SRINIVAS UNIVERSITY

COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH. (HONOURS): REGULATION - 2019

B.TECH. (HONOURS) SCHEME & SYLLABUS

COMPUTER SCIENCE AND ENGINEERING

WITH

SCHEME OF TEACHING

SRINIVAS UNIVERSITY
College of Engineering and Technology
SCHEME OF TEACHING AND EXAMINATION 2021-22

PHYSICS CYCLE (I/II SEMESTER)

Sl. No	Subject Code	Title	Teaching Dept.	Teaching hours per week				Exam			Credits
				Lecture (L)	Tutorial (T)	Practical (P)	Practice Session/ Self-study (S)	IA	Exam	TOTAL	
1	21SPH11/21	Engineering Physics (S)	Physics	2	2	-	-	50	50	100	03
2	21SPHL11/21	Engineering Physics Laboratory (S)		-	1	2	-	25	25	50	02
3	21SCS12/ 21SCSP22	C Programming/ Python Programming (T)	CSE	2	2	-	-	50	50	100	03
4	21SCSL12/ 21SCSPL22	C Programming Laboratory/ Python Programming Laboratory (T)		-	1	2	-	25	25	50	02
5	21SEC13/23	Electrical & Electronics (E)	ECE	2	2	-	-	50	50	100	03
6	21SECL13/23	Electrical & Electronics Laboratory (E)		-	1	2	-	25	25	50	02
7	21SMA 14/24	Applied Quantitative Techniques – I/II (M)	Maths	2	2	-	-	50	50	100	03
8	**PRACTICE AND PRACTICAL SESSIONS (ONLINE/ OFFLINE)**										
	21STE15/ 21SPE25	Technical English/ Professional English (ESEP) (A)	Humanities	1	-	-	1	50	-	50	02
	21SES16/26	Environmental Studies and Sustainable Development Goals (A)	Any Dept.	1	-	-	1	50	-	50	01
	21SCS17/ 21SCP27	ICCT/ Certification Course (T)	CSE	2	1	-	-	50	-	50	02
				-	-	-	2				
	21SID18/28	Innovation and Design Thinking (Skill)	Any Dept.	-	-	-	1	50	-	50	01
	21SKK10 21SKM10	Kannada Kali - I Kannada Manasu – I (A)		-	-	-	1	-	-	-	-
TOTAL										**750**	**24**

STEAM Model: S- Science, T- Technology, E-Engineering, A- Arts, M- Mathematics

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SCHEME OF TEACHING AND EXAMINATION 2021-22

CHEMISTRY CYCLE (I/II SEMESTER)

Sl. No	Subject Code	Title	Teaching Dept.	Teaching hours per week				Exam			Credits
				Lecture (L)	Tutorial (T)	Practical (P)	Practice Session/ Self-study (S)	IA	Exam	TOTAL	
1	21SCH11/21	Engineering Chemistry (S)	Chemistry	2	2	-	-	50	50	100	03
2	21SCHL11/21	Engineering Chemistry Laboratory (S)		-	1	2	-	25	25	50	02
3	21SCS12/ 21SCSP22	C Programming/ Python Programming (T)	CSE	2	2	-	-	50	50	100	03
4	21SCSL12/ 21SCSPL22	C Programming Laboratory/ Python Programming Laboratory (T)		-	1	2	-	25	25	50	02
5	21SMC13/23	Elements of Mechanical and Civil Engineering (E)	CV& ME	2	2	-	-	50	50	100	03
6	21SMA 14/24	Applied Quantitative Techniques–I/ II (M)	Maths	2	2	-	-	50	50	100	03
7	**PRACTICE AND PRACTICAL SESSIONS (ONLINE/ OFFLINE)**										
	21STE15/ 21SPE25	Technical English/ Professional English (ESEP) (A)	Humanities	1	-	-	1	50	-	50	02
	21SME16/26	Computer Aided Engineering Drawing (T)	ME	2	-	2	-	50	50	100	03
	21SCS17/ 21SCP27	ICCT/ Certification Course (T)	CSE	2	1	-	-	50	-	50	02
				-	-	-	2				
	21SCP18/28	Constitution of India, Professional Ethics and Human Values (A)	Any Dept.	1	-	-	1	50	-	50	01
	21SAS19/29	Activity on Social Responsibility (A)		-	-	-	1	-	-	-	-
	21SKK20 21SKM20	Kannada Kali- II Kannada Manasu – II (A)		-	-	-	1	-	-	-	-
TOTAL										**750**	**24**

STEAM Model: S- Science, T- Technology, E-Engineering, A- Arts, M- Mathemati

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SCHEME OF TEACHING AND EXAMINATION 2021-22

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SCHEME OF TEACHING AND EXAMINATION 2019

B.TECH (HONOURS) IN COMPUTER SCIENCE AND ENGINEERING
III SEMESTER

SL. No	Subject code	Title	Teaching				Exam			Credits
			Theory	Tutorial	Lab	Self Study / Practice	IA	Exam	TOTAL	
1	19SMA31	Numerical Techniques and Integral Transforms	4	1	0	0	50	50	100	04
2	19SCS32	Data Structures and its Applications	4	0	0	0	50	50	100	04
3	19SCS33	Digital System Design	4	0	0	0	50	50	100	04
4	19SCS34	Microprocessor and Embedded Systems	4	0	0	0	50	50	100	04
5	19SCSL35	Logic Design and Analog Circuits Laboratory	1	0	2	0	50	50	100	2
6	19SCSL36	Microprocessor Laboratory	1	0	2	0	50	50	100	2
7	19SCSL37	Data Structures Laboratory	1	0	2	0	50	50	100	2
8	19SCS38	ESEP – Troubleshooting	1	0	2	0	25	25	50	2
9	19SQA39	Part – A : Employability Skills Enhancement Programme 1 (ESEP 1)	2	0	0	0	50	-	50	2
		Part – B : International Certificate Course on Current Trends	0	0	0	2	-	-	-	
		Total Marks/Credit							**800**	**26**

SCHEME OF TEACHING AND EXAMINATION 2019

B.TECH (HONOURS) IN COMPUTER SCIENCE AND ENGINEERING

IV SEMESTER

SL. No	Subject code	Title	Teaching				Exam			Credits
			Theory	Tutorial	Lab	Self Study / Practice	IA	Exam	TOTAL	
1	19SCS41	Discrete Mathematical Structures And Graph Theory	4	1	0	0	50	50	100	04
2	19SCS42	Design and Analysis of Algorithms	4	0	0	0	50	50	100	04
3	19SCS43	Object Oriented Concepts	4	0	0	0	50	50	100	04
4	19SCS44	Software Engineering	4	0	0	0	50	50	100	04
5	19SCSL45	Design and Analysis of Algorithm laboratory	1	0	2	0	50	50	100	2
6	19SCSL46	Computer Graphics and Visualization Laboratory	1	0	2	0	50	50	100	2
7	19SCSL47	Java Programming Laboratory	1	0	2	0	50	50	100	2
8	19SCS48	ESEP- Hands-on training on Unix and Shell Programming	1	0	2	0	25	25	50	2
9	19SQA49	Part – A : Employability Skills Enhancement Programme 2 (ESEP 2)	2	0	0	0	50	-	50	2
		Part – B : International Certificate Course on Current Trends	0	0	0	2	-	-	-	
		Total Marks/Credit							**800**	**26**

SCHEME OF TEACHING AND EXAMINATION 2019

B.TECH (HONOURS) IN COMPUTER SCIENCE AND ENGINEERING

V SEMESTER

SL. No	Subject code	Title	Teaching				Exam			Credits
			Theory	Tutorial	Lab	Self Study / Practice	IA	Exam	TOTAL	
1	19SCS51	Data Base Management Systems	4	0	0	0	50	50	100	04
2	19SCS52	Computer Networks	4	0	0	0	50	50	100	04
3	19SCS53X	Core-Elective -1	4	0	0	0	50	50	100	04
4	19SCS54X	Optional/Soft Elective	4	0	0	0	50	50	100	04
5	19SCSL55	Data Base Management Systems Laboratory	1	0	2	0	50	50	100	2
6	19SCSL56	Computer Networks Laboratory	1	0	2	0	50	50	100	2
7	19SCSL57	Programming the Web Laboratory	1	0	2	0	50	50	100	2
8	19SCS58	ESEP- MOOC	0	0	0	2	50	-	50	2
9	19SQA59	Part – A: Employability Skills Enhancement Programme 3 (ESEP 3)	2	0	0	0	50	-	50	2
		Part - B: International Certificate Course on Current Trends	0	0	0	2	-	-	-	
		Total Marks/Credit							**800**	**26**

Core Elective-1		Optional/Soft Elective	
19SCS531	Programming the World Wide Web	19SCS541	Operating Systems
19SCS532	Object-Oriented Modeling and Design	19SCS542	Natural Language Processing
19SCS533	Theory of Computation	19SCS543	Management and Entrepreneurship
19SCS534	Digital Image Processing	19SCS544	Mobile Application Development
19SCS535	Data Compression	19SCS545	Stress Management

SCHEME OF TEACHING AND EXAMINATION 2019

B.TECH (HONOURS) IN COMPUTER SCIENCE AND ENGINEERING

VI SEMESTER

SL. No	Subject code	Title	Teaching				Exam			Credits
			Theory	Tutorial	Lab	Self Study / Practice	IA	Exam	TOTAL	
1	19SCS61	System Software and Compiler Design	4	0	0	0	50	50	100	04
2	19SCS62	Machine Learning	4	0	0	0	50	50	100	04
3	19SCS63X	Core-Elective -2	4	0	0	0	50	50	100	04
4	19SCS64X	Open Elective-1	4	0	0	0	50	50	100	04
5	19SCSL65	System Software and Compiler Design Laboratory	1	0	2	0	50	50	100	2
6	19SCSL66	Machine Learning Laboratory	1	0	2	0	50	50	100	2
7	19SCSL67	Python Programming Laboratory	1	0	2	0	50	50	100	2
8	19SCS68	ESEP – Miniproject	0	0	0	4	50	-	50	2
9	19SQA69	Part – A: Employability Skills Enhancement Programme 4 (ESEP 4)	2	0	0	0	50	-	50	2
		Part - B: International Certificate Course on Current Trends	0	0	0	2	-	-	-	
		Total Marks/Credit							**800**	**26**

Core Elective-2	
19SCS631	Python Application Programming
19SCS632	Data Warehousing and Data Mining
19SCS633	Adhoc Networks
19SCS634	Wireless Sensor Networks and Mobile Computing
19SCS635	Cryptography, Network Security and Cyber Law

Open Elective - 1	
19SCS641	Web2.0
19SCS642	Designing Embedded Systems
19SEC641	Cryptography and Network Security
19SEC642	Python Application Programming
19SCV641	Occupation Health and safety in construction industry
19SCV642	Air Pollution Control
19SME641	Total Quality Management
19SME642	Micro Electromechanical Systems

SCHEME OF TEACHING AND EXAMINATION 2019
B.TECH (HONOURS) IN COMPUTER SCIENCE AND ENGINEERING
VII SEMESTER

SL. No	Subject code	Title	Teaching				Exam			Credits
			Theory	Tutorial	Lab	Self Study / Practice	IA	Exam	TOTAL	
1	19SCS71	Internet of Things	4	0	0	0	50	50	100	04
2	19SCS72X	Core Elective –3	4	0	0	0	50	50	100	04
3	19SCS73X	Core Elective – 4	4	0	0	0	50	50	100	04
4	19SXX74X	Open Elective - 2	4	0	0	0	50	50	100	04
5	19SCSL75	Internet of Things Laboratory	1	0	2	0	50	50	100	2
6	19SCSL76	Cloud Computing Laboratory	1	0	2	0	50	50	100	2
7	19SCS77	Project Phase I	0	0	2	2	100	-	100	2
8	19SCS78	ESEP –MOOC	0	0	0	2	50	-	50	2
9	19SQA79	ESEP - Employability Skill Enhancement Programme - Patent Filing & IPR	2	0	0	0	50	-	50	2
		Total Marks/Credit							**800**	**26**

Core Elective-3		Core Elective-4		Open Elective -2	
19SCS721	Cloud computing	19SCS731	Artificial Intelligence	19SCS741	Social and Web Analytics
19SCS722	Genetic Algorithms	19SCS732	Block chain	19SCS742	Information Security
19SCS723	High speed networks	19SCS733	Virtual Reality	19SCS743	Software testing
19SCS724	Advanced Computer Architecture	19SCS734	Storage Area Networks	19SEC741	Artificial Intelligence
19SCS725	Multimedia Processing	19SCS735	Software Architecture	19SEC742	Virtual Reality
19SCS726	Agile Technology	19SCS736	Distributed Computing systems	19SEC743	Telecommunication Management
19SCS727	System Modeling and Simulation	19SCS737	Advanced Database Management systems	19SCV741	Research Methodology
19SCS728	Digital Signal Processing	19SCS738	Data Science	19SCV742	Environment impact Assessment
19SCS729	Deep Learning	19SCS739	Advanced Microprocessor	19SCV743	Introduction to smart city
19SCS720	Big Data and Analytics	19SCS730	Cyber Security	19SME741	Nano Technology
				19SME742	Operation Management
				19SME743	Quality Control

SCHEME OF TEACHING AND EXAMINATION 2019

B.TECH (HONOURS) IN COMPUTER SCIENCE AND ENGINEERING

VIII SEMESTER

SL. No	Subject code	Title	Teaching				Exam			Credits
			Theory	Tutorial	Lab	Self Study / Practice	IA	Exam	TOTAL	
1	19SCS81	Technical Seminar	0	0	0	4	100	0	100	2
2	19SCS82	Internship	0	0	0	4	50	50	100	3
3	19SCS83	Project (With Patent Application)	0	0	24	0	100	100	200	13
		Total Marks/Credit							**400**	**18**

I/II SEMESTER

ENGINEERING CHEMISTRY OF MATERIALS

Subject Code	19SCHE11/21	IA Marks	50
Number of Lecture Hours/Week	4	Exam Marks	50
Total Number of Lecture Hours	50	Exam Hours	02
Credits	04		

Course objectives:

To provide students with knowledge of engineering chemistry for building technical competence in industries, research and development in the following fields

- Electrochemistry & Battery Technology.
- Corrosion & Metal Finishing.
- Fuels & Solar energy
- Phase rule and Instrumentation
- Nano Materials.

Course outcomes:

On completion of this course, students will have knowledge in: · CO1.Basics of electrochemistry. Classical & modern batteries and fuel cells.

CO2. Causes & effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electroless plating.

CO3. Production & consumption of energy for industrialization of country and living standards of people. Utilization of solar energy for different useful forms of energy.

CO4. Understanding Phase rule and instrumental techniques and its applications.

CO5.Over viewing of synthesis, properties and applications of nanomaterials.

Module 1

Electrochemistry and Battery Technology

Electrochemistry: Introduction, Derivation of Nernst equation for electrode potential. Reference electrodes: Introduction, construction, working and applications of calomel and Ag / AgCl electrodes. Measurement of electrode potential using calomel electrode. Ion selective electrode: Introduction; Construction and working of glass electrode, determination of pH using glass electrode. Problems on Nerst equation

Battery Technology: Introduction, classification - primary, secondary and reserve batteries.

Characteristics - cell potential, current, capacity, electricity storage density, energy efficiency, cycle life and shelf life. Construction, working and applications of Nickel- metal hydride batteries. Lithium batteries: Introduction, construction, working and applications of Li-ion batteries.

Fuel Cells: Introduction, difference between conventional cell and fuel cell, limitations & advantages. Construction, working & applications of methanol-oxygen fuel cell with H_2SO_4 electrolyte.

10 hours

Module -2

Corrosion and Metal Finishing:

Corrosion: Introduction, electrochemical theory of corrosion, galvanic series. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of medium – pH, conductivity, and temperature. Types of corrosion- Differential metal, differential aeration (Pitting and water line) and stress. Corrosion control: Metal coatings- Galvanization and Tinning. Cathodic protection (sacrificial anodic and impressed current methods).

Metal Finishing: Introduction, Technological importance. Electroplating: Introduction, principles governing-Polarization, decomposition potential and overvoltage. Factors influencing the nature of electro deposit-current density, concentration of metal ion& electrolyte; pH, temperature & throwing power of plating bath; additives- brighteners,. Electroplating of Chromium (decorative and hard).

Electro less plating: Introduction, distinction between electroplating and electro less plating, electroless plating of copper & manufacture of double sided Printed Circuit Board with copper.

10hours

Module - 3

Fuels and Solar Energy:

Fuels: Introduction, classification, calorific value- gross andnet calorific values, determination of calorific value of fuel using bomb calorimeter, numerical problems. Cracking: Introduction, fluidized catalytic cracking, reformation of petrol, octane and cetane numbers. Gasoline knocking and their mechanism, anti knocking agents, power alcohol & biodiesel.

Solar Energy: Introduction, photovoltaic cells- construction and working. Advantages & disadvantages of PV cells. purification of silicon (zone refining).

10 hours

Module - 4

Phase Rule and Instrumental Techniques in chemical analysis

Phase Rule: Introduction, Gibb's Phase Rule, Terms Involved in Phase rule- Phase , component and Degrees of freedom. Application of Phase rule to one component system(Water phase diagram) . Application of Phase rule to two component system (Silver –lead system).

Instrumental Techniques in chemical analysis.

Theoretical principles involved Colorimetry (Beer-Lambert's Law), Application of Colorimetry (Colorimetric estimation of copper), Theoretical principles involved Potnetniometry, Application of Potentiometry (Potentionmetric estimation of FAS), Theoretical principles involved Conductometry , Application of Conductomerty (HCl v/s NaOH)

10 hours

Module-5

Nanochemsitry

Introduction, properties. Synthesis techniques (sol-gel, precipitation, gas condensation & chemical vapour condensation processes). Nanoscale materials- carbon nano tubes, nano wires, fullerenes, dendrimers, nano rods, & nano composites.

Properties and applications of nano sized ZnO, TiO_2

10 hours

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 10 marks
- There will be **2** full questions(with a **maximum** of **four** sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer **5** full questions, selecting one full question from each module.

Text Books:

1.B.S.JaiPrakash, R.Venugopal, Sivakumaraiah&PushpaIyengar.,**"Chemistry for Engineering Students"**, Subhash Publications,Bangalore.

2.R.V.Gadag&A.NityanandaShetty., **"Engineering Chemistry"**, I KInternational Publishing House Private Ltd. New Delhi.

3. P.C.Jain& Monica Jain.,**"Engineering Chemistry"**, DhanpatRaiPublications, New Delhi.

4.A text book of Engineering chemistry, S Chand Publications, by S S DARA

5.Engineering Chemistry by GopalakKrishnaBhat N, Acme Learning

Publications

Reference Books

1. O.G.Palanna,**"Engineering Chemistry"**,Tata McGraw Hill Education Pvt.Ltd. New Delhi, Fourth Reprint.

2. G.A.Ozin& A.C. Arsenault, **"NanochemistryA Chemical Approach toNanomaterials"**, RSC publishing, 2005.

3. **"Wiley Engineering Chemistry"**, Wiley India Pvt. Ltd. New Delhi. SecondEdition.

