Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
	CO4	Analyze the complexities associated with management of the group behavior in the organization.
	CO5	Evaluate the behavior of the people based on the different situations.
19006200-Ability and Skill Enhancement -IV	**CO1**	Design the resume and know about different format.
	CO2	Know and classify the different types of interviews i.e.Mock Interview, HR Expert Mock Interview, Telephonic Interviews.
	CO3	Examine the Company Specific Research and Presentation.
	CO4	Build conversation skill
	CO5	Find out Industry suitable for internship or job.

7. CO PO Mapping

19005300	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2					3	2		3
CO2	3	3	2	3	3	3	3	2	3		2	3
CO3	3	3	3	2	3	3	3	2	3	3	3	3
CO4	2	2	3	2	3	3	3	3	3	3	3	3
CO5	3		2		2	2		2		2	3	

19006100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2		3	3	3	3	3	3	3
CO2	2	2	3	2	3	3	3	3	3	3	3	3
CO3	2	2	2	3	3				3	3	3	3
CO4	3	3	2	2	3				3	3	3	3
CO5	2		2		2	3	3	3		2		2

19015100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	-	1	1	-	-	-	-	-
CO2	3	3	3	-	2	1	1	1	-	-	-	-
CO3	3	3	3	2	2	1	1	1	1	-	1	1
CO4	3	3	3	2	2	1	1	1	1	-	2	1
CO5	2	2	3	2	2	1	1	1	1	-	2	1

19006000	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2		3	3	3	3	3	3	3
CO2	2	2	3	2	3	3	3	3	3	3	3	3
CO3	2	2	2	3	3				3	3	3	3
CO4	3	3	2	2	3				3	3	3	3
CO5	2		3		2	3		3			2	2

19005600	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2			3	3	3	3	2	3
CO2	2	3	2	3	2		3	3	2	3	2	3
CO3	3	2	2	3	2	3			3		3	3
CO4		2	3	2	3	3	3	3	3	2	3	3
CO5	2				3	3	2	2		3		3

19005700	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2		3	3	3	3	3	2	3
CO2	2	3	3	2		2	2	3	3	2		3
CO3	2	2	2	2	3				2	3	3	3
CO4	2	3	3	2	3				3	3	3	3
CO5				3	3	3	2	2			2	

19015200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2			3	3	3	3	2	3
CO2	3	2		3	2		3	3	2	3	3	3
CO3	2	2		2	3	3			3		3	3
CO4		2	3	2	2	2	3	2	3	2	3	3
CO5	2		3		2	3		2		3		

19015300	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2			3	3	3	3	2	3
CO2	2	3	3	3	3		3	3	2		3	
CO3	2	2	2		2	3			3		3	3
CO4		2	3		2	2	3	2	3	2	3	3
CO5	2			3		3				3		2

19005400	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2		3	3	3	3	3	2	3
CO2	3	3	3		3	2	2	3		2	3	
CO3	2		2	2	3				2	3	3	3
CO4	2	2	3	2					3	3		3
CO5					3	2	3	2			2	2

19005500	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		2	3	2	2	2		2	2	3
CO2	3		3	2	2	3	2	3			3	3
CO3	3	2	3	3	3	2	3	2		2	2	3
CO4	3		2			3	2	2			3	3
CO5		3		2	2				3	3		2

11017100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	2	2	2		2	2	
CO2			3		2	3		3	2		3	3
CO3	3	2	3	3	3	2	3		3	2		
CO4			2	2		3	2	2	3	3	3	3
CO5	3	3			2				3		3	3

19006200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		3	2	2		3	3	3		2
CO2	3	3	3	3	3	2		2	2	3	3	2
CO3					3	2			2	3	2	2
CO4	3	3	2	3	2	2				3	3	2
CO5	3	3		3	3		3	3	2		2	2

8. Curriculum

Course Name: Optimization Techniques
Course Code: 19005300

Objectives

- The main objective of the course is to formulate mathematical models and to understand solution methods for real life optimal decision problems. The emphasis will be on basic study of linear programming problem, Integer programming problem, Transportation problem, two-person zero sum games with economic applications and project management techniques using PERT and CPM.

Course Outline

Unit I: Scope of Operations Research
Introduction to linear and non-linear programming formulation of different models; **Linear Programming:** Geometry of linear programming, Graphical method, Linear programming (LP) in standard form, Solution of LP by simplex and revised simplex methods, Exceptional cases in LP, Duality theory, Dual Simple method, Sensitivity analysis.

Unit II: Network Analysis
Transportation problem (with transshipment), Assignment problem, Traveling-salesman problem, shortest route problem, Minimal spanning tree, Maximum flow problem; **Integer Programming:** Branch and bound algorithm, Traveling salesman problem.

Unit III: Dynamic programming
Forward recursions, General problem, Reliability problem, Capital budgeting problem, Cargo-loading problem; **CPM and PERT:** Drawing of networks, Removal of redundancy, Network computations, Free slack, Total slack, Crashing, Resource allocation.

Unit IV: Non-Linear Programming
Characteristics, Concepts of convexity, maxima and minima of functions of n-variables using Lagrange multipliers and Kuhn-Tukerconditions, One dimensional search methods, Fibonacci, golden section method and gradient methods for unconstrained problems. **Software:** Introduction to software for optimization techniques (TORA).

Suggested Readings:

1. Taha, H.A., Operations Research: An Introduction, Prentice Hall of India (2007) 8^{th} ed.
2. Kasana, H.S., Introductory Operation Research: Theory and Applications, Springer Verlag (2005).
3. Rardin, Ronald L., Optimization in Operations research, Pearson Education (2005).
4. Ravindran A, Phllips D.T. and Solberg J.J. Operation Research: Principles and Practice, John Wiley (2007).

Course Name: Advanced Numerical Techniques Computation Lab (ANTC)

Course Code:19006100

Course Outline Laboratory Work

Programming exercises on numerical and Statistical methods using C or C++ languages.

1. To detect the interval(s) which contain(s) root of equation f(x)=0 and implement bisection Method to find root of f(x)=0 in the detected interval.
2. To find the root of f(x)=0 using Newton-Raphson and fixed-point iteration methods.
3. To evaluate the Newton's Forward Lagrange and divided difference interpolating polynomials of degree ≤ n, Based on (n+1) points.
4. To solve linear system of equations using Gauss elimination (without pivoting) method.
5. To solve linear system of equations using Gauss- seidel method.
6. To find the dominant eigen-value and associated eigen-vector by Rayleigh power method.
7. To integrate a function numerically using trapezoidal and Simpson's rule.
8. To solve the initial value problem using modified Euler's and Runge-kutta methods.
9. Generation of random numbers for Binomial and Poisson distributions using Linear Congruential Genrator Algorithm.
10. Regression analysis using least square principle.
11. Correlation analysis for bivariate distribution.

Suggested Readings:

1. Conte, S.D and Carl D. Boor, Elementary Numerical Analysis: An Algorithmic approach, Tata McGraw Hill, New York (2005).
2. Johnson, R., Miller, I. and Freunds, J., Miller and Freund's Probability and Statistics for Engineers, Pearson Education (2005) 7th ed.
3. Gerald C.F and Wheatley P.O., Applied Numerical Analysis, Pearson Education (2008) 7th ed.
4. Mathew, J.H., Numerical Methods for Mathematics, Science and Engineering, Prentice Hall Inc.J (2002).
5. Meyer, P.L. Introductory Probability and Statistical Applications, Oxford (1970) 2nd ed.
6. Jain M.K., Iyengar, S.R.K., and Jain, R.K. Numerical Methods for Scientific and Engineering Computation, New Age International (2008) 5th ed.
7. Walpole, Ronald E., Myers, Raymond H., Myers, Sharon L. and, Keying Ye, Probability and Statistics for Engineers and Scientists, Pearson Education (2007) 8th ed.

Course Name: Introduction to Machine Learning
Course Code: 19015100

Objective:

- To introduce students to the basic concepts and techniques of Machine Learning.
- To develop skills of using recent machine learning software for solving practical problems.
- To gain experience of doing independent study and research.

Course Outline:

Unit 1
Introduction to ML, Goals and applications of machine learning. Aspects of developing a learning system: trainingand testing data. Types of learning: Supervised, Unsupervised, and Reinforcement. Linear regression, variance, bias, gradient descent, R^2, Ridge and Lasso regression.

Unit 2
Logistic regression, decision boundary, classification parameters: Accuracy, precision, recall, F-measure, RoC curve. Bayesian learning: Probability theory and Bayes rule. Naive Bayes learning algorithm. Regression tree – random forest

Unit 3
Perceptron and backpropagation neural network - k-nearest neighbor rule. Support vector machine: multicate- gory generalizations, Kernels for learning non-linear functions. ADA Boost classifier. Feature engineering and feature selection. PCA and LDA

Unit 4
Unsupervised learning. Clustering: Learning from unclassified data. Clustering. Hierarchical Agglomerative Clus-tering. k-means partitional clustering. Expectation maximization (EM) for soft clustering. Semi-supervised learn-ing with EM using labeled and unlabeled data.

Unit 5
Deep learning: Deep Neural network, Activation functions, Cost function, feed forward network, CNN, SequentialModels.

Suggested Readings:

1. Kevin P. Murphey, "Machine Learning, a probabilistic perspective", The MIT Press, 2012.
2. Tom Mitchael, "Machine Learning", McGraw Hill, 1997.
3. Ethem Alpaydin," Introduction to Machine learning", PHI learning, MIT Press, 2010, 2nd edition
4. John D. Killeher, Brian Mac, Namee, AoiFE D'Arcy, Fundamental of Machine Learning for Predictive Data Analytics, 2015 MITpress.
5. Alex Smola and SVN. Viswanathan, "Introduction to Machine Learning", Cambridge University Press,
6. 2008.
7. ShaiShalev-Shwartz and Shai Ben-David, "Understanding Machine Learning: From Theory to Algo-rithms", Cambridge University Press,2014.
8. Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press, 2016.

Course Name: Software Engineering
Course Code: 19006000

Objectives:

- Planning and Estimation of Software projects
- Software Requirements Specification, Software Design Concepts
- Implementation issues ,Validation and Verification Procedures
- Maintenance of Software and methodologies
- To apply principles of software development and evolution. To specify, abstract, verify, validate, plan, develop and manage large software and learn emerging trends in software engineering.

Course Outline:

Unit I: Introduction
Introduction to Software Engineering, importance of Software, The Software Evolution, Software Characteristics, Software Applications, Software Crisis: Problem and Causes
.**Software Development Life Cycle:** Waterfall model, Incremental and Evolutionary process models, Personal Software process (PSP) and Team Software process (TSP), Overview of agile process and aspect oriented programming

Unit II: **Software Requirement Specification**
Problem Analysis, Requirement elicitation and Validation, Requirements modeling, Scenarios, Information and analysis classes, flow and behavioral modeling, documenting Software Requirement Specification (SRS);
System Design: Design Concepts, design models for architecture, component, data and user interfaces; Problem Partitioning, Abstraction, Cohesiveness, Coupling, Top Down and Bottom Up design approaches; Functional Versus Object Oriented Approach, Design Specification, 4GL.

Unit III: Coding
TOP-DOWN and BOTTOM-UP structure programming, Information Hiding, Programming Style, and Internal Documentation, Verification. **Software Testing:** Levels of Testing, Functional Testing, Structural Testing, Test Plan, Test Case Specification, Software Testing Strategies, Verification & Validation, Unit, Integration Testing, Top Down and Bottom Up Integration Testing, Alpha & Beta Testing, White box and black box testing techniques, System Testing and Debugging.
Software Quality Assurance: Software Configuration Management, Overview of Software Quality Control and Quality Assurance, ISO 9000 Certification for Software Industry, SEI Capability Maturity Model (CMM) and Comparison between ISO & SEI CMM.

Unit IV: Technical Metrics for Software
A Framework for Technical Software Metrics, Metrics for the Analysis Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.
CASE (Computer Aided Software Engineering): CASE and its Scope, CASE support in Software Life Cycle, Documentation Support, Architecture of CASE Environment. Exposure to CASE tools like Rational Software suit, Turbo Analyst, SilkSuite.

Suggested Readings:

1. Roger S. Pressman, Software Engineering, A Practitioner's Approach, Mc Graw Hill International Edition (2009) 7th edition.
2. Ian Sommerville, Software Engineering, Addison-Wesley Publishing Company, (2006) 8th ed.
3. Watts Humphery, A discipline for Software Engineering, Addison Wesley, Massachusetts (1995).
4. James F. Peter, Software Engineering - An Engineering Approach, John Wiley (2004).
5. Pankaj Jalote, An integrated Approach to Software Engineering, Narosa (2005).

Course Name: Computer Networks
Course Code: 19005600

Objectives

- To develop an understanding of modern network architectures from a design and performance perspective.
- To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
- To provide an opportunity to do network programming
- To provide a WLAN measurement idea.
- The subject will introduce the basics of computer networks to students through a study of layered models of computer networks and applications

Course Outline:

Unit I: Introduction
Motivation, OSI model, Signals and media, Bits over signals, Synchronous communication, Modulation and modems, Bandwidth, Throughput, and noise, Time division and Frequency division multiplexing, Standards.