4. M.G.Fontana., **"Corrosion Engineering"**, Tata McGraw Hill PublishingPvt. Ltd. New Delhi.

INFORMATION COMMUNICATION & COMPUTATIONTECHNOLOGY

Sub Code :	**19SIS12/22**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course objectives:

To provide students with knowledge of the following technologies

- Emerging technologies of information communication technology
- Artificial Intelligence & Robotics, Cloud Computing Technology, Applications
- 3D Printing methodologies and its usage and Storage Management and Quantum Computing
- Virtual & Augmented Reality processing Applications

Course Outcomes:

On completion of this course, students will have knowledge in:

CO 1: Emerging technologies of information communication technology

CO 2: Artificial Intelligence & Robotics Technology uses and Cloud Computing Technology & IOT Applications

CO 3: 3D Printing methodologies and its usage and Storage Management

CO 4: IT in Online Education methods and Virtual & Augmented Reality processing Applications

CO 5: Cyber Security, Legal & Ethical Issues with real time applictions

MODULE -1

CH 1 : Introduction to Emerging Technologies
CH 2 : Data, Data Processing, Data Science & Communication
Technology CH 3 : Internet Technology
CH 4 : Underlying Technologies of ICCT

10 Hours

MODULE - 2

CH 5 : Artificial Intelligence & Robotics Technology

CH 6 : Cloud Computing Technology & Applications

CH 7 : IOT Technology & Applications

10 Hours

MODULE – 3

CH 8 : 3D Printing Technology & Applications
CH 9 : Information Storage Technology
CH 10. Quantum Computing
10 Hours

MODULE – 4

CH 11 : IT in Online Ubiquitous Education
CH 12 : Virtual & Augmented Reality & Applications

10 Hours

MODULE-5: POINTERS AND PREPROCESSORS & DATA STRUCTURES

CH 13 : Cyber Security, Legal & Ethical Issues in Internet Communication

10 Hours

Text Books:

1. Emerging Technologies in Distance Education., Publisher: Athabasca University Press, Editors: Veletsianos, George, pgno 3-22
2. Artificial Intelligence A Modern Approach Stuart J. Russell and Peter Norvig pgno 131, 773,842
3. The Data Science Handbook**,** Field Cady, 2017 John Wiley & Sons, Inc.
4. Internet of Things (IoT): Technologies, Applications, Challenges and Solutions, BK Tripathy,J Anuradha
5. Computational Thinking on the Internet Kindle Edition, Fred Hofstetter
6. Cloud Computing: Master the Concepts, Architecture and Applications with Realworld examples and Case studies 1st Edition, Kindle Edition byKamal Kant Hiran,Ruchi Doshi
7. Fundamentals of 3D Food Printing and ApplicationsbyFernanda C. Godoi,Bhesh R. Bhandari, Sangeeta Prakash,Min Zhang.
8. Information Storage and Management, 2nd edition, EmcEducation Services
9. Quantum Computation and Quantum Information **,**byNielsen
10. Ubiquitous Computing: Smart Devices, Environments and Interactions, Stefan Poslad
11. Augmented Reality: Principles & Practice, Schmalstieg/Hollerer
12. Fundamentals of Cyber Security, Mayank Bhushan
13. Information & Communication Technology (ICT) In Education, Prof. T.Mrunalini(Author)Prof. A. Ramakrishna

ELEMENTS OF MECHANICAL AND CIVILENGINEERING

Sub Code :	19SMC13/23	IAMarks :	50
Hrs/ Week :	4	Exam Hours :	2
Credits :	4	Exam Marks:	50
		Total Hours :	50

Course Objectives:

- To provide basic concepts and principles of Mechanical Engineering and Civil Engineering
- To make student understand concepts of force, moment and couple system
- To give an ability to apply the knowledge of Engineering Mechanics in Designs
- To make the concept of Centroid and Moment of InertiaClear.
- To give an Idea regarding Nano Technology andMechatronics

Course outcomes:

CO1: Students will be having basic knowledge regarding the Mechanical and Civil Engineering

CO2: Student understand the practical implication of the force systems

CO3: Student can use the concepts in design.

CO4: Students will be able to calculate centroid and moment of Inertia

CO5: Students will have the idea of the Nano Technology and the Mechatronics

MODULE 1

Elements of Mechanical Engineering: Basics of IC engines: Introduction, Types of IC engines. Basics of refrigeration: COP, Relative COP, types of refrigeration cycles. Basics of machining processes: Lathes, Drilling Machines, Milling Machines, Grinding Machines.

Elements of Civil Engineering :Scope of different fields of Civil Engineering-Surveying, Building Materials, ConstructionTechnology,GeotechnicalEngineering,StructuralEngineering,Hydraulics,Water Resourcesand Irrigation Engineering, Transportation Engineering, Environmental Engineering. Infrastructure: Types of infrastructure, Role of Civil Engineer in the Infrastructural Development, Effect of the infrastructural facilities on socio-economic development of a country. Roads: Classification of Roads and their functions, Comparison

of Flexible and Rigid Pavements (Advantages and Limitations). Bridges: T beam Bridges, Slab and pipe Culverts. Dams: Different types of Dams based on Material, Structural behavior and functionality with simple sketches.

08 Hours

MODULE 2

Basic idealizations-Particle,Continuumand Rigidbody; Newton's laws, Force and its characteristics, types of forces-Gravity, Lateral and its distribution on surfaces, Classification of force systems, Principle of physical independence, superposition, transmissibility of forces, Introduction to SI units. Couple, Moment of a couple, Characteristics of couple, Moment of a force, Equivalent force - Couple system; Numerical problems on moment of forces and couples, on equivalent force – couple system.

Types of Loads and Supports, statically determinate beams, Numerical problems on support reactions for statically determinate beams with Point load (Normal and inclined) and uniformly distributed and uniformly varying loads and Momen. **08Hours**

MODULE 3

Centroids: Introduction to the concept, centroid of line and area, centroid of basic geometrical figures, computing centroid for– T, L, I, Z and full/quadrant circular sections and their built up sections. Numerical problems**.**

Moment of Inertia: Introduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of basic planar figures, computing momentof Inertia for – T, L, I, Z and full/quadrantcircularsectionsandtheirbuiltupsections.Numericalproblems. **08 Hours**

MODULE 4

Robotics and Automation: Robotics: Introduction, classification based on robots configuration-polar, cylindrical, Cartesian coordinate and spherical. Application,Advantages and disadvantages.

Automation: Definition, types- fixed, programmable, flexible automation, NC/CNC Machines: Basic elements with simple block diagrams, Advantages and disadvantages.

08Hours

MODULE 5

Mechatronics & Nano Technology Mechatronics: Definition & Introduction to mechatronic system Overview of mechatronics product and functioning. Nano Technology :Introduction, Scientific revolutions, Time and length scale in structures, Definition of a nanosystem. Dimensionality and size dependent phenomena, Surface to volume ratio, Fraction of surface atoms, Surface energy and surface stress, surface defects, Properties at nanoscale (optical, mechanical, electronic, and magnetic). **08Hours**

REFERENCE BOOKS:

1..Elements of Civil Engineering and Engineering Mechanics by M.N.Shesha Prakash and Ganesh.B. Mogaveer, PHI Learning, 3rd Revised edition (2014)

2. Engineering Mechanics-Statics and Dynamics by A Nelson, Tata McGraw Hill Education Private Ltd, New Delhi,2009.

3. Elements of Civil Engineering (IVEdition) by S.S.Bhavikatti, New Age International Publisher, New Delhi, 3rd edition 2009.

4. Elements of Mechanical Engineering, R.K. Rajput, Firewall Media,2005.
5. CAD/CAM/CIM, Dr. P Radhakrishnan, 3rd edition, New Age International Publishers, New Delhi.
6. Introduction to Robotics: Mechanics And Control, Craig, J. J., 2nd Ed.Addison-Wesley Publishing Company, Readong, MA,1989

QUANTITATIVE TECHNIQUES IN ENGINEERING -I

Subject Code	19SMA14	IA Marks	:	50
Number of lecture hours/week	4+1	Exam Marks	:	50
Total number of lecture hours	50	Credits	:	04

Course objectives:

To enable the students to apply the knowledge of Mathematics in various engineering fields by making them to learn the following:

- Solution of system of linear equations , quadratic forms
- Partial derivatives
- Reduction formulae of integration
- Vector Calculus.

Course outcomes:

On completion of this course, students are able to,

CO1: Understand Basics of Differential Calculus , Learn the importance of Maclaurin's series

CO2: Use partial derivatives to calculate rates of change of multivariate functions.

CO3: Evaluate double and triple integrals to find area and volume

CO4:Use curl and divergence of a vector valued functions in various applications of electricity, magnetism and fluid flows

CO5:Analyze position, velocity, and acceleration in two or three dimensions using the calculus of vector valued functions

CO6:sematrices techniques for solving systems of linear equations in the different areas of Linear Algebra

Module –1:

Matrix & Algebra: Characteristic equation of a matrix, Eigen values and Eigen vectors, Rayleigh's power method to find the largest Eigen value and the corresponding Eigen vector. Diagonalization of a square matrix of order two. Caley Hamilton theorem (without proof). Verification. Quadratic forms **10 hours**

Module –2

Elements of basic Calculus :

Sequences, Infinite series and various test, Mean value theorem, nth derivative ofstandard function, Taylor's and Maclaurin's series expansion (statement only).Angle between radius vector and tangent, angle between two polar curves pedal equation of polar curves – problems.

10 hours

Module –3

Function of several variables: Definition and simple problems on partial differentiation, Euler's theorem (without proof) – problems, Change of variables- problems, definition and evaluation of Jacobians. Maxima and minima for function of two variables. **10 hours**

Module –4

Vector Differentiation: Derivative of Vector valued functions, Scalar and Vector valued functions. Definition of gradient, Directional Derivatives, Divergence and Curl – problems. Solenoidal and Irrotational Vector fields. Vector Identities- div((φF) , curl((φF) , curl(grad), div(curl F) **10 hours**

Module –5

Multiple Integrals : Reduction formulae – sin $x$dcos $x$dsin $x$cos ($x$dx and n are

positive integers)- Statement only, evaluation of these integrals with standard limits (0 to $\pi/2$) and problems, Multiple Integrals – Double and triple Integrals – Evaluation of change of order of integration and change of variables. Application to area and volume. Simple problems

10 Hours

$\overline{n}$ $\overline{m}$ $\overline{n}$

Text Books:

- B. S. Grewal," Higher Engineering Mathematics", Khanna publishers, 43rd edition
- Kreyszig, "Advanced Engineering Mathematics " - Wiley, 2013

Reference Books:

- B.V.Ramana "Higher Engineering mathematics" Tata Mc Graw-Hill, 2006
- N P Bali and Manish Goyal, "A text book of Engineering mathematics”, Laxmi publications, latest edition.
- H. K Dass and Er. Rajnish Verma ,"Higher Engineerig Mathematics", S. Chand publishing, 1st edition, 2011

QUANTITATIVE TECHNIQUES IN ENGINEERING -II

Subject Code	19SMA24	IA Marks	:	50	
Number of lecture hours/week	04+01	Exam Marks	:	50	
Total number of lecture hours	50	Credits	:	04	

Course objectives:

To enable students to apply the knowledge of Mathematics in various engineering fields by making them to learn the following'

- Ordinary differential equations
- Partial differential equations
- Solve first order differential equations
- knowledge of interpolation and extrapolation

Course outcomes:

On completion of this course, students are able to,

CO1: Solve differential equations of electrical circuits, forced oscillation of mass spring.

CO2:Solve partial differential equations fluid mechanics, electromagnetic theory and heat transfer.

CO3: Recognize and solve first-order ordinary differential equations, Newton's law of cooling

CO4: Use Laplace transforms to determine general or complete solutions to linear ODE

CO5: To apply interpolation and numerical methods with integration technique whenever analytical methods fail or very complicated to offer solutions.

Module –1

Finite differences: Forward and backward differences, Newton's forward and backward interpolation formulae. Divided differences- Newton's divided difference formula. Lagrange's interpolation formula and inverse Interpolation formula (all formulae without proof)-Problems.

Numerical integration: Simpson's (1/3)th and (3/8)th rules, Weddle's rule (without proof) –Problems

10 hours

Module –2

Linear Differential Equation-first order: Solution of first order and first degree differential equations–, Exact, reducible to exact and Bernoulli's differential equations. Orthogonal trajectories in Cartesian and polar form. Simple problems on Newton's law of cooling.**10 hours**

Module –3

Linear Differential Equation-higher order: Basic review of first order differential equation -higher order differential equations with const coefficients-Particular integral for , $cosbx$, $sinbx$.Linear differential equations with variable coefficients: Solution of Cauchy's and Legendre's linear differential equations

10 hours

Module –4

Partial Differential equations: Formulation of Partial differential equations by elimination of arbitrary constants/functions, solution of non-homogeneous Partial differential equations by direct integration, solution of homogeneous Partial differential
equations involving derivative with respect to one independent variable only.

Module –5

Laplace transforms: Laplace transforms of elementary functions. Transforms of derivatives and integrals**,** transforms of periodic function and unit step function- Problems only

Inverse Laplace transform: convolution theorem to find the inverse Laplace transform (with out proof). Solutions of linear differential equation using Laplacetransform.

10 hours

Text Books:

- B. S. Grewal," Higher Engineering Mathematics", Khanna publishers, 43rd edition.
- Kreyszig, "Advanced Engineering Mathematics " - Wiley, 2013

Reference Books:

- B.V.Ramana "Higher Engineering Mathematics" Tata Mc Graw-Hill, 2006
- N P Bali and Manish Goyal, "A text book of Engineering mathematics" , Laxmi publications, latest edition.
- H. K Dass and Er. Rajnish Verma ,"Higher Engineerig Mathematics", S. Chand publishing,1st edition, 2011

LAB ON ENGINEERING CHEMISTRY OF MATERIALS LABORATORY SEMESTER - I/II

Laboratory Code	19SCHL15/25	IA Marks	50
Number of Lecture Hours/Week (Practicals)	3	Exam Marks	50
CREDITS	**2**	Exam Hours	03

Course objectives:

- To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

Course outcomes:

On completion of this course, students will have the knowledge in,

CO1: Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results

CO2: Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results

Instrumental Experiments

1. Estimation of FAS potentiometrically using standard $K_2Cr_2O_7$ solution.
2. Estimation of Copper colorimetrically.
3. Estimation of Acid (HCl v/s NaOH)conductometrically.
4. Determination of pKa of weak acid using pH meter.
5. Determination of Viscosity co-efficient of the given liquid using Ostwald's viscometer.
6. Estimation of Sodium and Potassium in the given sample of water using Flame Photometer.

Volumetric Experiments

1. Estimation of Total hardness of water by EDTA complexometric method.
2. Estimation of CaO in cement solution by rapid EDTA method.
3. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.
4. Estimation of Iron in haematite ore solution using standard $K_2Cr_2O_7$ solution by External Indicator method.

5. Estimation of Alkalinity (OH^-, CO_3^{--} & HCO_3^-) of water using standard HCl solution.
6. Determination of COD of waste water.

Conduction of Practical Examination:

1 . All experiments are to be included for practical examination.
2 . One instrumental and another volumetric experiments shall be set.
3 . Different experiments shall be set under instrumental and a common experiment under volumetric.
4 . Change of experiment is allowed only once and 15% Marks allotted to the procedure part to be made zero.

Reference Books:

1. G.H.Jeffery, J.Bassett, J.Mendham and R.C.Denney, **"Vogel's Text Book of Quantitative Chemical Analysis"**
2. O.P.Vermani & Narula, **"Theory and Practice in Applied Chemistry"** , New Age International Publisers.
3. Gary D. Christian, **"Analytical chemistry** ", 6th Edition, Wiley India.

COMPUTER AIDED ENGINEERING DRAWING

Sub Code :	**19 SMEL 16/26**	**IA Marks :**	**50**
Hrs/ Week :	**(2T+3L)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**
		Total Hours :	**51**

Course Objectives:

- Comprehend general projection theory, with emphasis on orthographic projection to representin two-dimensional views (principal, auxiliary, sections).
- Dimension and annotate two-dimensional engineering drawings.
- Understand the application of industry standards and best practices applied in engineeringgraphics.
- Emphasize freehand sketching to aid in the visualization process and to efficientlycommunicate ideas graphically.
- Introduction of CAD software for the creation of 2D engineering drawings.
- The theoretical concepts delivered in this course would help the students to understand the signconsiderations and tolerances to be used in the design and manufacture of engineeringcomponents

Course outcomes:

CO1: Students will able to apply the concept of theory of orthographic projection in solving problems of pointsand lines.

CO2: Students will be able to demonstrate and project the planes for different positions.

CO3: Students will be able to demonstrate and project the solids for different positions

CO4: Students will be able to improve their visualization skills so that they can apply these skills to develop asketch into an isometric and section the solids, draw the true shape of the section.

CO5: Students will able to demonstrate and sketch the drawings using software.

Module 1

Introduction to Computer Aided Sketching: Introduction,Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co- ordinate system and reference planes. Of HP, VP, RPP & LPP. of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions.

5 Hours

Module 2

Orthographic projections: Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (locatedin First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems). Orthographic Projections of Plane Surfaces (First Angle Projection Only)
Introduction, Definitions–projections of plane surfaces–triangle, square, rectangle, pentagon, hexagon and circle, planes in different positions by change of position method only(Simple numerical only).
(No problems on punched plates and composite plates).

14 Hours

Module 3

Projections of Solids: (First angle Projection only) Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions (No problems on octahedrons and combination solid).

15 Hours

Module 4

Sections And Development of Lateral Surfaces of Solids: Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of rightregular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on sections of solids) Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

08 Hours

Module 5

Isometric Projection (Using Isometric Scale Only) Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three solids).

09 Hours

Text Books:

1) **Engineering Drawing** - N.D. Bhatt & V.M. Panchal, 48th edition, 2005-Charotar Publishing House, Gujarat.
2) **"Computer Aided Engineering Drawing"** by Dr C N Chandrappa, Dr B Sudheer Premkumar Dr. M H Annaiah, Fifth edition, New Age InternationalPublishers.

Reference Books:

1) Computer Aided Engineering Drawing - S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006.
2) Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore.
3) Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production- Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005- Prentice- Hall of India Pvt. Ltd., New Delhi.
4) A Primer on Computer Aided Engineering Drawing-2006, Published byVTU, Belgaum.