Unit II: **Packet Transmission**
Multiplexing, Frames, Error correction techniques, LAN/WAN topologies, Shared media and media access, Bus topology, CSMA/CD, Wireless and CSMA/CA, Ethernet addressing and Wiring, hubs.

Unit III: Other LAN technologies
Ring topology, Token passing rings, FDDI, Star topologies, Asynchronous transfer mode, IEEE 802.3, 802.5.
Routing Algorithms: Distance-Vector, Link-State, Shortest path computation, Dijkstra's algorithm, WAN technologies including frame relay, X.25, and ATM.

Unit IV: Internet working
Motivation, Concept, Goals, IP addressing, Address binding with ARP, IP Datagram, Encapsulation IP fragmentation and reassembly, ICMP, TCP, UDP concept and datagrams, **Network Services:** Electronic mail, File transfer, Remote login-introduction to protocol specification, Validation and testing.

Course Name: Computer Networks Lab

Course Code: 19005700

Course Outline

1. Study of different Network cables and practically implement the cross-wired cable and straight through wire using clamping tool.
2. Study Network tools and basic devices
3. Study of Network IP addressing
4. To study about different physical equipment's used for networking.
5. To study different internetworking devices in a computer network
6. Aim: To study the working of Basic Networking Commands
7. To assign IP address to the PC connected to the internet
8. To connect the computers in Local Area Network

Course Name: Python

Course Code: 19015200

Unit-I: Introduction, Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program. Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit().

Unit-II-Functions: def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling. 08 L1, L2, L3 Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods.

Unit-III- Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things. Manipulating Strings - Working with Strings, Useful String Methods.

Unit-IV- Pattern Matching with Regular Expressions: Finding Patterns of Text without Regular Expressions, Finding Patterns of Text with Regular Expressions, More Pattern Matching with Regular Expressions, Greedy and Nongreedy Matching, The findall () Method, Character Classes, Making Your Own Character Classes, The Caret and Dollar Sign Characters, Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint. pformat() Function. Organizing Files: The shutil Module, walking a Directory Tree, Compressing Files with the zip file Module.

Unit-V- Web Scraping: Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML.

Suggested Readings

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN: 978-9352134755.
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd. ISBN-13: 978-8126556014.
3. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365.

Course Name: Python Lab
Course Code: 19015300

Laboratory work

- To install and run the Python interpreter
- To learn control structures.
- To Understand Lists, Dictionaries in python
- To Handle Strings and Files in Python

i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.

ii) Start the Python interpreter and type help () to start the online help utility.

2. Start a Python interpreter and use it as a Calculator.
3. i) Write a program to calculate compound interest when principal, rate and number of periods are given.

ii) Given coordinates (x1, y1), (x2, y2) find the distance between two points

4. Read name, address, email and phone number of a person through keyboard and print the details.

Suggested Readings

1. Python for Data Science, Dr. Mohd. Abdul Hameed, Wiley Publications - 1st Ed. 2021.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson

Course Name: Web Technologies

Course Code:19005400

Objectives:

- Basic web concept and Internet protocols.
- CGI Concepts & CGI Programming
- SCRIPTING LANGUAGES
- Study of DHTML, XML
- Study of On-Line web application & Internet Concepts

Course Outline:

Unit I: Basics of Internet
Concepts, Architecture: Internet, Intranet and Extranet, Design Goals, Issues and related aspects, addressing schemes, protocols, applications - e-mail, ftp, telnet, WWW, IRC.

Unit II: Intranet Connectivity
Connection concepts, FDDI, ISDN, ADSL, PPP and ATM, Web servers and browser's, web server, proxy server, web browser.

Unit III: Network Security
Network Security attacks and vulnerabilities of Network system, Data Security Encryption, key protocols, Document signatures, firewalls;
Client Side Scripting: Introduction to Javascript and DHTML. Unit IV: Web Programming
Introduction to Web Pages, HTML, HTTP, SHTTP and XML, Front Page Forms and Form Handlers, Site design and Navigation, Java Programming - class design, inheritance, overloading, polymorphism, exception handling, file streams and their manipulation, servlets, JSP, JDBC,.NET technologies.

Course Name: Web Technologies Lab
Course Code: 19005500

Course Outline Laboratory Work:

- Exploring various web browsers and web servers ,
- Designing web pages in HTML and XML.
- Using Front Page express.
- Programming for web in Java and JSP.

Suggested Readings:

1. Raj Kamal, Internet and Web Technologies , TMH,200
2. Bayross, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications, 2000.
3. C Xavier , World Wide Web Design, TMH, 2001
4. Monica D'Souza , Web publishing TMH, 2001
5. Heith Morneau , Active Server Pages, Vikas Publishing House,2000
6. Ravi Kalkota, Frontiers of electronic commerce, Addison Wesley, 2000

Course Name: Organizational Behavior
Course Code: 11017100

Objectives

- Subject OB prepares students about basic psychology of job. It makes pupil understand about various behavioral aspects when working in an organization at any level.
- To understand the implications of individual and group behaviour in organizational Context. The

students will conceptualize the components of individual and group behaviour, understand the practicability of communication and understand the various work, situations and apply behavioural techniques

Course Outline:

Unit I: Introduction to Organizational Behaviour
Today's Organizations, Challenges, Foundations of Organizational Behaviour, Individual Behaviour: Perception, Values, Attitudes Motivation theories. Employees Motivations in Organization, Management by Objectives Learning Processes, Reward and Punishment;

Unit II: Foundations of Group Behaviour
Interpersonal Communication, Leadership, Emotional Intelligence. Power & Polities, Conflict Process, Negotiations, Stress and Coping, Inter-Group Relations, Team Working.

Unit III: A Macro Perspective of Organizational Behaviour
Organization Structure – Key Elements, Types and Basic Models, Work Design, Organizational Change, and Learning Organizations;

Unit IV: Organizational Behaviour
Future Challenges Gender Diversity at the place of work, changing world Scenario, Role of External Environment.

Achieving Competitive: Advantage Management of change, International issues in Organizational Behaviour;

Suggested Readings

1. Robbins, S.P., Organizational Behaviour, PHI (2007) 8th ed.
2. Lufthans F., Organizational Behaviour, Irwin Mc-Graw Hill. (2007) 11th ed.
3. Hellriegal, D., and Slocum, J.W., Organizational Behaviour, Southwestern Educational Publishing (2008).

Course Name: Ability & Skill Enhancement – IV
Course Code: 19006200

Objectives:

- The objectives of the module are to make students self-confident individuals by developing leadership and organizing skills; to guide students in making appropriate and responsible decisions; to give each student a realistic perspective of work related skills and to help students prepare effective interview questions to conduct effective interviews.

Course Outline - Final Assessment – Mock Interviews & PI Kit Submission

Unit I: Tele – Etiquettes
Receiving Calls, Placing a call, Ending Calls, Transferring calls, Taking Message/ Voice Mails, Placing call on hold, Handling Complaints.

Unit II: Confidence Building & Brain Storming
How to build confidence by positive thinking, identifying negative thoughts, how to control negative thoughts entering our mind, identifying personal talents, and its ways to improve, how to develop good habits and having principles and follow them at all times.
Need to learn new things, ideas and skills, what is brain storming, why do we need it, what are the different ways of brain storming through logics and reasoning, Brain Storming Session.

Unit III: PI Kit
What is resume, Format of Resume, Formatting, Resume Preparation, Covering Letter, PI Kit.

Unit IV: Interview Skills
Mastering the art of giving interviews in - selection or placement interviews, web /video conferencing, Mock Interview, HR Expert Mock Interview, Telephonic Interviews;

Unit V: Internship Preparation: Company Specific Research and Presentation Identifying domain specific industries, researching the industry, Industry analysis, Presentation on specific industry/company.

9. Lesson Plans

19005300– Optimization Techniques

Unit	Particulars	Class No.	Pedagogy of Class
Unit- I	Scope of Operations Research		
Unit- I	Introduction to linear and non-linear programming formulation of different models	C-1	Lecture
Unit- I	Linear Programming: Geometry of linear programming, Graphical method	C-2	Lecture
Unit- I	Linear programming (LP) in standard form, Solution of LP by simplex and revised simplex methods	C-3	Lecture
Unit- I	Exceptional cases in LP, Duality theory	C-4	Lecture
Unit- I	Dual Simple method, Sensitivity analysis	C-5	Lecture
	Activity	C-6	Activity
	Take Home Assignments		Home Assignments
	Clarification Class	C-7	Clarification Class
Unit-II	Network Analysis		
Unit-II	Transportation problem (with transshipment)	C-8	Lecture
Unit-II	Assignment problem	C-9	Lecture
Unit-II	Traveling-salesman problem	C-10	Lecture
Unit-II	Shortest route problem	C-11	Lecture
Unit-II	Minimal spanning tree, Maximum flow problem	C-12	Lecture
Unit-II	Integer Programming: Branch and bound algorithm	C-13	Lecture
Unit-II	Webinar	C-14	Webinar
	Quiz	C-15	Quiz
	Class Room Assignment	C-16	Class Assignment
	Presentation	C-17	Presentation
	Take Home Assignments		Home Assignments
	Seminar	C-18	Seminar
	Clarification Class	C-19	Clarification Class
	Guest Lecture	C-20	Guest lecture
Unit-III	Dynamic programming		
Unit-III	Forward recursions	C-21	Lecture
Unit-III	General problem, Reliability problem	C-22	Lecture
Unit-III	Capital budgeting problem	C-23	Lecture
Unit-III	Cargo-loading problem	C-24	Lecture
Unit-III	CPM and PERT: Drawing of networks	C-25	Lecture
Unit-III	CPM and PERT: Removal of redundancy	C-26	Lecture
Unit-III	CPM and PERT: Network computations	C-27	Lecture

Unit-III	CPM and PERT: Free slack	C-28	Lecture
Unit-III	CPM and PERT: Total slack	C-29	Lecture
Unit-III	CPM and PERT: Resource allocation	C-30	Lecture
	Webinar	C-31	Webinar
	Presentation	C-32	Presentation
	Clarification Class	C-33	Clarification Class
	Class Room Assignment	C-34	Class Assignment
	Take Home Assignments		Home Assignments
Unit-IV	Non-Linear Programming		
Unit-IV	Characteristics, Concepts of convexity	C-35	Lecture
Unit-IV	Maxima and minima of functions of n-variables using Lagrange multipliers	C-36	Lecture
Unit-IV	Maxima and minima of functions of n-variables using Kuhn-Tucker conditions	C-37	Lecture
Unit-IV	One dimensional search methods	C-38	Lecture
Unit-IV	Fibonacci Method	C-39	Lecture
Unit-IV	Class Room Assignment	C-40	Class Assignment
Unit-IV	Guest Lecture	C-41	Guest lecture
Unit-IV	Golden section method	C-42	Lecture
Unit-IV	Gradient methods for unconstrained problems	C-43	Lecture
Unit-IV	Software: Introduction to software for optimization techniques (TORA).	C-44	Lecture
	Clarification Class	C-45	Clarification Class

19006100– Advanced Numerical Techniques Computation Lab (ANTC)

S. No.	Particulars	Class No.	Pedagogy of Class
1	To detect the interval (s) which contain(s) root of equation f(x)=0 and implement bisection Method to find root of f(x)=0 in the detected interval.	P-1	Lecture
2	Mathematical Programming based on Bisection Method	P-2,3	Practical
3	Mathematical problems solved through Bisection Method: solutions of questions	P-4	Clarification Class
4	Mathematical problems solved through Bisection Method: solutions of questions	P-5	Clarification Class
5	Activity	P-6	Activity
6	Activity	P-7	Activity
7	To find the root of f(x)=0 using Newton-Raphson and fixed-point iteration methods.	P-8	Lecture
8	Programming on Newton Raphson Method	P-9	Practical
9	Programming on Newton Forward interpolation method	P-10,11	Practical
10	Problems based on Newton forward interpolation	P-12	Clarification Class
11	Finding the root of polynomial using Regula falsi method	P-13	Lecture
12	Programming on Regula Falsi Method	P-14,15	Practical
13	Solution of Simultaneous linear equations using Gauss Elimination Method	P-16	Lecture
14	Programming on Gauss Elimination Method	P-17	Practical
15	Solution of Simultaneous linear equations using Gauss Seidal Method	P-18	Lecture
16	Solution of Simultaneous linear equations using Gauss Seidal Method	P-19	Lecture
17	Programming on Gauss Seidal Method	P-20,21	Practical
18	Numerical Solution of ODE using Euler's method	P-22	Lecture
19	Questions based on numerical solution of ODE and Solution of simultaneous equations using Gauss Seidal Method	P-23	Clarification Class
20	Programming of Euler's method	P-24,25	Practical
21	Numerical solution of ODE using Runge Kutta methods	P-26	Lecture
22	Runge Kutta Method Programming	P-27	Practical
23	Numerical Integration	P-28	Lecture
24	Trapezoidal Rule & Simpson's 1/3 Rule Regression analysis using least square principle. Correlation analysis for bivariate distribution.	P-29,30	Practical