Scheme of Examination:

Question paper pattern:

1. Module -1 is only for practice and Internal Assessment and not for examination.
2. The answer sheets will have to be jointly evaluated by the Internal & External examiners.
3. A maximum of **THREE** questions will be set as per the following pattern (No mixing of questions from different Modules).
4.Students have to submit the computer printouts and the sketches drawn on the graph sheets at the end of the examination. Both Internal & External examiners have to jointly evaluate the solutions (sketches)and computer display & printouts of each student for 100 marks (50 marks for solutions & sketches + 50 marks for computer display and printouts) and submit the marks list along with the solution (sketches) on graph sheets & computer printouts in separate covers. And reduce 100 Marks to 50 Marks (average of Each section).
5. Each batch must consist of a minimum of 10 students and a maximum of 12 students.
6.Examination can be conducted in parallel batches, if necessary.

Q.No.	From Chapter	Marks Allotted
Q.1	Module 2 (Choice between Poins+Lines or Planes)	30
Q.2	Module 3	40
Q.3	Module 4 or Module 5	30

Scheme of Evaluation :

Q.No.	Solutions and Sketching in the graph book	Computer display and printout	Total Marks
Q.1	15	15	30
Q.2	20	20	40
Q.3	15	15	30
Total Marks	**50**	**50**	**100**

LAB ON SPREADSHEET PROGRAMMING

Sub Code :	19SCSL18/28	IAMarks :	50
Hrs/ Week :	3	Exam Hours :	3
Credits :	2	Exam Marks:	50
		Total Hours :	36

EXPERIMENTS:

Exercise 1

Objectives:

- Introduction to MS Excel files, Workbooks, Worksheets, Columns and Rows.
- Formatting Worksheets.
- AutoFill, Numeric formats, previewing worksheets.

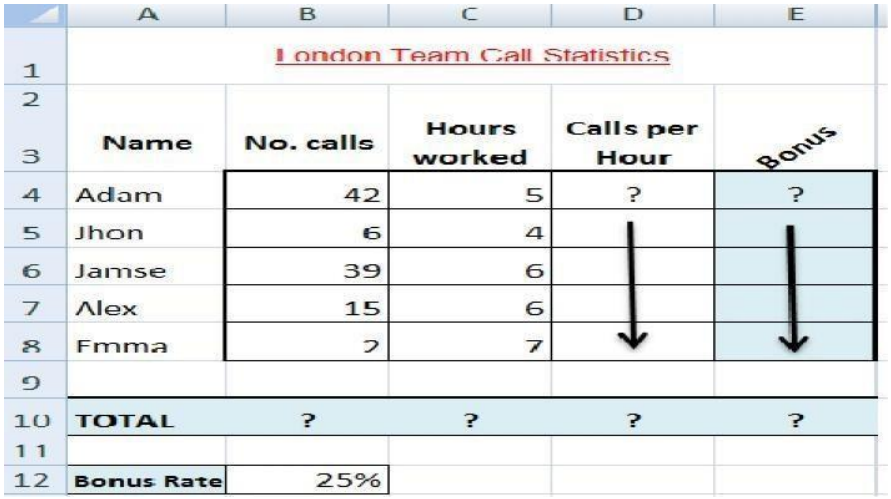
	A	B	C	D	E	F	G
1	Payroll						
2	Date:	1/1/2011					
3	EMPL Number	EMPL Name	Hourly Rate	Hours Worked	Gross Pay	S.S Tax	Net Pay
4	E00001	Ford	7.5	35	?	?	?
5	E00002	Mino	8	30	?	?	?
6	?	Bell	6.5	25	?	?	?
7	?	Davis	9	40	?	?	?
8	?	Turro	10	39	?	?	?

1. Open a new workbook and save the file with the name “Payroll”.
2. Enter the labels and values in the exact cells locations as desired.
3. Use AutoFill to put the Employee Numbers into cells A6:A8.
4. Set the columns width and rows height appropriately.
5. Set labels alignment appropriately.
6. Use warp text and merge cells as desired.
7. Apply borders, gridlines and shading to the table as desired.
8. Format cell B2 to Short Date format.
9. Format cells E4:G8 to include dollar sign with two decimal places.
10. Calculate the Gross Pay for employee; enter a formula in cell E4 to multiply Hourly Rate by Hours Worked.
11. Calculate the Social Security Tax (S.S Tax), which is 6% of the Gross Pay; enter a formula in cell F4 to multiply Gross Pay by 6%.
12. Calculate the Net Pay; enter a formula in cell G4 to subtract Social Security Tax from GrossPay.
13. Set the work sheet vertically and horizontally on the page.
14. Save your work.

Exercise 2

Objectives:

- Using Formulas.
- Header and Footers



	A	B	C	D	E
1	London Team Call Statistics				
2					
3	Name	No. calls	Hours worked	Calls per Hour	Bonus
4	Adam	42	5	?	?
5	Jhon	6	4		
6	Jamse	39	6		
7	Alex	15	6		
8	Fmma	?	7		
9					
10	TOTAL	?	?	?	?
11					
12	Bonus Rate	25%			

1. Open a new workbook and save the file with the name "Call Statistics".
2. Delete Sheet 2 & 3, and rename Sheet 1 to (Call Statistics).
3. Enter the labels and values in the exact cells locations as desired.
4. Set the row height of rows 1 & 3 to size 30; and rows 4 until 10 to size 20.
5. Set labels alignment appropriately.
6. Use Warp Text, Orientation and merge cells as desired.
7. Apply border, gridlines and shading to the table as desired.
8. Format column E to include Rupee sign with two decimal places.
9. Format cell B12 to include % sign with 0 Decimal places.
10. Calculate the Calls per Hour, enter a formula in cell D4 to divide numbers of calls by Hours worked. Using AutoFill, copy the formula to the remaining cells.
11. Calculate the Bonus. Enter a formula in cell E4 to multiply 'Calls per Hours' by the fixed Bonus Rate in cell B12. Using AutoFill, copy the formula to the remaining cells.
12. Calculate the 'TOTAL'.
13. Set the worksheet vertically and horizontally on the page.
14. Create a header that includes your name in the left section, and your ID number

Exercise 3

Objectives:

- Number, Commas and Decimal numeric formats.
- Working with Formulas (Maximum, Minimum, Average, Count and Sum).
- Percentage Numeric Formats.

	A	B	C	D	E	F
1	Panda EST					
2	Monthly Sales Report - July					
3						
4	**Emp. No.**	**Name**	**Salary**	**Sales Amount**	**Comission**	**Total Salary**
5	S101	Ahmed	1600	2500	?	?
6	S105	Hassan	1800	3000		
7	S112	Ali	1500	2200		
8	S107	Waleed	2000	4500		
9	S110	Mohammed	1700	3500		
10	S103	Samir	1600	2500		
11						
12		**Totals**	?	?	?	?
13		**Average**	?	?	?	?
14		**Highest**	?	?	?	?
15		**Lowest**	?	?	?	?
16		**Count**	?			

1. Create the worksheet shown above.
2. Set the **column widths** as follows: Column A: 8, Column B: 14, Columns C & D: 15, Columns E & F: 14.
3. Enter the formula to find COMMISSION for the first employee.
The commission rate is 2% of sales, **COMMISSION = SALES * 2%**
Copy the formula to the remaining employees.
4. Enter the formula to find TOTAL SALARY for the first employee where:

TOTAL SALARY = SALARY + COMMISSION
Copy the formula to the remaining employees.
5. Enter formula to find **TOTALS**, **AVERAGE**, **HIGHEST**, **LOWEST**, and **COUNT** values.

Copy the formula to each column.
6. Format numeric data to include **commas** and **two decimal places**.
7. Align all column title labels horizontally and vertically **at thecenter**.
8. Create a **Header** that includes your name in the left section, page number in the center section, and your ID number in the right section.
9. Create **footer** with DATE in the left section and TIME in the right section.
10. Save the file with name Exercise 3.

Exercise 4

Objectives:

- Working with the IF Statement.

	A	B	C	D	E	F	G
1	ITEM NO.	NO. OF ITEMS	ITEM PRICE	TAX	TOTAL PRICE BEFORE TAX	TOTAL PRICE AFTER TAX	RATE
2	100	115	30				
3	101	256	12				
4		49	56				
5		23	150				
6		840	5				
7		200	56				
8		294	300				
9		4	90				
10							
11	Count of items		?				
12	Average of tax		?				
13	Min ITEM PRICE		?				
14	Max ITEM PRICE		?				

For the above table find the following:

1. TAX (If ITEM PRICE is less than 100, TAX is 50, otherwise it should be 100).
2. TOTAL PRICE BEFORE TAX =NO. OF ITEMS * ITEM PRICE.
3. TOTAL PRICE AFTER TAX = TOTAL PRICE BEFORE TAX +TAX.
4. RATE (If TOTAL PRICE AFTER TAX > 3500 then the rate is “HIGH”, otherwise it is REASONABLE.
5. Find Count of Items, Average of Taxes, Min Item PRICE and Max Item PRICE.
6. Save file as Exercise 4.

Exercise 5

Objectives:

- Working w ith Sum IF and Count IF statements.
- Inserting Charts.

	A	B	C	D	E	F	G
1	Sales and Profit Report - First Quarter 2012						
2	**No**	**City**	**Jan**	**Feb**	**Mar**	**Average**	**Maximum**
3	C001	New York	$22,000.00	$29,000.00	$19,000.00	?	?
4	C002	Los Angeles	$42,000.00	$39,000.00	$43,000.00	?	?
5	?	London	$18,000.00	$20,000.00	$22,000.00	?	?
6	?	Paris	$35,000.00	$26,000.00	$31,000.00	?	?
7	?	Munich	$12,000.00	$15,000.00	$13,000.00	?	?
8		**Total Sales**	?	?	?		
9		**Cost**	$83,000.00	$84,000.00	$43,000.00		
10		**Profit**	?	?	?		
11		**10% Bonus**	?	?	?		
12							
13		**Total Sales greater than 30,000**	?	?	?		
14		**No Sales greater than 30,000**	?	?	?		

1. Create the worksheet shown above.
2. Set the Text alignment, Columns width and high appropriately.
3. Use AutoFill to put the Series Numbers into cells A5:A7.
4. Format cells C3:G7, C8:E11, C13:E13 to include dollar sign with two decimal places.
5. Find the Average Sales and Maximum Sales for each City.
6. Find the Total Sales for each Month.
7. Calculate the Profit for each month , where profit = Total Sales – Cost
8. Calculate the 10% Bonus, which is 10% of the Profit.
9. Find the Total Sales for each Month; only for sales greater than 30,000.
10. Find the No of Sales for each Month; only for sales greater than 30,000.
11. Create the following Charts:


Maximum Sales in each city
11%
20%
24%
30%
15%
New York
Los Angeles
London
Paris
Munich

CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS

Subject Code	:	19SCP 16/26	IA Marks	50
Number of lecture hours/week	:	2	Exam Marks	50
Total number of lecture hours	:	20	Credits	02

Course Objectives:

1. To provide basic information about Indian constitution.
2. To make students familiar with special provisions and constitutional remedies guaranteed by Indian constitution.
3. To identify individual role and ethical responsibility towards society.
4. To create an awareness on Engineering ethics and Human values.

Course Outcomes:

CO1: On Completion of this course, students will be able to understand the role of human being in ensuring harmony in society and nature.
CO2: They will be able to understand state and central policies, fundamental rights and duties.
CO3: Students can understand engineering ethics and responsibilities of engineers.
CO4: Students will be able to have general knowledge about Indian constitution, special provisions of constitution and assured constitutional remedies

Module –1:

Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations. **4 hours**

Module –2:

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties Union Executives – President, Prime Minister Parliament Supreme Court of India. **4 hours**

Module –3:

State Executives – Governor, Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments. **4 hours**

Module –4:

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Working of National Human Rights Commission in India. **4 hours**

Module –5:

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering **4 hours**

Text Books:

1. Durga Das Basu: **"Introduction to the Constitution on India",**(Students Edn.) Prentice–Hall EEE, 19 th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.
3. M.V.Pylee, "An Introduction to Constitution of Indi a", Vikas Publishing, 2002.
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004

ENGINEERING PHYSICS OF MATERIALS

Subject Code	19SPH11/21	IA Marks	50
Hours/Week	4	Exam Marks	50
Total Number of Lecture Hours:	50	Exam Hours	2

Course Objectives:

- To make students learn and understand basic concepts and principles of Physics.
- To make students familiar with latest trends in material science research.
- To make students learn about novel materials and its applications.

Course outcomes:

On Completion of this course, students are able to

CO1: Learn and understand more about basic principles and to develop problem solving skills and implementation in technology.

CO2:Study of material properties and their applications is the prime role to understand and use in engineering applications and studies.

CO3:Understand Crystal structure and applications to boost the technical skills and its applications.

CO4: Understand basic concepts of magnetism, nano science and technology.

Module-1

Electrical properties of metals

Classical free electron theory-Free–electron concept (Drift velocity, Thermal velocity, Mean collision time, Mean free path, relaxation time) –Expression for electrical conductivity-Matthiessen's rule of electrical resistivity- Failure of classical free electron theory.

Quantum free electron theory, Assumptions, Fermi factor, Fermi–Dirac Statistics. Expression for electrical conductivity based on quantum free electron theory, Merits of quantum free electron theory. Hall effect (Qualitative)- Wiedmann-franz law

10 Hours

Module – 2

Laser and Fiberoptics

Interaction of radiation with matter – Absorption-Spontaneous emission – Stimulated emission-Einstein's coefficients (expression for energy density). Requisites of a Laser system.Condition for laser action. Principle, Construction and working of He-Ne laser Holography–Principle of Recording and reconstruction of images.

Propagation mechanism in optical fibers. Angle of acceptance. Numerical aperture. Types of optical fibers and modes of propagation. Attenuation, Block diagram discussion of point to point communication ,applications.

10 Hours

Module-3

Science of superconducting materials and magnetic materials

Temperature dependence of resistivity in metals and superconducting materials. Effect of magnetic field (Meissner effect). Isotope effect - Type I and Type II superconductors– Temperature dependence of critical field. BCS theory (qualitative).Magnetic dipole- dipole moment-flux density-magnetic field intensity-Intensity of magnetization-magnetic permeability-susceptibility-relation between permeability and susceptibility-classification of magnetic materials- Dia, Para, Ferromagnetism. Hysteresis-soft and hard magnetic materials.

10 Hours

Module -4

Crystal Structure

Space lattice, Bravais lattice–Unit cell, primitive cell. Lattice parameters. Crystal systems. Direction and planes in a crystal. Miller indices. Expression for inter – planar spacing. Co-ordination number. Atomic packing factors (SC,FCC,BCC).Bragg's law, Determination of crystal structure using Bragg's X–ray difractometer. Polymorphism and Allotropy.

10 Hours

Module-5

Science of Nanomaterials

Introduction to Nano Science, Shapes of nanomaterials-Quantum well-quantum wire-quantum dot-Density of states in 1D, 2D and 3D structures.Synthesis:Top–downandBottom–

upapproach,BallMilling–Planetaryballmill-Sol–Gelmethod. Carbonnanotube–Properties,structures,synthesis:Arcdischarge,Pyrolysismethods,Applications.

10 Hours

Text Books:

1. S.O.Pillai ‘Solid state physics’, New Age international, sixthedition.

2. Dr.M.N.Avadhanulu,Dr.P.G.Kshirsagar,TextBookofEng

ineering Physics, S Chand Publishing, New Delhi -2012

3. Prof. S. P. Basavaraju, Engineering Physics, SubhasStores,

COMPUTER SOFTWARE CONCEPT & PROGRAMMING (T)

Sub Code :	**19SCS12/22**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

The objectives of this course is to make students to

- Learn basic principles of Problem solving.
- Implement through C programming language and to design & develop programming skills.
- To gain knowledge of data structures and their applications.

Course outcomes:

After studying this course, students will be able to:

CO1: Achieve Knowledge of design and development of C problem solving skills.

CO2: Understand the basic principles of Programming in C language.

CO3: Design and develop modular programming skills.

CO4: Effective utilization of memory using pointer technology.

CO5: Understands the basic concepts of pointers and data structures.

MODULE -1: INTRODUCTION TO C LANGUAGE

Pseudo code solution to problem, Basic concepts in a C program, Declaration, Assignment, & Print statements, Data Types, operators and expressions etc, Programming examples and exercise.

Text 1: Chapter 2,and **Text 2:** 1.1, 1.2, 1.3

10 Hours

MODULE - 2: BRANCHING AND LOOPING

Two way selection (if, if-else, nested if-else, cascaded if-else), switch statement, ternary operator? Go to, Loops (For, while-do, do-while) in C, break and continue, Programming examples and exercises.

Text 1: Chapter 3**.**

10 Hours

MODULE – 3:FUNCTIONS, ARRAYS AND STRINGS

ARRAYS AND STRINGS: Using an array, Using arrays withFunctions, Multi-Dimensional arrays. String:

Declaring, Initializing, Printing and reading strings, string manipulation functions, String input and output functions, array of strings, Programming examples and Exercises.

Text 1: 5.7, & **Text 2**: 7.3, 7.4, chapter 9

FUNCTIONS: Functions in C, Argument Passing – call by value,call by reference, Functions and program structure, location of functions, void and parameter less Functions, Recursion, Programming examples and exercises.

Text 1: 1.7, 1.8, Chapter 4. **Text 2:** 5.1 to 5.4.

10 Hours

MODULE – 4: STRUCTURES AND FILE MANAGEMENT

Basic of structures, structures and Functions, Array of structures, structure Data types, type definition, Defining, opening and closing of files, Input and output operations, Programming examples and exercises.

Text 1: 6.1 to 6.3.**Text 2**: 10.1 to 10.4, Chapter 11.

10 Hours

MODULE-5:POINTERS AND PREPROCESSORS & DATA STRUCTURES

Pointers and address, pointers and functions (call by reference) arguments, pointers and arrays, address arithmetic, character pointer and functions, pointers to pointer ,Initialization of pointer arrays, Dynamic memory allocations methods, Introduction to Preprocessors, compiler control Directives, Programming examples and exercises.

Text 1: 5.1 to 5.6, 5.8. **Text 2: 12.2,** 12.3**, 13.1 to13.7**

Introduction to Data Structures: Primitive and non primitivedata types, Abstract data types, Definition and applications of Stacks, Queues, Linked Lists and Trees.

Text 2: 14.1, 14.2, 14.11, 14.12, 14.13, 14.15, 14.16, 14.17, 15.1.

10 Hours

Text Books:

1. Brian W. Kernighan and Dennis M. Ritchie: The C Programming Language, 2nd Edition, PHI, 2012.
2. Jacqueline Jones & Keith Harrow: Problem Solving with C, 1st Edition, Pearson 2011.

Reference Books:

7. Vikas Gupta: Computer Concepts and C Programming, Dreamtech Press 2013.
8. R S Bichkar, Programming with C, University Press, 2012.
9. V Rajaraman: Computer Programming in C, PHI, 2013.