19015100– Introduction to Machine Learning

Unit	Particulars	Class No.	Pedagogy of Class
Unit- I	Introduction to ML		
Unit- I	Introduction to ML, Goals and applications of machine learning, Aspects of developing a learning system: trainingand testing data	C-1	Lecture
Unit- I	Types of learning: Supervised, Unsupervised, and Reinforcement	C-2	Lecture
Unit- I	Linear regression, Variance, Bias, gradient descent	C-3	Lecture
Unit- I	Bias, gradient descent	C-4	Lecture
Unit- I	R^2, Ridge and Lasso regression	C-5	Lecture
	Activity	C-6	Activity
	Take Home Assignments		Home Assignments
Unit-II	Logics		
Unit-II	Logistic regression, Decision boundary	C-7	Lecture
Unit-II	Classification parameters: Accuracy, precision, Recall, F-measure, RoC curve	C-8	Lecture
Unit-II	Bayesian learning: Probability theory and Bayes rule	C-9	Lecture
Unit-II	Naive Bayes learning algorithm, Regression tree – random forest	C-10	Lecture
	Clarification Class	C-11	Clarification Class
Unit- III	Neural network		
Unit- III	Perceptron and back propagation neural network - k-nearest neighbor rule	C-12	Lecture
Unit- III	Perceptron and back propagation neural network - k-nearest neighbor rule	C-13	Lecture
Unit- III	Support vector machine: multicate- gory generalizations	C-14	Lecture
Unit- III	Kernels for learning non-linear functions	C-15	Lecture
Unit- III	ADA Boost classifier	C-16	Lecture
Unit- III	Feature engineering and feature selection	C-17	Lecture
Unit- III	PCA and LDA	C-18	Lecture
Unit- III	PCA and LDA	C-19	Lecture
Unit- III	Webinar	C-20	Webinar
	Quiz	C-21	Quiz
	Class Room Assignment	C-22	Class Assignment
	Presentation	C-23	Presentation
	Take Home Assignments		Home Assignments
	Seminar	C-24	Seminar
	Clarification Class	C-25	Clarification Class

	Guest Lecture	C-26	Guest lecture
Unit-IV	Unsupervised learning		
Unit-IV	Clustering: Learning from unclassified data-Clustering	C-27	Lecture
Unit-IV	Hierarchical Agglomerative Clus-tering	C-28	Lecture
Unit-IV	k-means partitional clustering	C-29	Lecture
Unit-IV	Expectation maximization (EM) for soft clustering	C-30	Lecture
Unit-IV	Semi-supervised learn-ing with EM using labeled and unlabeled data	C-31	Lecture
Unit-IV	Semi-supervised learn-ing with EM using labeled and unlabeled data	C-32	Lecture
Unit-IV	Semi-supervised learn-ing with EM using labeled and unlabeled data	C-33	Lecture
	Webinar	C-34	Webinar
	Presentation	C-35	Presentation
	Clarification Class	C-36	Clarification Class
	Class Room Assignment	C-37	Class Assignment
	Take Home Assignments		Home Assignments
Unit-V	Deep learning		
Unit-V	Deep Neural network	C-38	Lecture
Unit-V	Activation functions	C-39	Lecture
Unit-V	Cost function	C-40	Lecture
Unit-V	Feed forward network	C-41	Lecture
Unit-V	CNN, SequentialModels	C-42	Lecture
	Class Room Assignment	C-43	Class Assignment
	Guest Lecture	C-44	Guest lecture
	Clarification Class	C-45	Clarification Class

19006000– Software Engineering

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Software Engineering, Importance of Software	C-1	Lecture
Unit-I	The Software Evolution, Software Characteristics	C-2	Lecture
Unit-I	Software Applications	C-3	Lecture
Unit-I	Software Crisis: Problem and Causes	C-4	Lecture
Unit-I	Software Development Life Cycle: Waterfall model	C-5	Lecture
Unit-I	Incremental and Evolutionary process models	C-6	Lecture
Unit-I	Personal Software process (PSP) and Team Software process (TSP)	C-7	Lecture
Unit-I	Overview of agile process and aspect oriented programming	C-8	Lecture
Unit-I	Clarification Class - 1	C-9	Clarification Class
	Take Home Assignments-1		Home Assignments
	Class Room Assignment-1	C-10	Class Assignment
Unit-II	Problem Analysis, Requirement elicitation and Validation	C-11	Lecture
Unit-II	Requirements modeling, Scenarios, Information and analysis classes	C-12	Lecture
Unit-II	Flow and behavioral modeling, documenting Software Requirement Specification (SRS)	C-13	Lecture
Unit-II	Design Concepts, design models for architecture, Component, data and user interfaces	C-14	Lecture
Unit-II	Problem Partitioning, Abstraction	C-15	Lecture
Unit-II	Cohesiveness, Coupling, Top Down and Bottom Up design approaches	C-16	Lecture
Unit-II	Functional Versus Object Oriented Approach, Design Specification, 4GL	C-17	Lecture
Unit-II	Clarification Class-2	C-18	Clarification Class
	Home Assignment-2		Home Assignments
	Class Room Assignment-2	C-19	Class Assignment
	Presentation-1	C-20	Presentation
	Guest Lecture-1	C-21	Guest lecture
	Quiz-1	C-22	Quiz
Unit-III	TOP-DOWN and BOTTOM-UP structure programming	C-23	Lecture
Unit-III	Information Hiding, Programming Style, and Internal Documentation, Verification	C-24	Lecture
Unit-III	Levels of Testing, Functional Testing, Structural Testing, Test Plan	C-25	Lecture

Unit-III	Test Case Specification, Software Testing Strategies, Verification & Validation	C-26	Lecture
Unit-III	Unit, Integration Testing, Top Down and Bottom Up Integration Testing	C-27	Lecture
Unit-III	Alpha & Beta Testing, White box and black box testing techniques, System Testing and Debugging	C-28	Lecture
Unit-III	Software Configuration Management, Overview of Software Quality Control and Quality Assurance, ISO 9000 Certification for Software Industry	C-29	Lecture
Unit-III	SEI Capability Maturity Model (CMM) and Comparison between ISO & SEI CMM	C-30	Lecture
	Clarification Class-3	C-31	Clarification Class
	Home Assignment-3		Home Assignments
	Workshop	C-32	Workshop
	Class Room Assignment 1	C-33	Class Assignment
	Presentation-2	C-34	Presentation
	Activity 1	C-35	Activity
Unit-IV	A Framework for Technical Software Metrics, Metrics for the Analysis Model	C-36	Lecture
Unit-IV	Metrics for Design Model, Metrics for Source Code	C-37	Lecture
Unit-IV	Metrics for Testing, Metrics for Maintenance	C-38	Lecture
Unit-IV	CASE and its Scope	C-39	Lecture
Unit-IV	CASE support in Software Life Cycle, Documentation Support	C-40	Lecture
Unit-IV	Architecture of CASE Environment	C-41	Lecture
Unit-IV	Exposure to CASE tools like Rational Software suit	C-42	Lecture
Unit-IV	Turbo Analyst	C-43	Lecture
Unit-IV	Silk Suite	C-44	Lecture
	Clarification Class-4	C-45	Clarification Class

19005600– Computer Networks

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction		
Unit-I	Introduction To Computer Networks	C-1	Lecture
Unit-I	Motivation, Signals & Media, Bits Over Signals	C-2	Lecture
Unit-I	OSI Model : Physical , Data Link & Network Layer	C-3	Lecture
Unit-I	OSI Model : Transport, Session, Presentation & Application Layer	C-4	Lecture
Unit-I	Transmission Modes: Synchronous/Asynchronous Communication	C-5	Lecture
Unit-I	Modulations & Modems	C-6	Lecture
Unit-I	Bandwidth, Through Put & Noise	C-7	Lecture
Unit-I	Multiplexing : Frequency Division & Time Division & Phase Division	C-8	Lecture
Unit-I	Standards & Administration , Brief Introduction to IP Addressing	C-9	Lecture
	Clarification Class 1	C-10	Clarification Class
	Class Room Assignment 1	C-11	Class Assignment
Unit-II	Packet Transmission		
Unit-II	Multiplexing : Frequency Division & Time Division & Phase Division	C-12	Lecture
Unit-II	Frames Flow Control & Error Control : Error Correction Techniques	C-13	Lecture
Unit-II	LAN/WAN Technologies	C-14	Lecture
Unit-II	Shared Media & Media Access	C-15	Lecture
Unit-II	Topology : Bus, Ring & Star Topology	C-16	Lecture
Unit-II	Wireless & CSMA/CA, CSMA/CD	C-17	Lecture
Unit-II	Ethernet Addressing & Wiring ,HUBS	C-18	Lecture
	Clarification Class 2	C-19	Clarification Class
	Class Room Assignment 2	C-20	Class Assignment
	Presentation 1	C-21	Presentation
	Activity 1	C-22	Activity
	Webinar 1	C-23	Webinar
	Guest lecture 1	C-24	Guest lecture
	Take Home Assignments 1		Home Assignments
Unit-III	Other LAN technologies		
Unit-III	Asynchronous Transfer Mode , Ring Topology: Token Passing Rings	C-25	Lecture
Unit-III	STAR Topology & FDDI	C-26	Lecture
Unit-III	WAN technologies including frame relay	C-27	Lecture
Unit-III	IEEE 802.3 , IEEE 802.5	C-28	Lecture
Unit-III	Routing Algorithms: Distance Vector &	C-29	Lecture

	Link State		
Unit-III	Shortest Path Communication, Dijkastra's Algorithm	C-30	Lecture
Unit-III	X.25, and ATM	C-31	Lecture
Unit-III	Clarification Class 3	C-32	Clarification Class
	Class Room Assignment 3	C-33	Class Assignment
	Presentation 2	C-34	Presentation
	Take Home Assignments 2		Home Assignments
Unit-IV	Internet working		
Unit-IV	Internet Working Introduction	C-35	Lecture
Unit-IV	Concept, Goals, IP addressing	C-36	Lecture
Unit-IV	Address binding with ARP	C-37	Lecture
Unit-IV	IP Datagram, Encapsulation IP fragmentation and reassembly	C-38	Lecture
Unit-IV	Protocols :concept and datagrams: ICMP, TCP, UDP	C-39	Lecture
Unit-IV	Network Services: Electronic mail, File transfer	C-40	Lecture
Unit-IV	Remote login-introduction to protocol specification	C-41	Lecture
Unit-IV	Validation and testing	C-42	Lecture
	Clarification Class 4	C-43	Clarification Class
	Seminar 1	C-44	Seminar
	Quiz 1	C-45	Quiz
	Take Home Assignments 3		Take Home Assignments

19005700– Computer Networks Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Study of Network Topologies with Introduction to Network Lab.	P-1,2	Practical
2	Study of Network Cables & Tools.	P-3,4	Practical
3	Study of Network Straight & Cross Cables.	P-5,6	Practical
4	Study of Network Physical Equipments: (Hubs / Repeaters/Switches/Modems).	P-7,8	Practical
5	Study of Network Connecting Physical Devices: (Routers /Gateways/Multiplexers).	P-9,10	Practical
6	Study of Network IP Addressing.	P-11,12	Practical
7	Study of Network IP Addressing/ Subnetting.	P-13,14	Practical
8	Study of Basic Networking Commands.	P-15,16	Practical
9	To Assign/Practical IP Address to the PC Connected to the Internet.	P-17,18	Practical
10	To Assign/Practical IP Address to the PC Connected to the Internet.	P-19,20	Practical
11	Practical to connect computers in Local Area Network.	P-21,22	Practical
12	Presentation	P-23,24	Presentation
13	Clarification Class	P-25,26	Clarification Class
14	Activity	P-27,28	Activity
15	Clarification Class	P-29,30	Clarification Class