ELEMENTS OF ELECTRICAL AND ELECTRONICS

Subject Code :19EC13/23	**IA Marks 50**
Hours/Week :4	**Exam Hours 2**
Credits:4	**Total Hours 50**

Course Objectives:

- To provide basic concepts d.c circuits and circuit analysis techniques
- To provide knowledge on a.c circuit fundamentals techniques
- To Understand Construction and operation of BJT and Junction FET
- To provide basic idea of Feedback. and Operational Amplifiers.
- Provides fundamental knowledge of Digital Logic.

Course outcomes:

After completion of this course, student will be able to :

CO1. Understand concepts of electrical circuits and elements

CO2. Apply basic electric laws in solving circuit problems.

CO3. Analyze simple circuits containing transistors and FETs

CO4. Understand concept of Feedback and Design simple Op-Amp circuits

CO5. Understand Number systems and design basic digital circuits

Module 1

D.C. Circuits :

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation.

Superposition, Thevenin and Norton Theorems. Maximum Power Transfer Theorem, Time- domain analysis of first-order RL and RC circuits. **10 Hours**

Module 2

Circuits : Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections. **10 Hours**

Module 3

Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point,

Voltage Divider Bias Configuration; Small Signal Amplifiers: Common Emitter Amplifier, Coupling and Bypass Capacitors, Distortion, AC Equivalent Circuit; Transistor as a Switch. Field Effect Transistor (FET) – Construction, Characteristics of Junction FET **10 Hours**

Module 4

Feedback Amplifiers – Principle, Advantages of Negative Feedback, Topologies, Current Series and Voltage Series Feedback Amplifiers;

Oscillators – Classification, RC Phase Shift, Wien Bridge, High Frequency LC and Non-Sinusoidal type Oscillators;

Operational Amplifiers and Applications covering, Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram, Pin Configuration of 741 Op-Amp, Characteristics of Ideal OpAmp, Concept of Virtual Ground; 10 **Hours**

Module 5

Digital Electronics: Number systems and its arithmetic, binary codes.

Boolean-algebra & simplification of Boolean expression. Logic gates, concept of universal logic; implementation of Boolean expressions using logic gates.Application of digital circuits (e.g. adder, subtractor, multiplexer, demultiplexer,).

Flip Flops : Introduction to Flip-Flops , RS Flip-Flop, Gated Flip-Flops: Clocked RS Flip-Flop **10 Hours**

Text Books:

1. D.P. Kothari and I.J. Nagrath, Basic Electrical Engineering, 3rd edition 2010, Tata McGraw Hill.
2. Albert Malvino, Electronic Principles, 6th edition (2010), McGraw Hill
3. Thomas L. Floyd and R. P. Jain (2009), Digital Fundamentals by Pearson Education,

Reference Books:

1. Basic Electrical Engineering - D.C. Kulshreshtha, 2009, Tata McGraw Hill.
2. R. T. Paynter (2009), Introductory Electronic Devices & Circuits, Conventional Flow Version, Pearson
3. 3. Robert Boylestad, Louis Nashelsky , Electronic Devices And Circuit Theory, 10th Edition, Pearson

4. Ramakant A Gayakwad, “Op-Amps and Linear Integrated Circuits,” Pearson, 4th Ed, 2015.
5. Donald P Leach, Albert Paul Malvino & Goutam Saha: Digital Principles and Applications, 8th Edition, Tata McGraw Hill, 2015

LAB ON ENGINEERING PHYSICS OF MATERIALS

:50

SubjectCode:	19SPH17/27	IA Marks	**50**
LabHours/Week	**3**	Exam Marks	**50**
Total Number of LectureHours	**42**	Exam Hours	**3**

Course Objectives:

The Objective of this course is to make the students gain practical knowledge to co-relate with thetheoretical studies. To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop and fabricate engineering and technical equipments. Design of circuits using new technology and latest components and to develop practical applications of engineeringmaterialsanduseofprincipleintherightwaytoimplementthemoderntechnology.

Course Outcomes:

On Completion of this course, students are able to –

CO1: Develop skills to impart practical knowledge in real time solution.

CO2:Understand principle, concept, working and application of new technology and comparison of results with theoreticalcalculations.

CO3:Design new instruments with practical knowledge.

CO4:Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoreticalproblems.

CO5:Understand measurement technology, usage of new instruments and real time applications in engineeringstudies.

EXPERIMENTS:

1. Dielectric constant (Measurement of dielectricconstant).
2. Determination of Fermi energy. (Measurement of Fermi energy incopper).
3. Uniform Bending Experiment (Determination of Young's modulus of materialbar).
4. Torsional pendulum (Determination of M.I. of wire and Rigiditymodulus).
5. Photo Diode Characteristics (Study of I–V characteristics in reverse bias and variation of photocurrent as a function of reverse voltage andintensity).
6. I–V Characteristics of Zener Diode. (Determination of knee voltage, zener voltage and forward resistance).
7. Diffraction (Measurement of wavelength of laser source using diffractiongrating).
8. Characteristics of Transistor (Study of Input and Output characteristics and calculation of input resistance, output resistance and amplificationfactor.
9. Series and parallel LCR Circuits (Determination of resonant frequency and quality factor).
10. Verification of Stefan'sLaw.

11. Newton’s Rings, (Determination of radius of curvature of plano convexlens).

12. Black box experiment; Identification of unknown passive electrical components and determine the value of Inductance andCapacitance.

13. Energy gap of asemiconductor.

14. Determination of Planck’sconstant.

Note:

1) Any ten experiments are to beconducted.

2) Two experiments are to be performed by the students in theexamination.

ELECTRICAL AND ELECTRONICS LAB

SubjectCode:	19SECL16/26	IA Marks	**50**
LabHours/Week	**3**	Exam Marks	**50**
Total Number of LectureHours	**42**	Exam Hours	**3**

Course Objectives:

To provide fundamental exposure to

- Common electrical components such as Resistors, capacitors andinductors,
- Types of wires and measuringinstruments.
- Techniques to analyzecircuits.
- Rectifiers andfilters
- Amplifiers,Oscillator
- DigitalCircuits
- Transistor and OPAMPAmplifiers

Course outcomes:

After completion of this course, student will be able to :

CO1. Understand identify and use Components and circuit elements.

CO2. Understand usage of electronic instruments.

CO3. Understand the rectification function of diode.

CO4. Practically understand basic electric laws in solving circuit problems.

CO5. Design and construct circuits containing transistors.

CO6. Understand operation o Op-Amp as amplifiers.

CO7. Understand Logic circuits and gates.

CO8. Understand generation of waveforms.

Experiment 1: Identification of Electrical and Electronic Components

Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT and DIP), Bread Boards and Printed Circuit Boards (PCBs); Identification, Specifications, Testing of Active Devices – Diodes, BJTs, JFETs, MOSFETs, Power Transistors, SCRs and LEDs;

Experiment 2: Study and Operation of Electronic Instruments

Study and Operation of Digital Multi Meter, Function / Signal Generator, Regulated Power Supply (RPS), Cathode Ray Oscilloscopes; Amplitude, Phase and Frequency of Sinusoidal Signals using

Lissajous Patterns on CRO; (CRO);

Experiment 3 : Study of Half Wave and Full Wave Rectification, Regulation with Filters

Experiment 4 : Verification of Thevenin's theorem

Experiment 5 : Verification of Superposition theorem

Experiment 6 : Maximum Power Transfer Theorem.

Experiment 7: BJT Common Emitter (CE) Amplifier: Gain and Bandwidth .

Experiment 8: Logic Gates Using Diodes and Transistors

Experiment 9: Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR Integrated Circuits(ICs);

Experiment 10: Truth Tables and Functionality of Flip-Flops – SR, JK and D Flip-Flop ICs;

Experiment 11: Square Wave Generation.(Transistor Astable Multivibrator)

Experiment 12: Operational Amplifier. Non Inverting and Inverting amplifiers

LAB ON COMPUTER PROGRAMMING

SubjectCode:	19SCSL17/27	IA Marks	**50**
LabHours/Week	**3**	Exam Marks	**50**
Total Number of LectureHours	**42**	Exam Hours	**3**

Course Objectives:

1. To understand the various steps in program development.
2. To learn the syntax and semantics of C programming language.
3. To learn the usage of structured programming approach in solving problems.

Course Outcomes:

CO1: On completion of this course students will beable to write algorithms and to draw flowcharts for solving problems.

CO2: On completion of this course students will beable to convert the algorithms/flowcharts to C programs.

CO3: Students will beable to code and test a given logic in C programming language.

CO4: Students will be able to decompose a problem into functions and to develop modular reusable code.

CO5: Students will be able to use arrays, pointers, strings and structures to write C programs.

Descriptions (if any):

Demonstration of Personal Computer and its Accessories: Demonstration andExplanation on Disassembly and Assembly of a Personal Computer by the faculty-in-charge. Students have to prepare a write-up on the same andinclude it in the Lab record and evaluated.

LaboratorySession-1: Write-uponFunctionalblockdiagramofComputer,CPU,Buses,MotherBoard,Chip sets,OperatingSystem&typesofOS,BasicsofNetworking&TopologyandNIC.

Laboratory Session-2: Write-up on RAM, SDRAM, FLASH memory, Hard disks, Optical media, CD-ROM/R/RW, DVDs, Flash drives, Keyboard, Mouse, Printers and Plotters. Introduction to flowchart, algorithm and pseudo code.

Note: TheseTWO Laboratory sessionsare used to fill the gap between theory classes and practical sessions. Both sessions are to be evaluated as lab experiments.

Laboratory Experiments:

Implement the following programs with WINDOWS / LINUX platform using appropriate C compiler.

1. Design and develop a flowchart or an algorithm that takes three coefficients (***a***, ***b***, and ***c***) of a Quadraticequation (***a***x^2+***b***x+***c***=0) as input and compute all possible roots. Implement a C program for the developed flowchart/algorithm and execute the same to output the possible roots for a given set of coefficients with appropriatemessages.
2. Design and develop an algorithm to find the ***reverse*** of an integer number **NUM** and check whether it is PALINDROME or NOT. Implement a C program for the developed algorithm that takes an integer number as input and output the reverse of the same with suitable messages. Ex: Num: **2014**, Reverse: **4102**, Not a Palindrome
3. a)Designanddevelopaflowcharttofindthesquarerootofagivennumber ***N***. ImplementaCprogramforthesameandexecuteforallpossibleinputswithappropriate messages. Note: **Don't use library functions*qrt (n)*.**

b) Design and develop a C program to read a ***year*** as an input and find whether it is ***leap year*** or not. Also consider end of the centuries.

4. Design and develop an algorithm to evaluate polynomial **f(x) = a_4x^4+ a_3x^3+ a_2x^2+ a_1x+a_0**,for a given value of***x***anditscoefficientsusingHorner'smethod.ImplementaCprogramforthesameandexecutetheprogram with different set of values of coefficients and***x.***
5. Draw the flowchart and Write a C Program to compute **Sin(x)** using Taylor series approximation given by **Sin(x) = x - (x^3/3!) + (x^5/5!) - (x^7/7!) + …….** Compare your result with the built-in Library function. Print both the results with appropriatemessages.
6. Develop an algorithm, implement and execute a C program that reads ***N*** integer numbers and arrange them in ascending order using ***BubbleSort***.
7. Develop,implementandexecuteaCprogramthatreadstwomatrices***A*****(mxn)**and***B*****(pxq)**andCompute product of matrices ***A*** and ***B***. Read matrix ***A*** and matrix ***B*** in rowmajor order and in column major order respectively. Print both the input matrices and resultant matrix with suitable headings and output should be in matrix format only. Program must check the compatibility of orders of the matrices for multiplication. Report appropriate message in case ofincompatibility.
8. Develop, implement and execute a C program to search a Name in a list of namesusing **Binarysearching**Technique.
9. Write and execute a C programthat

   i. Implementsstringcopyoperation**STRCOPY**(str1,str2)thatcopiesastring*str1*toanother string *str2* without using libraryfunction.

   iv. Reada*sentence*andprintfrequencyofvowelsandtotalcountofconsonants.
10. a) Design and develop a C function **RightShift***(x ,n)* that takes two integers *x*and *n* as input and returns valueoftheinteger*x*rotatedtotherightby*n*positions.Assumetheintegersareunsigned.WriteaC program that invokes this function with different values for *x* and *n* and tabulate the results with suitable headings.

b) Design and develop a C function **isprime**(num) that accepts an integer argument and returns 1 if the argument is prime, a 0 otherwise. Write a C program that invokes this function to generate prime numbers between the given ranges.

11. Draw the flowchart and write a **recursiveC** function to find the factorial of number, ***n*!**, defined by *fact*(*n*)=1, if *n*=0.Otherwise*fact*(*n*)=*n***fact*(*n*-1). Using thisfunction, write a C program to compute the binomialcoefficient$_{n}C_{r}$.Tabulatetheresultsfordifferentvaluesof***n***and***r***withsuitablemessages.
12. Given two university information files "**studentname.txt**" and "**usn.txt**" that contains students Name and USN respectively. Write a C program to create a new file called "**output.txt**" and copy the content of files "**studentname.txt**" and "**usn.txt**" into output file in the sequence shown below. Display the contentsof output file "**output.txt**" on to thescreen.

Student Name	USN
Name 1	USN 1
Name 2	USN 2
……..	…….
……..	…….

Heading

13. Write a C program to maintain a record of **n** student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Assume appropriate data type for each field. Print the marks of the student, given the student name asinput.
14. Write a C program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of **n** realnumbers.

TECHNICAL ENGLISH (ESEP)

Subject Code	19SPE18	IA Marks	25
Number of lecture hours/week	1L +1T	Exam Marks	25
Total number of lecture hours	25	Total Marks	50
Credits	01	Exam Hours	1 Hour

Course Objectives:

To enable the learner -

1. to communicate effectively and appropriately in real-life situation.
2. to use English effectively for study purpose across the curriculum.
3. to develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking, Writing.
4. to revise and reinforce structure already learnt.
5. to familiarize the learners with the Technicalities of communication.

Course Outcomes:

After studying this course, students should be able to:

CO1: Demonstrate and apply appropriate study skills for college success, including but not limited to annotation, note taking, completion of assignments, and reflective journal writing.

CO2:Employ a writing process and demonstrate the ability to write clear sentences and construct paragraphs and essays that effectively make use of supporting details, examples, and evidence

CO3: Use a variety of reading strategies to foster comprehension and to construct personally meaningful and culturally relevant connections to the text.

CO 4: Employ a writing process and demonstrate the ability to write clear sentences and construct paragraphs and essays that effectively make use of supporting details, examples, and evidence.

Module – 1

Types of Nouns, Noun Number, Correct usage of Nouns, Pronouns, Correct usage of Pronouns, Verb Types, Regular and Irregular Verbs

Teaching Methodology:

Chalk & Talk, Self-learningOnline tests.

5 Hours

Module – 2

Subject – Verb agreement, Non – finite Verbs, Adjectives, Correct usage of Adjectives, Articles, Adverbs, Correct usage of Adverbs

Teaching Methodology:

Chalk & Talk, Self-learning Online tests.

5 Hours

Module – 3

Prepositions, Correct usage of Prepositions, Conjunctions, Correct usage of Conjunctions Interjections, Kinds of Sentences, Sentence – Subject and Predicate, Phrases Clauses, Combining sentences.

Teaching Methodology:

Chalk & Talk, Self-learning Online tests.

5 Hours

Module – 4

Punctuations, Vocabulary, Spelling rules, Prefixes Suffixes Learning Roots, More Roots, Foreign language terms, Business terms Technology terms

Teaching Methodology:
Chalk & Talk, Self-learningOnline tests.

5 Hours

Module – 5

Legal terms, Terms relating to Language and Literature, Short words that mean a lot, Adjectives, Acronyms, Commonly tested words, More Commonly tested words, Philosophical terms

Teaching Methodology:
Chalk & Talk, Self-learningOnline tests.

5 Hours

Assessment Method

Six Internal Tests are conducted by Online method and average of Highest two internal marks is considered for IA marks.

Final examination is conducted in Online Method for 25 marks. Duration of the exam is 60 minutes.

Reference Books:

1. Effective Technical Communication - Ashraf Rizvi M, TMH, 2005.
2. Business Communication - Sehgal M. K &Khetrapal V, Excel BOOKS.
3. Business Communication – Krizan, Merrier, Jones, 8/e, Cengage Learning, 2012.

Text books:

1. Basic Business Communication – Raj Kumar, Excel BOOKS, 2010.
2. Communicative English –E.Suresh Kumar, P.Sreehari, Orient Blackswan.
3. English for Engineering and Management- Dr.Sutapa Banerjee, S.Chand.

PROFESSIONAL ENGLISH (ESEP)

Subject Code	19SPE28	IA Marks	25
Number of lecture hours/week	1L +1T	Exam Marks	25
Total number of lecture hours	25	Total Marks	50
Credits	01	Exam Hours	1 Hour

Course Objectives:

To enable the learner -

1. to communicate effectively and appropriately in real-life situation.
2. to use English effectively for study purpose across the curriculum.
3. to develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking, Writing.
4. to revise and reinforce structure already learnt.
5. to familiarize the learners with the Technicalities of communication.

Course Outcomes:

After studying this course, students should be able to:

CO1: Demonstrate and apply appropriate study skills for college success, including but not limited to annotation, note taking, completion of assignments, and reflective journal writing.

CO2:Employ a writing process and demonstrate the ability to write clear sentences and construct paragraphs and essays that effectively make use of supporting details, examples, and evidence

CO3: Use a variety of reading strategies to foster comprehension and to construct personally meaningful and culturally relevant connections to the text.

CO 4: Employ a writing process and demonstrate the ability to write clear sentences and construct paragraphs and essays that effectively make use of supporting details, examples, and evidence.

Module – 1

Capitalization, General rules of Capitalization, Capitalization of Pronouns, Capitalization of Adjectives, Rules for using Periods, Full – stop, Question marks, Exclamation points, Faulty sentences, Commas, Using Commas in–Introductory words, Phrases and Clauses, Commas with Appositives, Commas and Non- restrictive clauses, Commas to separate other elements of a sentence.

Teaching Methodology:

Chalk & Talk, Self-learningOnline tests.

5 Hours

Module – 2

Semi – colon, Apostrophes, Rules for correct usage, Quotation marks, Rules regarding Punctuating within Quotation marks, Designer punctuations, Rules for correct usage of the Designer punctuations – Hyphens, Parentheses, Brackets, Ellipses, Diagonals and Numbers **Teaching Methodology:**

Chalk & Talk, Self-learning Online tests.