19005400– Web Technologies

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	History on Internet and World wide Web	C-1	Lecture
Unit-I	Search Engines, ISP, Domain Name,	C-2	Lecture
Unit-I	URL, E-mail and All technology related to E-Mail	C-3	Lecture
Unit-I	What is Difference Between Static and Dynamic Web page	C-4	Lecture
Unit-I	Introduction of HTML, Tags Related to Text Formatting Tools	C-5	Lecture
Unit-I	anchor tags, adding images and sounds, Lists in HTML	C-6	Lecture
Unit-I	anchor tags, adding images and sounds, Lists in HTML	C-7	Lecture
Unit-I	Frames in HTML	C-8	Lecture
Unit-I	Tables in HTML	C-9	Lecture
Unit-I	Forms in HTML-1	C-10	Lecture
Unit-I	Forms in HTML-2	C-11	Lecture
Unit-I	global and Local Tags	C-12	Lecture
Unit-I	ID and Class Attributes in html, Map tag in HTML	C-13	Lecture
Unit-I	clarification Class1	C-14	Clarification Class
	Class Room Assignment-1	C-15	Class Assignment
	Home Assignment-1		Home Assignments
Unit-II	Intranet Connectivity		
Unit-II	FDDI	C-16	Lecture
Unit-II	ISDN	C-17	Lecture
Unit-II	ADSL	C-18	Lecture
Unit-II	PPP	C-19	Lecture
Unit-II	ATM	C-20	Lecture
Unit-II	Web servers and browser's	C-21	Lecture
Unit-II	proxy server	C-22	Lecture
Unit-II	Class Room Assignment-2	C-23	Class Assignment
Unit-II	Home Assignment-2		Home Assignments
Unit-II	proxy server	C-24	Lecture
	Clarification Class2	C-25	Clarification Class
	Presentation 1	C-26	Presentation
Unit-III	Network Security		
Unit-III	Network Security attacks	C-27	Lecture
Unit-III	Vulnerabilities of Network system	C-28	Lecture
Unit-III	Data Security Encryption	C-29	Lecture
Unit-III	key protocols	C-30	Lecture
Unit-III	Document signatures	C-31	Lecture
Unit-III	Firewalls	C-32	Lecture

Unit-III	Activity1	C-33	Lecture
Unit-III	Clarification Class3	C-34	Clarification Class
	Class Room Assignment-3	C-35	Class Assignment
	Home Assignment 3		Home Assignments
	Presentation 2	C-36	Presentation
Unit-IV	Web Programming		
Unit-IV	Introduction to Web Pages	C-37	Lecture
Unit-IV	HTML, HTTP, SHTTP	C-38	Lecture
Unit-IV	XML	C-39	Lecture
Unit-IV	Front Page Forms and Form Handlers	C-40	Lecture
Unit-IV	Site design and Navigation, jsp, jdbc	C-41	Lecture
Unit-IV	Java Programming - class design, inheritance, overloading, polymorphism, exception handling	C-42	Lecture
Unit-IV	Activity2	C-43	Lecture
Unit-IV	Quiz	C-44	Quiz
	Clarification Class4	C-45	Clarification Class

19005500– Web Technologies Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Introduction of HTML, Browser, Online and Offline editor	P-1	Practical
2	Basic tags, text formatting tags	P-2	Practical
3	List and Type Definition Tags, Image and Anchor tags	P-3	Practical
4	Use of tables in HTML	P-4	Practical
5	Use of Frames in HTML	P-5	Practical
6	Introduction of JavaScript, Variables and Type Casting in HTML	P-6	Practical
7	Form in HTML	P-7	Practical
8	Use of DHTML and Use in HTML	P-8	Practical
9	Introduction of CSS, Tags related CSS, Java Script	P-9	Practical
10	Use of XML and How use in WEB Designing	P-10	Practical
11	XML Syntax and Use in HTML Coding	P-11	Practical
12	Clarification Class	P-12	Clarification Class
13	Clarification Class	P-13	Clarification Class
14	Revision	P-14	Clarification Class
15	Revision	P-15	Clarification Class

11017100– Organizational Behavior

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Organizational Behavior		
Unit-I	Today's Organizations, Challenges	C-1	Lecture
Unit-I	Foundations of Organizational Behavior, Individual Behavior: Perception	C-2	Lecture
Unit-I	Values, Attitudes Motivation theories	C-3	Lecture
Unit-I	Employees Motivations in Organization	C-4	Lecture
Unit-I	Management by Objectives Learning Processes, Reward and Punishment	C-5	Lecture
Unit-I	Take Home Assignments		Home Assignments
	Clarification Class	C-6	Clarification Class
Unit-II	Foundations of Group Behavior		
Unit-II	Interpersonal Communication	C-7	Lecture
Unit-II	Leadership, Emotional Intelligence	C-8	Lecture
Unit-II	Power & Polities	C-9	Lecture
Unit-II	Conflict Process	C-10	Lecture
Unit-II	Negotiations	C-11	Lecture
Unit-II	Class Room Assignment	C-12	Class Room Assignment
Unit-II	Stress and Coping	C-13	Lecture
Unit-II	Inter-Group Relations, Team Working	C-14	Lecture
Unit-II	Presentation	C-15	Presentation
	Clarification Class	C-16	Clarification Class
Unit-III	A Macro Perspective of Organizational Behavior		
Unit-III	Organization Structure – Key Elements	C-17	Lecture
	Quiz	C-18	Quiz
	Take Home Assignments		Home Assignments
	Class Room Assignment	C-19	Class Assignment
	Activity	C-20	Activity
Unit-III	Types and Basic Models	C-21	Lecture
Unit-III	Work Design	C-22	Lecture
Unit-III	Organizational Change, and Learning Organizations	C-23	Lecture
Unit-III	Clarification Class	C-24	Clarification Class
Unit-IV	Organizational Behavior		
Unit-IV	Future Challenges Gender Diversity at the place of work	C-25	Lecture
Unit-IV	Presentation	C-26	Presentation
Unit-IV	Class Room Assignment	C-27	Class Assignment
	Take Home Assignments		Home Assignments
Unit-IV	Changing world Scenario, Role of External Environment	C-28	Lecture
Unit-IV	Advantage Management of change, International issues in Organizational Behavior	C-29	Lecture
Unit-IV	Clarification Class	C-30	Clarification Class

19006200– Ability and Skill Enhancement -IV

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Receiving Calls, Placing a call, Ending Calls	C-1	Lecture
Unit-I	Transferring calls, Taking Message/ Voice Mails, Placing call on hold	C-2	Lecture
Unit-I	Handling Complaints	C-3	Lecture
Unit-I	Telephonic Conversation	C-4	Class Assignment
Unit-II	How to build confidence by positive thinking,	C-5	Lecture
Unit-II	identifying negative thoughts, how to control negative thoughts entering our mind, identifying personal talents, and its ways to improve	C-6	Lecture
Unit-II	how to develop good habits and having principles and follow them at all times	C-7	Lecture
Unit-II	Need to learn new things, ideas and skills	C-8	Lecture
Unit-II	what is brain storming, why do we need it,	C-9	Lecture
Unit-II	what are the different ways of brain storming through logics and reasoning	C-10	Lecture
Unit-II	Brain Storming Session - Assignment	C-11	Activity
	Presentation	C-12	Presentation
Unit-III	What is resume	C-13	Lecture
Unit-III	Format of Resume, Formatting	C-14	Lecture
Unit-III	Resume Preparation		Home Assignments
Unit-III	Covering Letter, PI Kit	C-15	Lecture
Unit-IV	Mastering the art of giving interviews in	C-16	Lecture
Unit-IV	selection or placement interviews	C-17	Lecture
Unit-IV	web /video conferencing	C-18	Activity
Unit-IV	Mock Interview (Questions)	C-19	Lecture
Unit-IV	Mock Interview (Questions)	C-20	Lecture
Unit-IV	HR Expert Mock Interview	C-21	Class Assignment
Unit-IV	Telephonic Interviews	C-22	Activity
Unit-IV	Class Room Assignment	C-23	Class Assignment
Unit-V	Identifying domain specific industries	C-24	Lecture
Unit-V	Identifying domain specific industries - Assignment	C-25	Activity
Unit-V	researching the industry		Home Assignments
Unit-V	Industry analysis	C-26	Lecture
Unit-V	Presentation on specific industry/company	C-27	Presentation
	Webinar	C-28	Webinar
	Guest Lecture	C-29	Guest lecture
	Home Assignment		Home Assignments
	Clarification Class	C-30	Clarification Class