5 Hours

Module – 3

Verb tenses, Principal parts of Verbs, Consistent Verb tense, Present, Past and Future Tense Forms, Switching Verb Tenses, Subjunctive Mood, Using Verbs, Guidelines on when to use Active and Passive Voice, How to use Verbs for better sentence construction, Subject – Verb agreement, Agreement between Noun Subjects and Verbs, Agreement between Pronoun Subjects and Verbs, Compound Subjects and Verb agreement, Using Pronouns, Pronouns and incomplete sentence constructions, Improper Reflexive

Pronouns

Teaching Methodology:

Chalk & Talk, Self-learning Online tests.

5 Hours

Module – 4

Problem Verbs, Correct usage of a few problem Verbs and Pronouns, Modifiers, Correct usage of Adjectives and Adverbs, Comparative form of the modifiers, Double Comparisons, Double Negatives, Misplaced Modifiers, Dangling Modifiers, easily confused word pairs, Idioms and Phrases, Some commonly used Idioms and their meaning.

Teaching Methodology:

Chalk & Talk, Self-learningOnline tests.

5 Hours

Module – 5

Letter writing, Informal and Formal letters, Format of an Informal letter, Precis writing, Essential features of a good précis, Important points while making a précis, Reading Comprehension, Concept, Vocabulary knowledge, Text comprehension, Comprehension strategies, Understanding of Passage Structure, Answering questions

Teaching Methodology:

Chalk & Talk, Self-learningOnline tests.

5 Hours

Assessment Method

Six Internal Tests are conducted by Online method and average of Highest two internal marks is considered for IA marks.

Final examination is conducted in Online Method for 25 marks. Duration of the exam is 60 minutes.

Reference Books:

1. Effective Technical Communication - Ashraf Rizvi M, TMH, 2005.
2. Business Communication - Sehgal M. K &Khetrapal V, Excel BOOKS.
3. Business Communication – Krizan, Merrier, Jones, 8/e, Cengage Learning, 2012.

Text books:

1. Basic Business Communication – Raj Kumar, Excel BOOKS, 2010.
2. Communicative English –E.Suresh Kumar, P.Sreehari, Orient Blackswan.
3. English for Engineering and Management- Dr.Sutapa Banerjee, S.Chand.

PRINCIPLES OF ENVIRONMENTAL STUDIES

Subject Code	19SES19/19SES29	IA Marks	25
Number of Lecture Hours/Week	2	Exam Marks	25
Total Number of Lecture Hours	25	Exam hours	1

Course Objectives:

- Learn Principles of ecology
- Learn the responsibility of a stud tent on Environmental aspects
- Learn Environmental laws

Course Outcome:

Students will be able to,

CO1:Understandtheprinciplesofecologyandenvironmentalissuesthatapplytoair,

land, and water issues on a globalscale,

CO2:Developcriticalthinkingand/orobservationskills,andapplythemtotheanalysis

of a problem or question related to theenvironment,

CO3:Demonstrateecologyknowledgeofacomplexrelationshipbetweenbioticand

abioticcomponents

CO4:Applytheirecologicalknowledgetoillustrateandgraphaproblemanddescribe

the realities that managers face when dealing with complex issues

Module - 1

Introduction:Environment-ComponentsofEnvironmentEcosystem:Types&Structureof

Ecosystem,BalancedecosystemHumanActivities–Food,Shelter,AndEconomic&Social

Security. Impacts of Agriculture & Housing Impacts of Industry, Mining & TransportationEnvironmentalImpactAssessment,SustainableDevelopment. **5Hours**

Module - 2

NaturalResources,Waterresources–Availability&Qualityaspects,Waterbornediseases&

waterinduceddiseases,FluorideproblemindrinkingwaterMineralresources,

Energy–Differenttypesofenergy,Conventionalsources&NonConventionalsourcesof energySolarenergy,Hydroelectricenergy,WindEnergy,Nuclearenergy,Biomass& **5Hours**

Module -3

Environmental Pollution – Water Pollution, Noise pollution, Land Pollution, Public Health Aspects.GlobalEnvironmentalIssues:PopulationGrowth,Urbanization,LandManagement, **5Hours**

Module -4

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozonelayerdepletion,controllingmeasures. **5Hours**

Module -5

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources,Characteristics&Disposalmethods. **5Hours**

Text Books:

1. BennyJoseph(2005),**"EnvironmentalStudies"**,TataMcGraw–HillPublishing CompanyLimited.

2. R.J.RanjitDanielsandJagadishKrishnaswamy,(2009),**"Environmentalstudies",** Wiley India Private Ltd., New Delhi.

Reference Books:

1. RamanSivakumar,**"PrincipalsofEnvironmentalScienceand Engineering",** Second Edition, Cengage learning Singapore, 2005

2. P.Meenakshi,**"ElementsofEnvironmentalScienceandEngineering",**Prentice Hall of India Private Limited, New Delhi,2006

3. S.M. Prakash, **"Environmental Studies",** Elite Publishers Mangalore,2007

III SEMESTER SYLLABUS

NUMERICAL TECHNIQUES AND INTEGRAL TRANSFORMS

Sub Code :	**19SMA31**	**IA Marks :**	**50**
Hrs/ Week :	**4(L)+1(T)**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- To introduce students to the mostly used analytical and numerical methods in the different engineering fields
- Making them to learn Fourier series, Fourier transforms, z-transforms
- Numerical methods to solve ordinary differential equations.

Course Outcomes:

On completion of this course, students are able to:

CO1: Know the use of periodic signals and Fourier series to analyze circuits and system communications.

CO2: Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and Employ appropriate numerical methods to solve algebraic and transcendental equations

CO3: Solve first order ordinary differential equations arising in flow problems

CO4: Using single step and multistep numerical methods.

CO5: Apply the concept of Z- transform to engineering problems.

Module I

Fourier Series : Periodic functions, Dirichlet's condition, Fourier Series of periodic functions with period 2π and with arbitrary period $2c$. Half range Fourier Series, practical harmonic analysis-Illustrative examples from engineering field.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Fourier Transform: Infinite Fourier transforms, Fourier sine and cosine transforms. Inverse Fourier transforms, Problems

Numerical Methods: Numerical solution of algebraic and transcendental equations by Regula- Falsi Method and Newton-Raphson method

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Numerical solution of ordinary differential equations: Numerical solution of simultaneous first order ordinary differential equation and first degree, Taylor's series method, Modified Euler's method, Runge kutta method of fourth order. Milne's and Adam's bashforth predictor and creditor method.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Numerical solution of second order ordinary differential equations:

Numerical solution of simultaneous differential equation, Numerical solution of second order ordinary differential equations, Runge-Kutta method and Milne's method. (No derivations of formulae)

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Difference equations and Z-transforms: Difference equations, basic definition, z-transform-definition, standard z-transforms, damping and shifting rules, initial value and final value theorems (without proof) and problems. Inverse z-transform-problems and applications to solve difference equations.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. E. Kreyszig: Advanced Engineering Mathematics, John Wiley& Sons, 10th Ed.(Reprint), 2017.
2. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2017.
3. Srimanta Pal & Subobh C Bhunia: "Engineering Mathematics", Oxford University Press, 3rd Reprint, 2016.

Reference Books:

1. C.Ray Wylie, Louis C.Barrett :"Advanced Engineering Mathematics", 6th Edition, 2. McGraw-Hill Book Co., New York, 1995.
2. S.S.Sastry: "Introductory Methods of Numerical Analysis", 11th Edition, Tata McGraw-Hill, 2010
3. B.V.Ramana: "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. N.P.Bali and Manish Goyal, "A Text Book of Engineering Mathematics", Laxmi Publications. Latest edition, 2014.
5. Chandrika Prasad and Reena Garg "Advanced Engineerig mathematics, Latest edition, Khanna Publishing, 2018.

DATA STRUCTURES AND ITS APPLICATIONS

Sub Code :	**19SCS32**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Explain the fundamentals of data structures and their applications essential for programming/ problem solving
- Analyze linear data structures: stacks queues and lists.
- Analyze non linear data structures : trees and graphs
- Analyze and evaluate the sorting and searching algorithms
- Access appropriate data structures during the program development/ problem solving

Course Outcomes:

After studying this course, students will be able to:

CO1: Use different types of data structures, operations and algorithms and apply searching and sorting operations on files

CO2: Use stack, Queue in problem solving

CO3: Use Lists in problem solving

CO4: Use Trees in problem solving

CO5: UseGraphs in problem solving

Module I

Introduction: Data Structures, Classifications (Primitive & Non Primitive), Data structure Operations, Review of Arrays, Structures, Self-Referential Structures, and Unions. Pointers and Dynamic Memory Allocation Functions. Representation ofLinear Arrays in Memory, Dynamically allocated arrays.

Array Operations: Traversing, inserting, deleting, searching, and sorting. Multidimensional Arrays,Polynomials and Sparse Matrices.

Strings: Basic Terminology, Storing, Operations, Programming Examples.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Stacks:Definition, Stack Operations, Array Representation of Stacks, Stacks using Dynamic Arrays, Stack Applications: Polish notation, Infix to postfix conversion, evaluation of postfix expression

Recursion:Factorial, GCD, Fibonacci Sequence, Tower of Hanoi, Ackerman\'s function.

Queues:Definition, Array Representation, Queue Operations, Circular Queues, Circular queues using Dynamic arrays, Dequeues, Priority Queues. Programming Examples.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Linked Lists: Definition, Representation of linked lists in Memory, Memory allocation; Garbage

Collection. Linked list operations: Traversing, Searching, Insertion, andDeletion. Doubly Linked lists, Circular linked lists, and header linked lists.Linked Stacks and Queues. Applications of Linked lists – Polynomials, Sparse matrix representation. Programming Examples

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Trees:Terminology, Binary Trees, Properties of Binary trees, Array and linked Representation of Binary Trees, Binary Tree Traversals - Inorder, postorder,preorder; Additional Binary tree operations. Threaded binary trees, Binary SearchTrees – Definition, Insertion, Deletion, Traversal, Searching, Application ofTrees-Evaluation of Expression, Programming Examples

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Graphs: Definitions, Terminologies, Matrix and Adjacency List Representation Of Graphs, Elementary Graph operations

Traversal methods: Breadth First Search and Depth First Search.

Sorting and Searching: Insertion Sort, Radix sort, Address Calculation Sort. **Hashing:** Hash Table organizations, Hashing Functions, Static and Dynamic Hashing.

Files and Their Organization:Data Hierarchy, File Attributes, Text Files and Binary Files, Basic File Operations, File Organizations and Indexing

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.

Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)

Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer FIVE full questions, choosing at least ONE full question from each module.

08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Fundamentals of Data Structures in C - Ellis Horowitz and SartajSahni, 2nd edition,Universities Press,2014.
2. Data Structures - Seymour Lipschutz, Schaum's Outlines, Revised 1st edition, McGraw Hill,2014

Reference Books:

1. Data Structures: A Pseudo-code approach with C –Gilberg&Forouzan, 2nd edition,Cengage Learning, 2014.
2. Data Structures using C, ,ReemaThareja, 3rd edition Oxford press, 2012.
3. An Introduction to Data Structures with Applications- Jean-Paul Tremblay & Paul G.Sorenson, 2nd Edition, McGraw Hill, 2013.
4. Data Structures using C - A M Tenenbaum, PHI, 1989. **5**. Data Structures and Program Design in C - Robert Kruse, 2nd edition, PHI, 1996.

DIGITAL SYSTEM DESIGN

Sub Code :	**19SCS33**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Describe, Illustrate and Analyze Combinational Logic circuits, Simplification of Algebraic Equations using Karnaugh Maps and QuineMcClusky Techniques.
- Describe and Design Decoders, Encoders, Digital multiplexers, Adders and Subtractors, Binary comparators, Latches and Master-Slave Flip-Flops.
- Describe, Design and Analyze Synchronous and Asynchronous Sequential
- Explain and design registers and Counters, A/D and D/A converters.

Course Outcomes:

CO1: Design and analyze digital circuits using TTL/CMOS ICs.
CO2: Simplify digital circuits using Karnaugh Map , POS and Quine-McClusky Methods
CO3: Explain Gates and flipflops and make us in designing different data processing circuits, registers and counters and compare the types.
CO4: Develop simple HDL programs
CO5: Explain the basic principles of A/D and D/A conversion circuits and develop the same.

Module I

Logic Families :
TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL. CMOS families, CMOS Characteristics, and their interfacing, TTL-to-CMOS Interface,CMOS-to-TTL Interface.
The Basic Gates: Review of Basic Logic gates, Positive and Negative Logic, Introduction to HDL.
Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Combinational Logic Circuits: Sum-of-Products Method, Truth Table to Karnaugh Map, Pairs Quads, and Octets, Karnaugh Simplifications, Don't-care Conditions, Product-of-sums Method, Product-of-sums simplifications, Simplification by Quine- McClusky Method, Hazards and Hazard covers, HDL Implementation Models.
Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Data-Processing Circuits: Multiplexers, Demultiplexers, 1-of-16 Decoder, BCD to Decimal Decoders, Seven Segment Decoders, Encoders, Exclusive-OR Gates, Parity Generators and Checkers, Magnitude Comparator, Programmable Array Logic, Programmable Logic Arrays, HDL Implementation of Data Processing Circuits. Arithmetic Building Blocks, Arithmetic Logic Unit **Flip- Flops:** RS Flip-Flops, Gated Flip-Flops, Edge-triggered RS FLIP-FLOP, Edge-triggered D FLIP-FLOPs, Edge-triggered JK FLIPFLOPs.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Flip- Flops: FLIP-FLOP Timing, JK Master-slave FLIP-FLOP, Switch Contact Bounce Circuits, Various Representation of FLIP-FLOPs, HDL Implementation of FLIP-FLOP. **Registers:** Types of Registers, Serial In - Serial Out, Serial In - Parallel out, Parallel In - Serial Out, Parallel In - Parallel Out, Universal Shift Register, Applications of Shift Registers, Register implementation in HDL. **Counters:** Asynchronous Counters, Decoding Gates, Synchronous Counters, Changing the Counter Modulus.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Counters: Decade Counters, Presettable Counters, Counter Design as a Synthesis problem, A Digital Clock, Counter Design using HDL. **D/A Conversion and A/D Conversion:** Variable, Resistor Networks, Binary Ladders, D/A Converters, D/A Accuracy and Resolution, A/D Converter-Simultaneous Conversion, A/D Converter-Counter Method, Continuous A/D Conversion, A/D Techniques, Dual-slope A/D Conversion, A/D Accuracy and Resolution.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.

Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)

Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer FIVE full questions, choosing at least ONE full question from each module.

08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Donald P Leach, Albert Paul Malvino&GoutamSaha: Digital Principles and Applications, 8th Edition, Tata McGraw Hill, 2015
2. Stephen Brown, ZvonkoVranesic: Fundamentals of Digital Logic Design with VHDL, 2nd Edition, Tata

Reference Books:

1. M Morris Mano: Digital Logic and Computer Design, 10th Edition, Pearson, 2008.
2. A.K Maini,VarshaAgarval, Electronic Devices And Circuit,1st Edition, Wiley 2011

MICROPROCESSOR AND EMBEDDED SYSTEMS

Sub Code :	**19SCS34**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Differentiate between microprocessors and microcontrollers.
- To be familiar with the architecture and the instruction set of an Intel microprocessor Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Identify the applicability of the embedded system.
- Comprehend the real time operating system used for the embedded system.

Course Outcomes:

CO1: Design and implement programs on 8086, ARM.
CO2: Design I/O circuits.
CO3: Describe the architecture and instruction set of ARM microcontroller.
CO4: To design Embedded systems.
CO5: Design and develop modules using RTOS,Implement RPC, threads and tasks

Module I

A Historical Background, The Microprocessor-Based Personal Computer Systems. The Microprocessor and its Architecture: Internal Microprocessor Architecture, Real Mode Memory Addressing.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Introduction to Protected Mode Memory Addressing, Memory Paging, Flat Mode Memory Addressing Modes: Data Addressing Modes, Program Memory Addressing Modes, Stack Memory Addressing Modes

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Data Movement Instructions: MOV Revisited, PUSH/POP, Load-Effective Address, String Data Transfers, Miscellaneous Data Transfer Instructions, Segment Override Prefix, Assembler Details. Arithmetic and Logic Instructions: Addition, Subtraction and Comparison, Multiplication and Division.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Introduction, Complex Systems and Microprocessors, Embedded Systems Design Process,

formalism for system design, Design Example: Model Train Controller.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Basics of OS, Kernel, types of OSs, tasks, processes, Threads, Multitasking and Multiprocessing, Context switching, Scheduling Policies, Task Communication, Task Synchronization, Inter process Communication mechanisms.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.

Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)

Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer FIVE full questions, choosing at least ONE full question from each module.

08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Barry B Brey: The Intel Microprocessors, 8th Edition, Pearson Education, 2009. (Listed topics
   only from the Chapters 1 to 13)
2. Wayne Wolf: Computers as Components, Principles of Embedded Computing Systems Design, 2nd Edition, Elsevier, 2008.

Reference Books:

1. The Insider's Guide to the ARM7 Based Microcontrollers, Hitex Ltd.,1st edition, 2005
2. Steve Furber, ARM System-on-Chip Architecture, Second Edition, Pearson, 2015
3. Raj Kamal, Embedded System, Tata McGraw-Hill Publishers, 2nd Edition, 2008
4. Ragunandan, An Introduction to ARM System Design, Cengage Publication

LOGIC DESIGN AND ANALOG CIRCUITS LABORATORY

Sub Code :	**19SCSL35**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

This laboratory course enable students to get practical experience in design, assembly andevaluation/testing of

- Analog components and circuits including Operational Amplifier, Timer, etc.
- Combinational logic circuits.
- Flip - Flops and their operations
- Counters and registers using flip-flops.
- Synchronous and Asynchronous sequential circuits.
- A/D and D/A converters

Course Outcomes:

CO1: Use various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit

CO2: Design and demonstrate various combinational logic circuits.

CO3: Design and demonstrate various types of counters and Registers using Flip-flops

CO4: Use simulation package to design circuits.

CO5: Understand the working and implementation of ALU.

Laboratory Experiments:

1. Design and implement basic gates, universal gates.

2. Design and implement Half adder, Full Adder, Half Subtractor, Full Subtractor using basic gates.

3. a) Given a 4-variable logic expression, simplify it using Entered Variable Map and realize the simplified logic expression using 8:1 multiplexer IC.

b) Design and develop the Verilog /VHDL code for an 8:1 multiplexer. Simulate and verify its working.

4. Design and implement code converter I) Binary to Gray (II) Gray to Binary Code using basic gates.

5. Design and verify the Truth Table of 3-bit Parity Generator and 4-bit Parity Checker using basic Logic Gates with an even parity bit.

6. a) Realize a J-K Master / Slave Flip-Flop using NAND gates and verify its truth table.

b) Design and develop the Verilog / VHDL code for D Flip-Flop with positive edge triggering. Simulate and verify it's working.

7. a) Design and implement a mod-n (n<8) synchronous up counter using J-K Flip-Flop ICs and demonstrate its working.
b) Design and develop the Verilog / VHDL code for mod-8 up counter. Simulate and verify it's working.

8. Design and implement an asynchronous counter using decade counter IC to count up from 0 to n (n<=9) and demonstrate on 7-segment display (using IC-7447).

9. Generate a Ramp output waveform using DAC0800 (Inputs are given to DAC through IC74393 dual 4-bit binary counter).

NOTE: hardware and software results need to be compared

Conduction of Practical Examination:

1. All laboratory experiments (Nine nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12 + 28 +10 (50)
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

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MICROPROCESSORS LABORATORY

Sub Code :	**19SCSL36**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives

- To provide practical exposure to the students on microprocessors, design and coding knowledge on 80x86 family/ARM.
- To give the knowledge and practical exposure on connectivity and execute of interfacing devices with 8086/ARM kit like LED displays, Keyboards, DAC/ADC, and various other devices

Course Outcomes:

After studying this course, students will be able to

- Learn 80x86 instruction sets and gins the knowledge of how assembly language works.
- Design and implement programs written in 80x86 assembly language.
- Know functioning of hardware devices and interfacing them to x 86 families.

Note:

- Develop and execute the following programs using 8086 Assembly Language. Any suitable assembler like MASM, TASM etc may be used.
- Program should have suitable comments.

Laboratory Experiments:

1. a) Search a key element in a list of „n" 16-bit numbers using the Binary search algorithm.
   b) Read the status of eight input bits from the Logic Controller Interface and display „FF" if it is the parity of the input read is even; otherwise display 00.

2. a) Write two ALP modules stored in two different files; one module is to read a character from the keyboard and the other one is to display a character. Use the above two modules to read a string of characters from the keyboard terminated by the carriage return and print the string on the display in the next line.
   b) Implement a BCD Up-Down Counter on the Logic Controller Interface.

3. a) Sort a given set of „n" numbers in ascending order using the Bubble Sort algorithm.
   b) Read the status of two 8-bit inputs (X & Y) from the Logic Controller Interface and display X*Y.

4. a) Read an alphanumeric character and display its equivalent ASCII code at the center of the screen.
   b) Display messages FIRE and HELP alternately with flickering effects on a 7-segment display interface for a suitable period of time. Ensure a flashing rate that makes it easy to read both the messages (Examiner does not specify these delay

values nor is it necessary for the student to compute these values).

5. a) Reverse a given string and check whether it is a palindrome or not.
   b) Assume any suitable message of 12 characters length and display it in the rolling fashion on a 7- segment display interface for a suitable period of time. Ensure a flashing rate that makes it easy to read both the messages. (Examiner does not specify these delay values nor is it necessary for the student to compute these values).

6. a) Read two strings, store them in locations STR1 and STR2. Check whether they are equal or not and display appropriate messages. Also display the length of the stored strings.
   b) Convert a 16-bit binary value (assumed to be an unsigned integer) to BCD and display it from left to right and right to left for specified number of times on a 7-segment display interface.

7. Drive a Stepper Motor interface to rotate the motor in specified direction (clockwise or counter- clockwise) by N steps (Direction and N are specified by the examiner). Introduce suitable delay between successive steps. (Any arbitrary value for the delay may be assumed by the student).

Conduction of Practical Examination:

1. All laboratory experiments (Seven nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12 + 28 +10 (50)
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

DATA STRUCTURES LABORATORY

Sub Code :	**19SCSL37**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

This laboratory course enable students to get practical experience in design,develop, implement,

- Analyze and evaluation/testing of Asymptotic performance of algorithms.
- Linear data structures and their applications such as Stacks, Queues andLists.
- Non-Linear Data Structures and their Applications such as Trees andGraphs
- Sorting and Searching Algorithms.

Course Outcomes:

CO1: Analyze and Compare various linear and non-linear data structures

CO2: Code, debug and demonstrate the working nature of different types of data structures and their applications

CO3: Implement, analyze and evaluate the searching and sorting algorithms
Choose the appropriate data structure for solving real world problems

Laboratory Experiments:

1. Design, Develop and Implement a menu driven Program in C for the following Array operations

a. Creating an Array of N Integer Elements
b. Display of Array Elements with Suitable Headings
c. Inserting an Element (ELEM) at a given valid Position (POS)
d. Deleting an Element at a given valid Position(POS)
e. Exit.
Support the program with functions for each of the above operations

2. Design, Develop and Implement a menu driven Program in C for the followingoperations on STACK of Integers (Array Implementation of Stack with maximum size MAX)

a. Push an Element on to Stack b.
Pop an Element from Stack
c. Demonstrate Overflow and Underflow situations on Stack
d. Display the status of Stack
e. Exit
Support the program with appropriate functions for each of the above Operations

3 . Design, Develop and Implement a Program in C for converting an Infix Expression to Postfix Expression. Program should support for both parenthesized and free parenthesized expressions with the operators: +, -, *,/, %(Remainder), ^(Power) andalphanumeric operands.

4. Design, Develop and Implement a Program in C for the following Stack Applications
a. Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^
b. Solving Tower of Hanoi problem with n disks

5. Design, Develop and Implement a menu driven Program in C for the following operations on Circular QUEUE of Characters (Array Implementation of Queue with maximum size MAX)
a. Insert an Element on to Circular QUEUE
b. Delete an Element from Circular QUEUE
c. Demonstrate *Overflow* and *Underflow* situations on Circular QUEUE
d. Display the status of Circular QUEUE
e. Exit Support the program with appropriate functions for each of the above Operations

6. Design, Develop and Implement a menu driven Program in C for the following operations on Singly Linked List (SLL) of Student Data with the fields: *USN, Name, Branch, Sem, PhNo*
a. Create a SLL of N Students Data by using *front insertion*.
b. Display the status of SLL and count the number of nodes in it
c. Perform Insertion and Deletion at End of SLL
d. Perform Insertion and Deletion at Front of SLL
e. Exit

7. Design, Develop and Implement a menu driven Program in C for the following operations on Doubly Linked List (DLL) of Employee Data with the fields: *SSN, Name, Dept, Designation, Sal, PhNo*
a. Create a DLL of N Employees Data by using *end insertion*.
b.Display the status of DLL and count the number of nodes in it
c. Perform Insertion and Deletionat End of DLL
d. Perform Insertion and Deletion at Front of DLL
e. Demonstrate how this DLL can be used as Double Ended Queue
f. Exit

8. Design, Develop and Implement a menu driven Program in C for the followingoperations on Binary Search Tree (BST) of Integers
a. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2
b. Traverse the BST in Inorder, Preorder and Post Order
c. Search the BST for a given element (KEY) and report the appropriate message
d. Exit

9. Design, Develop and Implement a Program in C for the following operations on Graph(G) of Cities
a. Create a Graph of N cities using Adjacency Matrix.
b. Print all the nodes reachable from a given starting node in a digraph using BFS method
c. Check whether a given graph is connected or not using DFS method

10. Given a File of N employee records with a set K of Keys(4-digit) which uniquely determine the records in file F. Assume that file F is maintained in memory by a Hash Table(HT) of m memory locations with L as the set of memory addresses (2-digit) of locations in HT. Let the keys in K and addresses in L are Integers. Design and develop a Program in C that uses Hash function H: K →L as H(K)=K mod m (remainder method),and implement hashing technique to map a given key K to the address space L. Resolve the collision (if any) using linear probing.

Conduction of Practical Examination:

1. All laboratory experiments (TEN nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12 + 28 +10 (50)
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

TROUBLESHOOTING

Sub Code :	**19SCS38**	**IA Marks :**	**25**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**25**

1. Prove the following.
   Problem: Power button will not start computer
   An application is running slowly
   An application is frozen
2. Prove
   The mouse or keyboard has stopped working
   The screen is blank
   The Computer Won't Start
   Overheating
   Laptop Won't Start
3. Explain most Common Computer Problems and Solutions (min 5)
4. Draw the motherboard and explain.
5. Explain and demo assembling and dissembling of computer.

Conduction of Practical Examination:

1. All laboratory experiments (Five nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva: 5 + 5 +15= (25)

Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

PART – A : EMPLOYABILITY SKILLS ENHANCEMENT PROGRAMME 1 (ESEP 1)

Sub Code :	**19SQA39**	**IA Marks :**	**50**
Hrs/ Week :	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**25**

Course Objectives:

This course enables students to develop their ability to reason by introducing them to elements of formal reasoning. The primary focus will be on recognizing the logical structure of arguments. Topics will include types of statements, symbolism, logical connectives, logical relations, basic deductive inferences, truth tables, validity, invalidity, and soundness. To enhance the problem-solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations with Domain specific training in respective branches.

Course Outcomes:

After studying this course, students will be able to:

- Understand the basic concepts of QUANTITATIVE ABILITY
- Understand the basic concepts of LOGICAL REASONING Skills
- Acquire satisfactory competency in use of VERBAL REASONING
- Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- Learn domain specific knowledge
- Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

PART - A

Number system - "a. Number system b. Power cycle c. Remainder cycle d. Factors, Multiples e. HCF and LCM f. Trailing Zeroes", **Data arrangements and Blood relations -** "a. Linear Arrangement b. Circular Arrangement c. Multi-dimensional Arrangement d. Blood Relation e. Option elimination method in Blood Relation"

Time and work - "a. Work with different efficiencies b. Alternate day work c. Pipes and cisterns d. Work equivalence e. Division of wages f. Leaving the work concept with example **"Coding & decoding, Number Series, Analogy, Odd man out** - "a. Different types of Problems on Coding and Decoding b. Mixed Series,alternate Series, mixed operaional series c. Analogy d. Odd Man Out

"Reading comprehension - "a. Types and Tackling Strategies.b. Understanding meaning of a text.c. Drawing Connections.d. Summarizing and Synthesizing.e. Building Vocabulary.f. Speed Reading Strategies." **Antonyms & Synonyms -** "a. Understanding root words.b. Prefixes.c. Suffixes.d. Vocabulary building.e. Putting words into context. f. Word Power made easy. g. Elimination.

PART - B

C Programming
Data Structures & Algorithms
C++

Computer Organization and Architecture
HTML and XML
Computer fundamentals
Computer Awareness
DOS

Marks allotment pattern:

- 10 assessment tests will be conducted based on Multiple choice questions.
- Final marks are based on the test marks conducted during the semester.

Reference Books

1. Quantitative abilities by Arun Sharma
2. Quantitative Aptitude for Competitive Examinations by R S Agrawal
3. Verbal and Non-Verbal reasoning by R S Agrawal

PART-B: INTERNATIONAL CERTIFICATION COURSE ON CURRENT TRENDS

Sub Code :	**19SQA39**	**IA Marks :**	**50**
Self Study Hours/Week:	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**-**

Course Objectives:

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

Course Outcomes:

On completion of this course, students will be able to:

CO1: Have exposure on the latest development

CO2: Acquire new skills

CO3: Become Industry ready

CO4: Have more confidence

CO5: Get additional knowledge

About the Course:

- A common Certification Course on current trends will be offered to all the students of the batch.
- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.

Assessment Method

- Assessment will be conducted for 2 Hours duration for 50 Marks on completion of the course and based on the marks scored, grading will be done.

ADDITIONAL MATHEMATICS - I

(MANDATORY LEARNING COURSE: COMMON TO ALL BRANCHES)

(A BRIDGE COURSE FOR LATERAL ENTRY STUDENTS OF III SEM. B. TECH.)

Subject Code : 19SMADIP301	
Contact Hours/Week : 02	**L-T-P : 2-0-0**
Total Hours : 25	**Exam. Hours : 02**
Exam. Marks : 50	**Credits : -**

Course Objectives:

- Basic concepts of Complex Trigonometry
- Vector Algebra
- Differential & Integral Calculus
- Vector Differentiation

Course Outcomes:

On completion of the course, students are able to:

CO1: Understand the fundamental concepts of complex numbers and vector algebra to analyze the problems arising in related area.

CO2: Use derivatives and partial derivatives to calculate rates of change of multivariate functions.

CO3: Learn techniques of integration including double and triple integrals to find area, volume mass and moment of inertia of plane and solid region.

CO4: Analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.

CO5: Recognize and solve first-order ordinary differential equations occurring in different branches of engineering.

Module I

Complex Trigonometry: Complex Numbers: Definitions & properties. Modulus and amplitude of a complex number, Argand's diagram, De-Moivre's theorem (without proof)

Vector Algebra: Scalar and vectors. Vectors addition and subtraction. Multiplication of vectors (Dot and Cross products). Scalar and vector triple products simple problems.

05 Hours

Module II

Differential Calculus: Review of successive differentiation. Formulae for nth derivatives of standard functions- Polar curves –angle between the radius vector and the tangent - Problems. Maclaurin's series expansions- Illustrative examples.

05 Hours

Module III

Partial Differentiation : Euler's theorem for homogeneous functions of two variables. Total derivatives differentiation of composite function. Application to Jacobians.

05 Hours

Module IV

Integral Calculus: Statement of reduction formulae for $\sin^n x, \cos^n x \; and \; \sin^n x cos^n x$ and evaluation of these with standard limits-Examples. Double integrals-Simple examples.

05 Hours

Module V

Vector Differentiation: Differentiation of vector functions. Velocity and acceleration of a particle moving on a space curve. Scalar and vector point functions. Gradient, Divergence, Curl and Laplacian (Definitions only). Solenoidal and irrotational vector fields problems.

05 Hours

Question Paper Pattern:

- **PART A: TEN** multiple choice questions to be set for **ONE MARK** each. [01 mark*10 Questions = 10 marks]
- **PART B: TWO** question to be set from each module. Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. [08 mark*5 Questions = 40 marks]

Text Book:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna publishers, 43rd edition

Reference books:

1. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2015.
2. N.P.Bali and Manish Goyal: Engineering *Mathematics, Laxmi Publishers,7th Ed., 2007*

IV SEMESTER SYLLABUS

DISCRETE MATHEMATICAL STRUCTURES AND GRAPH THEORY

Sub Code :	**19SCS41**	**IA Marks :**	**50**
Hrs/ Week :	**4(L)+1(T)**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to:

- Provide theoretical foundations of computer science to perceive other courses in the programme.
- Illustrate applications of discrete structures: logic, relations, functions, set theory and counting.
- Describe different mathematical proof techniques,
- Illustrate the use of graph theory in computer science

Course Outcomes:

After studying this course, students will be able to:

CO1: Use propositional and predicate logic in knowledge representation and truth verification.
CO2: Demonstrate the application of discrete structures in different fields of computer science.
CO3: Solve problems using recurrence relations and generating functions.
CO4: Application of different mathematical proofs techniques in proving theorems in the courses.
CO5: Compare graphs, trees and their applications.

Module I

Fundamentals of Logic: Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference. Fundamentals of Logic contd.: The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Properties of the Integers: The Well Ordering Principle – Mathematical Induction, Recursive Definitions, The division algorithm, The Greatest common divisor. **Fundamental Principles of Counting:** The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Relations and Functions: Cartesian Products and Relations, Functions – Plain and One-to- One, Onto Functions. The Pigeon-hole Principle, Function Composition and Inverse Functions. **Relations:** Properties of Relations, Computer Recognition – Zero-One Matrices and Directed Graphs, Partial Orders – Hasse Diagrams, Equivalence Relations and Partitions.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

The Principle of Inclusion and Exclusion: The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials.

Recurrence Relations: First Order Linear Recurrence Relation, The Second Order Linear Homogeneous Recurrence Relation with Constant Coefficients.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Introduction to Graph Theory: Definitions and Examples, Sub graphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits. **Trees**: Definitions, Properties, and Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Ralph P. Grimaldi: Discrete and Combinatorial Mathematics, 5th Edition, Pearson Education. 2004.

Reference Books:

1. Basavaraj S Anami and Venakanna S Madalli: Discrete Mathematics – A Concept based\ approach, Universities Press, 2016
2. Kenneth H. Rosen: Discrete Mathematics and its Applications, 6th Edition, McGraw Hill, 2007.
3. JayantGanguly: A Treatise on Discrete Mathematical Structures, Sanguine-Pearson, 2010.
4. D.S. Malik and M.K. Sen: Discrete Mathematical Structures: Theory and Applications, Thomson, 2004.
5. Thomas Koshy: Discrete Mathematics with Applications, Elsevier, 2005, Reprint 2008.

DESIGN AND ANALYSIS OF ALGORITHMS

Sub Code :	**19SCS42**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Analyze the asymptotic performance of algorithms.
- Explain various computational problem solving techniques.
- Apply appropriate method to solve a given problem and describe various methods of algorithm analysis.
- Describe the classes P, NP, and NP Complete.

Course Outcomes:

CO1: Estimate the computational complexity of different algorithms using asymptotic analysis.

CO2: Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Derive and solve recurrences describing the performance of divide-and-conquer algorithms

CO3: Describe the greedy paradigm and explain when an algorithmic design situation calls for it.

CO4: Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it.

CO5: Able to describe the classes P, NP, and NP Complete and be able to prove that a certain problem is NP-Complete.

Module I

Introduction: What is an Algorithm?, Algorithm Specification Analysis Framework, Performance Analysis: Space complexity, Time complexity. Asymptotic Notations: Big-Oh notation (O), Omega notation (Ω), Theta notation (Q), and Little-oh notation (o), Mathematical analysis of Non Recursive and recursive Algorithms with Examples

Important Problem Types: Sorting, Searching, String processing, Graph Problems, Combinatorial Problems. Fundamental Data Structures: Stacks, Queues, Graphs, Trees, Sets and Dictionaries.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Divide and Conquer: General method, Binary search, Recurrence equation for divide and conquer, Finding the maximum and minimum, Merge sort, Quick sort, Strassen's matrix multiplication, Advantages and Disadvantages of divide and conquer. Decrease and Conquer Approach: Topological Sort.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Greedy Method: General method, Coin Change Problem, Knapsack Problem, Job sequencing with deadlines. Minimum cost spanning trees: Prim's Algorithm, Kruskal's Algorithm. Single source shortest paths: Dijkstra's Algorithm

Optimal Tree problem: Huffman Trees and Codes, Transform and Conquer Approach: Heaps and Heap Sort.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Dynamic Programming: General method with Examples, Multistage Graphs, Transitive Closure: Warshall's Algorithm, All Pairs Shortest Paths: Floyd's Algorithm, Optimal Binary Search Trees, Knapsack problem, Bellman-Ford Algorithm, Travelling Sales Person problem.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Backtracking: General method (T2:7.1), N-Queens problem (T1:12.1), Sum of subsets problem (T1:12.1), Graph coloring (T2:7.4), Hamiltonian cycles (T2:7.5). Branch and Bound: Assignment Problem, LC Branch and Bound solution (T2:8.2), FIFO Branch and Bound solution (T2:8.2). NP-Complete and NP-Hard problems: Basic concepts, nondeterministic algorithms, P, NP, NP Complete, and NP-Hard classes (T2:11.1).