19015200– Python

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types	C-1	Lecture
Unit-I	String Concatenation and Replication, Storing Values in Variables	C-2	Lecture
Unit-I	Your First Program, Dissecting Your Program	C-3	Lecture
Unit-I	Flow control: Boolean Values, Comparison Operators	C-4	Lecture
Unit-I	Boolean Operators, Mixing Boolean and Comparison Operators	C-5	Lecture
Unit-I	Elements of Flow Control, Program Execution	C-6	Lecture
Unit-I	Elements of Flow Control, Program Execution	C-7	Lecture
Unit-I	Flow Control Statements	C-8	Lecture
Unit-I	Flow Control Statements	C-9	Lecture
Unit-I	Flow Control Statements	C-10	Lecture
Unit-I	Importing Modules	C-11	Lecture
Unit-I	Ending a Program Early with sys.exit()	C-12	Lecture
Unit-I	Ending a Program Early with sys.exit()	C-13	Lecture
	Clarification Class	C-14	Clarification Class
	Class Room Assignment-1	C-15	Class Assignment
	Home Assignment-1		Home Assignments
Unit-II	Functions: def Statements with Parameters, Return Values and return Statements		
Unit-II	The None Value, Keyword Arguments and print()	C-16	Lecture
Unit-II	Local and Global Scope, The global Statement	C-17	Lecture
Unit-II	Exception Handling. 08 L1, L2, L3 Lists: The List Data Type	C-18	Lecture
Unit-II	Exception Handling. 08 L1, L2, L3 Lists: The List Data Type	C-19	Lecture
Unit-II	Working with Lists	C-20	Lecture
Unit-II	Augmented Assignment Operators	C-21	Lecture
Unit-II	Augmented Assignment Operators	C-22	Lecture
	Class Room Assignment-2	C-23	Class Assignment
	Home Assignment-2		Home Assignments
Unit II	Methods	C-24	Lecture
	Clarification Class2	C-25	Clarification Class
	Presentation 1	C-26	Presentation
Unit-III	Dictionaries and Structuring Data: The Dictionary Data Type		
Unit-III	Pretty Printing	C-27	Lecture
Unit-III	Using Data Structures to Model Real-World	C-28	Lecture

	Things		
Unit-III	Using Data Structures to Model Real-World Things	C-29	Lecture
Unit-III	Manipulating Strings - Working with Strings	C-30	Lecture
Unit-III	Manipulating Strings - Working with Strings	C-31	Lecture
Unit-III	Useful String Methods	C-32	Lecture
Unit-III	Useful String Methods	C-33	Lecture
Unit-III	Clarification Class3	C-34	Clarification Class
	Class Room Assignment-3	C-35	Class Assignment
	Home Assignment 3		Home Assignments
	Presentation 2	C-36	Presentation
Unit-IV	Pattern Matching with Regular Expressions:		
Unit-IV	Finding Patterns of Text without Regular Expressions, Finding Patterns of Text with Regular Expressions, More Pattern Matching with Regular Expressions	C-37	Lecture
Unit-IV	Greedy and Nongreedy Matching, The findall() Method, Character Classes, Making Your Own Character Classes, The Caret and Dollar Sign Characters, Reading and Writing Files: Files and File Paths, The os.path Module	C-38	Lecture
Unit-IV	The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint.pformat() Function. Organizing Files: The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module.	C-39	Lecture
Unit-V	Web Scraping: Project: MAPIT.PY with the web browser Module	C-40	Lecture
Unit-V	Downloading Files from the Web with the requests Module	C-41	Lecture
Unit-V	Downloading Files from the Web with the requests Module	C-42	Lecture
Unit-V	Saving Downloaded Files to the Hard Drive, HTML.	C-43	Lecture
Unit-V	Quiz	C-44	Quiz
Unit-V	Clarification Class4	C-45	Clarification Class

19015300– Python Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation	P-1	Practical
2	Start the Python interpreter and type help() to start the online help utility	P-2	Practical
3	Start the Python interpreter and type help() to start the online help utility	P-3	Practical
4	Start the Python interpreter and type help() to start the online help utility	P-4	Practical
5	Write a program to calculate compound interest when principal, rate and number of periods are given.	P-5	Practical
6	Given coordinates (x1, y1), (x2, y2) find the distance between two points	P-6	Practical
7	Read name, address, email and phone number of a person through keyboard and print the details	P-7	Practical
8	a) Demonstrate about Basics of Python Programming. b) Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types) c) Demonstrate the working of following functions in Python. i) id( ) ii) type( ) iii) range( ) d) Write a Python program to demonstrate various base conversion functions. e) Write a Python program to demonstrate various type conversion functions.	P-8	Practical
9	a) Demonstrate the following Operators in Python with suitable examples. i) Arithmetic Operators ii) Relational Operators iii) Assignment Operator iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators	P-9	Practical
10	3 a) Write Python programs to demonstrate the following: i) input( ) ii) print( ) iii) 'sep' attribute iv) 'end' attribute v) replacement Operator ({ }) b) Demonstrate the following Conditional statements in Python with suitable examples. i) if statement ii) if else statement iii) if – elif – else statement	P-10	Practical
11	a) Write a Python program to demonstrate various ways of accessing the string. i) By using Indexing (Both Positive and Negative) ii) By using Slice Operator	P-11	Practical

12	a) Python program to perform read and write operations on a file. b) Python program to copy the contents of a file to another file. c) Python program to count frequency of characters in a given file. d) Python program to print each line of a file in reverse order. e) Python program to compute the number of characters, words and lines in a file.	P-12	Clarification Class
13	Revision	P-13	Clarification Class
14	Revision	P-14	Clarification Class
15	Revision	P-15	Clarification Class

Note: The review of Syllabus happens on a periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

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