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Introduction to the Design and Analysis of Algorithms, AnanyLevitin:, 2rd Edition, 2009. Pearson.
2. Computer Algorithms/C++, Ellis Horowitz, SatrajSahni and Rajasekaran, 2nd Edition, 2014, Universities Press

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, PHI.
2. Design and Analysis of Algorithms , S. Sridhar, Oxford (Higher Education)

OBJECT ORIENTED CONCEPTS

Sub Code :	**19SCS43**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- This course will enable students to
- Learn fundamental features of object oriented language and JAVA
- Set up Java JDK environment to create, debug and run simple Java programs.
- Create multi-threaded programs and event handling mechanisms.
- Introduce event driven Graphical User Interface (GUI) programming using applets.

Course Outcomes:

CO1: Explain the object-oriented concepts and JAVA.

CO2: Develop computer programs to solve real world problems in Java.

CO3: Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets.

CO4: Understand the concepts of importing of packages and exception handling mechanism.

CO5: Explain String Handling examples with Object Oriented concepts.

Module I

Introduction to Object Oriented Concepts: A Review of structures, Procedure–Oriented Programming system, Object Oriented Programming System, Comparison of Object Oriented Language with C, Console I/O, variables and reference variables, Function Prototyping, Function Overloading. Class and Objects: Introduction, member functions and data, objects and functions, objects and arrays, Namespaces, Nested classes, Constructors, Destructors.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Introduction to Java: Java's magic: the Byte code; Java Development Kit (JDK); theJava Buzzwords, Object-oriented programming; Simple Java programs. Data types,variables and arrays, Operators, Control Statements.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Classes, Inheritance, Exceptions, Packages and Interfaces: Classes: Classes fundamentals; Declaring objects; Constructors, this keyword, garbage collection. Inheritance: inheritance basics, using super, creating multi-level hierarchy, method overriding. Exception handling: Exception handling in Java. Packages, Access Protection, Importing Packages, Interfaces.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Multi-Threaded Programming, Event Handling: Multi-Threaded Programming: What are threads? How to make the classes threadable ; Extending threads; Implementing runnable;

Synchronization; Changing state of the thread; Bounded buffer problems, read-write problem, producer consumer problems. Event Handling: Two event handling mechanisms; The delegation event model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Adapter classes; Inner classes.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

The Applet Class: Introduction, Two types of Applets; Applet basics; AppletArchitecture; An Applet skeleton; Simple Applet display methods; Requesting repainting; Using the Status Window; The HTML APPLET tag; Passing parameters to Applets; getDocumentbase() and getCodebase(); ApletContext and showDocument(); The AudioClip Interface; The AppletStubInterface;Output to the Console. Swings: Swings: The origins of Swing; Two key Swing features; Components and Containers; The Swing Packages; A simple Swing Application; Create a Swing Applet; Jlabel and ImageIcon; JTextField;The Swing Buttons; JTabbedpane; JScrollPane; JList; JComboBox; JTable.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. SouravSahay, Object Oriented Programming with C++ , Oxford University Press,2006 (Chapters 1, 2, 4)
2. Herbert Schildt, Java The Complete Reference, 7th Edition, Tata McGraw Hill, 2007. (Chapters 1, 2, 3, 4, 5, 6, 8, 9,10, 11, 21, 22, 29, 30)

Reference Books:

1. Mahesh Bhave and Sunil Patekar, "Programming with Java", First Edition, Pearson

Education,2008, ISBN:9788131720806
2. Herbert Schildt, The Complete Reference C++, 4th Edition, Tata McGraw Hill, 2003.
3. Stanley B.Lippmann, JoseeLajore, C++ Primer, 4th Edition, Pearson Education, 2005.
4. RajkumarBuyya,SThamarasiselvi, xingchenchu, Object oriented Programming with java, Tata McGrawHill education private limited.
5. Richard A Johnson, Introduction to Java Programming and OOAD, CENGAGE Learning.
6. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.

SOFTWARE ENGINEERING

Sub Code :	**19SCS44**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to:

- Identify ethical and professional issues and explain why they are of concern to software engineers.
- Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation.
- Differentiate system models, use UML diagrams and apply design patterns.
- Discuss the distinctions between validation testing and defect testing.
- Recognize the importance of software maintenance and describe the intricacies involved in software evolution.
- Apply estimation techniques, schedule project activities and compute pricing.
- Identify software quality parameters and quantify software using measurements and metrics.
- List software quality standards and outline the practices involved.
  Recognize the need for agile software development, describe agile methods, apply agile practices and plan for agility.

Course Outcomes:

After studying this course, students will be able to:

CO1: Design a software system, component, or process to meet desired needs within realistic constraints.

CO2: Assess professional and ethical responsibility

CO3: Function on multi-disciplinary teams

CO4: Use the techniques, skills, and modern engineering tools necessary for engineering practice

CO5: Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Module I

Introduction: Software Crisis, Need for Software Engineering. Professional Software Development, Software Engineering Ethics. Case Studies. **Software Processes**: Models: Waterfall Model **(Sec 2.1.1)**, Incremental Model **(Sec 2.1.2)** and Spiral Model **(Sec 2.1.3)**. Process activities. **Requirements Engineering**: Requirements Engineering Processes **(Chap 4)**. Requirements Elicitation and Analysis **(Sec 4.5).** Functional and non-functional requirements **(Sec 4.1)**. The software Requirements Document **(Sec 4.2)**. Requirements Specification **(Sec 4.3)**. Requirements validation **(Sec 4.6)**. Requirements Management **(Sec 4.7)**.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

System Models: Context models **(Sec 5.1)**. Interaction models **(Sec 5.2)**. Structural models **(Sec 5.3)**. Behavioral models **(Sec 5.4)**. Model-driven engineering **(Sec 5.5)**. **Design and Implementation**: Introduction to RUP **(Sec 2.4)**, Design Principles **(Chap 17)**. Object-oriented design using the UML **(Sec 7.1)**. Design patterns **(Sec 7.2)**. Implementation issues **(Sec 7.3)**. Open

source development **(Sec 7.4)**.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Software Testing: Development testing **(Sec 8.1)**, Test-driven development **(Sec 8.2)**, Release testing **(Sec 8.3)**, User testing **(Sec 8.4)**. Test Automation **(Page no 42, 70,212, 231,444,695)**. **Software Evolution**: Evolution processes **(Sec 9.1)**. Program evolution dynamics **(Sec 9.2)**. Software maintenance **(Sec 9.3)**. Legacy system management **(Sec 9.4)**.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Project Planning: Software pricing **(Sec 23.1)**. Plan-driven development **(Sec 23.2)**. Project scheduling **(Sec 23.3)**: Estimation techniques **(Sec 23.5)**. **Quality management**: Software quality **(Sec 24.1)**. Reviews and inspections **(Sec 24.3)**. Software measurement and metrics **(Sec 24.4)**. Software standards **(Sec 24.2)**

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Agile Software Development: Coping with Change **(Sec 2.3)**, The Agile Manifesto: Values and Principles. Agile methods: SCRUM (Ref "**The SCRUM Primer, Ver 2.0**") and Extreme Programming **(Sec 3.3)**. Plan-driven and agile development **(Sec 3.2)**. Agile project management **(Sec 3.4),** Scaling agile methods **(Sec 3.5)**.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/Case Study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012. (Listed topics only from Chapters 1,2,3,4, 5, 7, 8, 9, 23, and 24)

2. The SCRUM Primer, Ver 2.0, http://www.goodagile.com/scrumprimer/scrumprimer20.pdf

Reference Books:

1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill.

2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India

DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY

Sub Code :	**19SCSL45**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

This course will enable students to

- Design and implement various algorithms in JAVA
- Employ various design strategies for problem solving.
- Measure and compare the performance of different algorithms.

Course Outcomes:

CO1: Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)

CO2: Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high
level language.

CO3: Analyze and compare the performance of algorithms using language features

CO4: Apply and implement learned algorithm design techniques and data structuresto solve realworld problems.

Note:.Design, develop, and implement the specified algorithms for the following problems using Java language under LINUX /Windows environment.Netbeans/Eclipse IDE tool can be used for development and demonstration

Laboratory Experiments:

1. Sort a given set of n integer elements using Quick Sort method and compute its time complexity. Run the program for varied values of n> 5000 and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated using the random number generator. Demonstrate using Java how the divideand-conquer method works along with its time complexity analysis: worst case, average caseand best case

2. Sort a given set of n integer elements using Merge Sort method and compute its time complexity. Run the program for varied values of n> 5000, and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated using the random number generator. Demonstrate using Java how the divide and-conquer method works along with its time complexity analysis: worst case, average case and best case.

3. Find Minimum Cost Spanning Tree of a given connected undirected graph using Prim's algorithm.

4. Find Minimum Cost Spanning Tree of a given connected undirected graph using Kruskal'salgorithm. Use Union-Find algorithms in your program.

5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm. Write the program in Java.

6. Implement in Java, the 0/1 Knapsack problem using Greedy method.

7. Implement in Java, the 0/1 Knapsack problem using Dynamic Programming method.

8. Write Java programs to

(a) Compute the Transitive Closure of a given directed graph using Warshall's Algorithm.

(b) Implement All-Pairs Shortest Paths problem using Floyd's algorithm.

9. Implement Travelling Sales Person problem using Dynamic programming.

10. Design and implement in Java to find a subset of a given set S = {Sl, S2,.....,Sn} of n positive integers whose SUM is equal to a given positive integer d. For example, if S ={1, 2, 5, 6, 8} and d= 9, there are two solutions {1,2,6}and {1,8}. Display a suitable message, if the given problem instance doesn't have a solution.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments (TEN nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12 + 28 +10 (50)
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

COMPUTER GRAPHICS AND VISUALIZATION LABORATORY

Sub Code :	**19SCSL46**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

This course will enable students to

- Demonstrate simple algorithms using OpenGL Graphics Primitives and attributes.
- Implementation of line drawing and clipping algorithms using OpenGL functions
- Design and implementation of algorithms Geometric transformations on both 2D and 3D objects.

Course Outcomes:

The students should be able to:

CO1: Apply the concepts of computer graphics

CO2: Implement computer graphics applications using OpenGL

CO3: Animate real world problems using OpenGL

Laboratory Experiments:

Design, develop, and implement the following programs using OpenGL API:

1. Implement Brenham's line drawing algorithm for all types of slope.
2. Create and rotate a triangle about the origin and a fixed point.
3. Draw a colour cube and spin it using OpenGL transformation matrices.
4. Draw a color cube and allow the user to move the camera suitably to experiment with perspective viewing.
5. Clip a lines using Cohen-Sutherland algorithm
6. To draw a simple shaded scene consisting of a tea pot on a table. Define suitably the position and properties of the light source along with the properties of the surfaces of the solid object used in the scene.
7. Design, develop and implement recursively subdivide a tetrahedron to form 3D sierpinski gasket. The number of recursive steps is to be specified by the user.
8. Develop a menu driven program to animate a flag using Bezier Curve algorithm
9. Develop a menu driven program to fill the polygon using scan line algorithm

Reference books:

1. Donald Hearn & Pauline Baker: Computer Graphics-OpenGL Version,3rd Edition, Pearson Education,2011
2. Edward Angel: Interactive computer graphics- A Top Down approach with OpenGL, 5th edition. Pearson Education, 2011
3. M MRaikar, Computer Graphics using OpenGL, Fillip Learning / Elsevier, Bangalore / New Delhi (2013).

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments (NINE nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva & Mini Project:12 + 28 +10 (50)
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

JAVA PROGRAMMING LABORATORY

Sub Code :	**19SCSL47**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

This course will enable students to

- Design and implement various algorithms in JAVA
- Employ various design strategies for problem solving constructs

Course Outcomes:

The students should be able to:

CO1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

CO2: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

LABORATORY EXPERIMENTS:

1. Write a Java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

2 a. Write a Java program that works as a simple calculator.

b. Write a Java program to sort for an element in a given list of elements using bubble sort.

3. Create a Java class called Student with the following details as variables within it.

(i) USN
(ii) Name
(iii) Branch
(iv) Phone

Write a Java program to create n Student objects and print the USN, Name, Branch, and Phoneof these objects with suitable headings.

4 a. Write a Java Program to define a class, define instance methods and overload them and use them for dynamic method invocation

b. Write a java program for abstract class to find areas of different shapes

5. Design a superclass called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a Java program to read and display at least 3 staff objects of all three categories.

6. Write a Java class called Customer to store their name and date_of_birth. The date_of_birth format should be dd/mm/yyyy. Write methods to read customer data as <name, dd/mm/yyyy> and display as <name, dd, mm, yyyy> using StringTokenizer class considering the delimiter character as "/".

7. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; second thread computes the square of the number andprints; third thread will print the value of cube of the number

8. Write a java program that displays the number of characters, lines and words in a text file.

9. Write a java program that reads a file and displays the file on the screen with line number b.

10. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments (TEN nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva & Mini Project:12 + 28 +10 (50)
   Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

ESEP - HANDS-ON TRAINING ON UNIX AND SHELL PROGRAMMING

Sub Code :	**19SCS48**	**IA Marks :**	**25**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**25**

Course Objectives:

This course will enable students to

- Learn basic Unix commands
- Understand Linux environment and shell programming.

LABORATORY EXPERIMENTS:

1. Execution of various file/directory handling commands.
2. Write a shell script that takes a command –line argument and reports on whether it isdirectory, a file, or something else.
3. Write a shell script to find the gcd of two given numbers.
4. Write a shell script to print the first *n* Fibonacci numbers.
5. Write a program to accept 'n' and find the sum of the series 1! + 3! + 5! …… + n!
6. Write a shell script to determine whether a given number is a prime number or not
7. Write a shell script to accept an integer and find its sum and reverse it.
8. Write a program to find the largest number among a set of integers.
9. Write a shell script to accept 'n' integers and count +ves, -ves and zeroes separately. Also find the sum of +ves and –ves.
10. Write a shell script to accept many characters and count individual vowels, digits, spaces, special characters and consonants.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**
		Final IA Marks = 50/2	**25**

Conduction of Practical Examination:

1. All laboratory experiments (TEN nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva: 10 + 10 +5 (25)
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

PART – A : EMPLOYABILITY SKILLS ENHANCEMENT PROGRAMME 1 (ESEP 2)

Sub Code :	**19SQA49**	**IA Marks :**	**50**
Hrs/ Week :	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**25**

Course Objectives:

This course enables students to develop their ability to reason by introducing them to elements of formal reasoning. The primary focus will be on recognizing the logical structure of arguments. Topics will include types of statements, symbolism, logical connectives, logical relations, basic deductive inferences, truth tables, validity, invalidity, and soundness. To enhance the problem-solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations. Domain specific training in respective branches with tests

Course Outcomes:

After studying this course, students will be able to:

- Understand the basic concepts of QUANTITATIVE ABILITY
- Understand the basic concepts of LOGICAL REASONING Skills
- Acquire satisfactory competency in use of VERBAL REASONING
- Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

PART - A

Percentages, Simple interest and Compound interest - "a. Percentages as Fractions and Decimals b. Percentage Increase / Decrease c. Simple Interest d. Compound Interest e. Relation Between Simple and Compound Interest f. Finding CI without using formula" **Data interpretation and Data sufficiency -** "a. Data Interpretation – Tables b. Data Interpretation - Pie Chart c. Data Interpretation - Bar Graph d. Data Interpretation - Line Graph e. Data Sufficiency"

Alligation and Mixture, Ratio and Roportion, Partnerships - "a. Basic Cocept of Alligation and Mixture b. concept of mixture containing more than two Ingredients c.Concept and Problem solving technic in Ratio and Proportion d.Partnership "

Permutation, Combination and Probability - "a. Fundamental Counting Principle b. Permutation and Combination c. Computation of Permutation d. Circular Permutations e. Computation of Combination f. Probability g. Total Probability h.Finding Probability without using Combination i. Finding Probability using Pascal Triangle" **Sentence correction -** "a. Subject Verb Agreement. b. Pronoun Reference and Agreement. c. Verb Tense. d. Modifier. e. Parallelism. f. Idioms. g. Comparisons. h. Prepositions. i. Determiners."

PART - B

Operating Systems
DBMS
Computer Networks
Theory of Computation
Software Engineering

Question paper pattern:

- 10 assessment tests will be conducted based on Multiple choice questions.
- Final marks are based on the test marks conducted during the semester.

Reference Books

1. Quantitative abilities by Arun Sharma
2. Quantitative Aptitude for Competitive Examinations by R S Agrawal
3. Verbal and Non-Verbal reasoning by R S Agrawal

PART-B: INTERNATIONAL CERTIFICATION COURSE ON CURRENT TRENDS

Sub Code :	**19SQA49**	**IA Marks :**	**50**
Self Study Hours/Week:	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**-**

Course Objectives:

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

Course Outcomes:

On completion of this course, students will be able to:

CO1: Have exposure on the latest development
CO2: Acquire new skills
CO3: Become Industry ready
CO4: Have more confidence
CO5: Get additional knowledge

About the Course:

- A common Certification Course on current trends will be offered to all the students of the batch.
- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.

Assessment Method

- Assessment will be conducted for 2 Hours duration for 50 Marks on completion of the course and based on the marks scored, grading will be done.

ADDITIONAL MATHEMATICS - II

(MANDATORY LEARNING COURSE: COMMON TO ALL BRANCHES)
(A BRIDGE COURSE FOR LATERAL ENTRY STUDENTS OF IV SEM. B. E.)

Subject Code : 19SMADIP401
Contact Hours/Week : 02 **L-T-P : 2-0-0**
Total Hours : 25 **Exam. Hours : 02**
Exam. Marks : 50 **Credits : -**

Course Objectives

The mandatory learning course 19SMADIP401 viz., Additional Mathematics-II aims to provide essential concepts of linear algebra, and methods of solving first order differential equations, introductory concepts of second & higher order differential equations along with methods to solve them, Laplace & inverse Laplace transforms

Course Outcomes:

On completion of this course, students are able to:

CO1: Solve systems of linear equations in the different areas of linear algebra.

CO2: Solve second and higher order differential equations occurring in of electrical circuits, damped/un-damped vibrations.

CO3: Describe Laplace transforms of standard and periodic functions.

CO4: Determine the general/complete solutions to linear ODE using inverse Laplace transforms.

CO5: Recall basic concepts of elementary probability theory and, solve problems related to the decision theory, synthesis and optimization of digital circuits.

Module I

Linear Algebra: Introduction - rank of matrix by elementary row operations - Echelon form. Consistency of system of linear equations - Gauss elimination method. Eigen values and eigen vectors of a square matrix. Application of Cayley-Hamilton theorem (without proof) to compute the inverse of a matrix-Examples.

05 Hours

Module II

Finite Differences: Forward and backward differences, Newton's forward and backward interpolation formulae, Lagrange's interpolation formula- Problems.

Numerical Integration: Simpson's (1/3)th and (3/8)th rules, Weddle's rule (without proof) – Problems

05 Hours

Module III

Higher Order ODE's: Linear differential equations of second and higher order equations with constant coefficients. Homogeneous /non-homogeneous equations. Inverse differential operators.

05 Hours

Module IV

Laplace Transforms: Laplace transforms of elementary functions. Transforms of derivatives and integrals**,** transforms of periodic function and unit step function-Problems only.

05 Hours

Module V

Inverse Laplace Transforms: Definition of inverse Laplace transforms. Evaluation of Inverse transforms by standard methods. Application to solutions of Linear differential equations and simultaneous differential equations.

05 Hours

Question Paper Pattern:

- **PART A: TEN** multiple choice questions to be set for **ONE MARK** each. [01 mark*10 Questions = 10 marks]
- **PART B: TWO** question to be set from each module. Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. [08 mark*5 Questions = 40 marks]

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi, 43rd Ed., 2011

Reference Books:

1. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2015.
2. N.P.Bali and Manish Goyal: Engineering Mathematics, Laxmi Publishers,7th Ed., 2007

V SEMESTER SYLLABUS

DATA BASE MANAGEMENT SYSTEMS

Sub Code :	**19SCS51**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Provide a strong foundation in database concepts.
- Provide knowledge regarding database technology and practice.
- Practice SQL programming through a variety of database problems.
- Demonstrate the use of concurrency and transactions in database.
- Design and build database applications for real world problems.

Course Outcomes:

After studying this course, students will be able to:

CO1: Identify, analyze and define database objects on a database using RDBMS
CO2: Identify and analyze enforce integrity constraints on a database using RDBMS
CO3: Use Structured Query Language (SQL) for database manipulation.
CO4: Design and build simple database systems
CO5: Develop application to interact with databases.

Module I

Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications.

Overview of Database Languages and Architectures: Data Models, Schemas, and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment. **Conceptual Data Modelling using Entities and Relationships:** Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations.

Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra.

SQL: SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

SQL : Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL.
Database Application Development: Accessing databases from applications, An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet Bookshop.
Internet Applications: The three-Tier application architecture, The presentation layer, The Middle Tier.
Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form. **Normalization Algorithms:** Inference Rules, Equivalence, and Minimal Cover.
Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL.
Concurrency Control in Databases: Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multi version Concurrency control techniques, Validation Concurrency control techniques.
Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:
3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.
2. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014,McGraw Hill.

Reference Books:

1. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-GrawHill, 2013.
2. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.

COMPUTER NETWORKS

Sub Code :	**19SCS52**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Demonstration of application layer protocols.
- Discuss transport layer services and understand UDP and TCP protocols.
- Explain routers, IP and Routing Algorithms in network layer.
- Disseminate the Wireless and Mobile Networks covering IEEE 802.11Standard.
- Illustrate concepts of Multimedia Networking, Security and Network Management

Course Outcomes:

After studying this course, students will be able to:

CO1: Illustrate basic computer network technology.
CO2: Identify the different types of network topologies and protocols.
CO3: Enumerate the layers of the OSI model and TCP/IP functions of each layer.
CO4: Make out the different types of network devices and their functions within a network.
CO5: Understand the concepts of Multimedia Networking, Security and Network Management.

Module I

Introduction: Data Communications, Networks, Network Types, Internet History, Standards and Administration, Networks Models: Protocol Layering, TCP/IP Protocol suite, The OSI model, Introduction to Physical Layer-1: Data and Signals, Digital Signals, Transmission Impairment, Data Rate limits, Performance, Digital Transmission: Digital to digital conversion (Only Line coding: Polar, Bipolar and Manchester coding)

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Physical Layer-2: Analog to digital conversion (only PCM), Transmission Modes, Analog Transmission: Digital to analog conversion, Bandwidth Utilization: Multiplexing and Spread Spectrum, Switching: Introduction, Circuit Switched Networks and Packet switching.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Error Detection and Correction: Introduction, Block coding, Cyclic codes, Checksum, Forward error correction, Data link control: DLC services, Data link layer protocols, HDLC, and Point to Point protocol (Framing, Transition phases only).

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Media Access control: Random Access, Controlled Access and Channelization, Wired LANs Ethernet: Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet and 10 Gigabit Ethernet, Wireless LANs: Introduction, IEEE 802.11 Project and Bluetooth.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Other wireless Networks: WIMAX, Cellular Telephony, Satellite networks, Network layer Protocols : Internet Protocol, ICMPv4,Mobile IP, Next generation IP: IPv6 addressing, The IPv6 Protocol, The ICMPv6 Protocol and Transition from IPv4 to IPv6.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Behrouz A. Forouzan, Data Communications and Networking 5E, 5th Edition, Tata McGraw-Hill, 2013. (Chapters 1.1 to 1.5, 2.1 to 2.3, 3.1, 3.3 to 3.6, 4.1 to 4.3, 5.1, 6.1, 6.2, 8.1 to 8.3, 10.1 to 10.5, 11.1 to 11.4, 12.1 to 12.3, 13.1 to 13.5, 15.1 to 15.3, 16.1 to 16.3, 19.1 to 19.3, 22.1 to 22.4)

Reference Books:

1. Alberto Leon-Garcia and Indra Widjaja: Communication Networks - Fundamental Concepts and Key architectures, 2nd Edition Tata McGraw-Hill, 2004.
2. William Stallings: Data and Computer Communication, 8th Edition, Pearson Education, 2007.

PROGRAMMING THE WORLD WIDE WEB

Sub Code :	**19SCS531**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Illustrate the Semantic Structure of HTML and CSS
- Compose forms and tables using HTML and CSS
- Design Client-Side programs using JavaScript and Server-Side programs using PHP
- Infer Object Oriented Programming capabilities of PHP
- Examine JavaScript frameworks such as jQuery and Backbone.

Course Outcomes:

After studying this course, students will be able to:

CO1: Adapt HTML and CSS syntax and semantics to build web pages.

CO2: Construct and visually format tables and forms using HTML and CSS

CO3: Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.

CO4: Appraise the principles of object oriented development using PHP.

CO5: Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

Module I

Introduction to HTML, What is HTML and Where did it come from?, HTML Syntax, Semantic Markup, Structure of HTML Documents, Quick Tour of HTML Elements, HTML5 Semantic Structure Elements, Introduction to CSS, What is CSS, CSS Syntax, Location of Styles, Selectors, The Cascade: How Styles Interact, The Box Model, CSS Text Styling.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

HTML Tables and Forms, Introducing Tables, Styling Tables, Introducing Forms, Form Control Elements, Advanced CSS: Layout, Normal Flow, Positioning Elements, Floating Elements, Constructing Multicolumn Layouts, Approaches to CSS Layout, Responsive Design, CSS Frameworks.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

JavaScript: Client-Side Scripting, What is JavaScript and What can it do?, JavaScript Design Principles, Where does JavaScript Go?, Syntax, JavaScript Objects, The Document Object Model (DOM), JavaScript Events, Forms, Introduction to Server-Side Development with PHP, What is Server-Side Development, A Web Server's Responsibilities, Quick Tour of PHP, Program Control, Functions.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

PHP Arrays and Superglobals, Arrays, $_GET and $_POST Superglobal Arrays, $_SERVER Array, $_Files Array, Reading/Writing Files, PHP Classes and Objects, Object-Oriented Overview, Classes and Objects in PHP, Object Oriented Design, Error Handling and Validation, What are Errors and Exceptions?, PHP Error Reporting, PHP Error and Exception Handling.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Managing State, The Problem of State in Web Applications, Passing Information via Query Strings, Passing Information via the URL Path, Cookies, Serialization, Session State, HTML5 Web Storage, Caching, Advanced JavaScript and jQuery, JavaScript Pseudo-Classes, jQuery Foundations, AJAX, Asynchronous File Transmission, Animation, Backbone MVC Frameworks, XML Processing and Web Services, XML Processing, JSON, Overview of Web Services.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", 1 stEdition, Pearson Education India. (ISBN:978-9332575271).

Reference Books:

1. Robin Nixon, "Learning PHP, MySQL &JavaScript with jQuery, CSS and HTML5", 4 thEdition, O'Reilly Publications, 2015. (ISBN:978-9352130153)
2. Luke Welling, Laura Thomson, "PHP and MySQL Web Development", 5th Edition, Pearson Education, 2016. (ISBN:978-9332582736)
3. Nicholas C Zakas, "Professional JavaScript for Web Developers", 3rd Edition, Wrox/Wiley India,

2012. (ISBN:978-8126535088)
4. David Sawyer Mcfarland, “JavaScript &jQuery: The Missing Manual”, 1st Edition, O’Reilly/Shroff Publishers & Distributors Pvt Ltd, 2014 (ISBN:978- 9351108078)
5. Zak Ruvalcaba Anne Boehm, “Murach's HTML5 and CSS3”, 3rdEdition, Murachs/Shroff Publishers & Distributors Pvt Ltd, 2016. (ISBN:978-9352133246)

OBJECT ORIENTED MODELING AND DESIGN

Sub Code :	**19SCS532**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Describe the concepts involved in Object-Oriented modelling and their benefits.
- Demonstrate concept of use-case model, sequence model and state chart model for a given problem.
- Explain the facets of the unified process approach to design and build a Software system.
- Translate the requirements into implementation for Object Oriented design.
- Choose an appropriate design pattern to facilitate development procedure.

Course Outcomes:

After studying this course, students will be able to:

CO1: Describe the concepts of object-oriented and basic class modelling.

CO2: Differentiate between use-case model, sequence model and state chart model for a given problem.

CO3: Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.

CO4: Choose and apply a befitting design pattern for the given problem.

CO5: Translate the requirements into implementation for Object Oriented design.

Module I

Introduction, Modelling Concepts and Class Modelling: What is Object orientation? What is OO development? OO Themes; Evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling; abstraction; The Three models. Class Modelling: Object and Class Concept; Link and associations concepts; Generalization and Inheritance; A sample class model; Navigation of class models; Advanced Class Modelling, Advanced object and class concepts; Association ends; N-ary associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived Data; Packages.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Use Case Modelling and Detailed Requirements: Overview; Detailed object- oriented Requirements definitions; System Processes-A use case/Scenario view; Identifying Input and outputs-The System sequence diagram; Identifying Object Behaviour-The state chart Diagram; Integrated Object-oriented Models.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Process Overview, System Conception and Domain Analysis: Process Overview: Development stages; Development life Cycle; System Conception: Devising a system concept; elaborating a concept; preparing a problem statement. Domain Analysis: Overview of analysis; Domain Class model: Domain state model; Domain interaction model; Iterating the analysis.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Use case Realization :The Design Discipline within up iterations: Object Oriented Design-The Bridge between Requirements and Implementation; Design Classes and Design within Class Diagrams; Interaction Diagrams-Realizing Use Case and defining methods; Designing with Communication Diagrams; Updating the Design Class Diagram; Package Diagrams-Structuring the Major Components; Implementation Issues for Three-Layer Design.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Design Patterns: Introduction; what is a design pattern?, Describing design patterns, the catalog of design patterns, Organizing the catalog, How design patterns solve design problems, how to select a design patterns, how to use a design pattern; Creational patterns: prototype and singleton(only);structural patterns adaptor and proxy(only).

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Michael Blaha, James Rumbaugh: Object Oriented Modelling and Design withUML,2nd Edition, Pearson Education,2005
2. Satzinger, Jackson and Burd: Object-Oriented Analysis & Design with the Unified Process,

CengageLearning,2005.
3. Erich Gamma, Richard Helm, Ralph Johnson and john Vlissides: Design Patterns – Elements of Reusable Object-Oriented Software, Pearson Education,2007.

Reference Books:

1. Grady Booch et.al.: Object-Oriented Analysis and Design withApplications,3rd Edition, Pearson Education,2007.
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michel Stal: Pattern – Oriented Software Architecture. A system of Patterns , Volume 1, John Wiley and Sons.2007.
3. Booch, Jacobson, Rambaugh: Object-Oriented Analysis and Design with Applications, 3rdedition, pearson, Reprint 2013

THEORY OF COMPUTATION

Sub Code :	**19SCS533**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Introduce core concepts in Automata and Theory of Computation.
- Identify different Formal language Classes and their Relationships.
- Design Grammars and Recognizers for different formal languages.
- Prove or disprove theorems in automata theory using their properties.
- Determine the decidability and intractability of Computational problems.

Course Outcomes:

After studying this course, students will be able to:

CO1: Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation.

CO2: Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).

CO3: Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.

CO4: Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.

CO5: Classify a problem with respect to different models of Computation.

Module I

Why study the Theory of Computation, Languages and Strings: Strings, Languages. A Language Hierarchy, Computation, **Finite State Machines (FSM)**: Deterministic FSM, Regular languages, Designing FSM, Nondeterministic FSMs, From FSMs to Operational Systems, Simulators for FSMs, Minimizing FSMs, Canonical form of Regular languages, Finite State Transducers, Bidirectional Transducers.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Regular Expressions (RE): what is a RE?,Kleene's theorem, Applications of REs, Manipulating and Simplifying REs. Regular Grammars: Definition, Regular Grammars and Regular languages. Regular Languages (RL) and Non regular Languages: How many RLs, To show that a language is regular, Closure properties of RLs, to show some languages are not RLs.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Context-Free Grammars(CFG): Introduction to Rewrite Systems and Grammars, CFGs and languages, designing CFGs, simplifying CFGs, proving that a Grammar is correct, Derivation and Parse trees, Ambiguity, Normal Forms.

Pushdown Automata (PDA): Definition of non-deterministic PDA, Deterministic and Non-deterministic PDAs, Non-determinism and Halting, alternative equivalent definitions of a PDA, alternatives that are not equivalent to PDA.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Context-Free and Non-Context-Free Languages: Where do the Context-Free Languages(CFL) fit, Showing a language is context-free, Pumping theorem for CFL, Important closure properties of CFLs, Deterministic CFLs. Algorithms and Decision Procedures for CFLs: Decidable questions, Un-decidable questions.

Turing Machine: Turing machine model, Representation, Language acceptability by TM, design of TM, Techniques for TM construction.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Variants of Turing Machines (TM), The model of Linear Bounded automata: Decidability: Definition of an algorithm, decidability, decidable languages, Undecidable languages, halting problem of TM, Post correspondence problem. Complexity: Growth rate of functions, the classes of P and NP, Quantum Computation: quantum computers, Church-Turing thesis.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Elaine Rich, Automata, Computability and Complexity, 1st Edition, Pearson Education,2012/2013.
2. K L P Mishra, N Chandrasekaran , 3rd Edition, Theory of Computer Science, PhI, 2012.

Reference Books:

1. John E Hopcroft, Rajeev Motwani, Jeffery D Ullman, Introduction to Automata Theory, Languages, and Computation, 3rd Edition, Pearson Education, 2013.
2. Michael Sipser : Introduction to the Theory of Computation, 3rd edition, Cengage learning,2013.
3. John C Martin, Introduction to Languages and The Theory of Computation, 3rd Edition, Tata McGraw –Hill Publishing Company Limited, 2013.
4. Peter Linz, "An Introduction to Formal Languages and Automata", 3rd Edition, Narosa Publishers, 1998.
5. Basavaraj S. Anami, Karibasappa K G, Formal Languages and Automata theory, Wiley India, 2012
6. C K Nagpal, Formal Languages and Automata Theory, Oxford University press, 2012.

DIGITAL IMAGE PROCESSING

Sub Code :	**19SCS534**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Define the fundamental concepts in image processing.
- Determine basic relationships between Pixels in an image.
- Evaluate techniques followed in image enhancements.
- Illustrate image segmentation and compression algorithms.
- Illustration on redundancy and compression regarding image.

Course Outcomes:

After studying this course, students will be able to:

CO1: Explain fundamentals of image processing.
CO2: Compare transformation algorithms.
CO3: Contrast enhancement, segmentation and compression techniques.
CO4: Analyze on redundancy and compression regarding image in different models.
CO5: Apply the image processing concepts in different fields.

Module I

Introduction Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Sampling and Quantization, Representing Digital Images (Data structure), Some Basic Relationships Between Pixels- Neighbors and Connectivity of pixels in image, Applications of Image Processing: Medical imaging, Robot vision, Character recognition, Remote Sensing.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Image Enhancement In The Spatial Domain: Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Image Enhancement In Frequency Domain: Introduction, Fourier Transform, Discrete Fourier Transform (DFT), properties of DFT , Discrete Cosine Transform (DCT), Image filtering in frequency domain.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Image Segmentation: Introduction, Detection of isolated points, line detection, Edge detection, Edge linking, Region based segmentation- Region growing, split and merge technique, local processing, regional processing, Hough transform, Segmentation using Threshold.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Image Compression: Introduction, coding Redundancy , Inter-pixel redundancy, image compression model, Lossy and Lossless compression, Huffman Coding, Arithmetic Coding, LZW coding, Transform Coding, Sub-image size selection, blocking, DCT implementation using FFT, Run length coding.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Rafael C G., Woods R E. and Eddins S L, Digital Image Processing, Prentice Hall, 3rd edition, 2008.

Reference Books:

1. Milan Sonka,"Image Processing, analysis and Machine Vision", Thomson Press India Ltd, Fourth Edition.
2. Fundamentals of Digital Image Processing- Anil K. Jain, 2nd Edition, Prentice Hall of India.
3. S. Sridhar , Digital Image Processing, Oxford University Press, 2nd Ed, 2016.

DATA COMPRESSION

Sub Code :	**19SCS535**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Develop comprehensive knowledge in the field of Data Compression and Coding.
- Introduce on commonly used Coding and Compression techniques
- Analyze and evaluate different Data Compression and Coding methods.
- Information on basic software and hardware tools used for data compression.
- Determine Video compression and model based coding.

Course Outcomes:

After studying this course, students will be able to:

CO1: Explain the evolution and fundamental concepts with Data Compression and Coding techniques.

CO2: Analyze the operation of a range of commonly used Coding and Compression techniques

CO3: Identify the basic software and hardware tools used for data compression.

CO4: Analyze and distinguish between different algorithms.

CO5: Identify what new trends and what new possibilities of data compression are available.

Module I

Introduction: Compression techniques, modeling and coding mathematical preliminaries for lossless compression: A brief introduction to information theory, models, coding, algorithmic information theory, minimum description length principle.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Huffman Coding: The Huffman coding algorithm, non-binary Huffman codes, adaptive Huffman coding, golomb codes, rice codes, Tunstall codes, application of Huffman coding.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Lossless Image Compression: Introduction, CALIC, JPEG-LS, multi resolution approaches, facsimile encoding, MRC-T.44. **Mathematical Preliminaries For Lossy Coding**: Introduction, distortion criteria, information theory revisited, rate distortion theory, models.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Wavelet Based Compression: Introduction, wavelets, multi resolution analysis and scaling function, implementation using filters, image compression, embedded zero tree coder, set partitioning in hierarchical trees, JPEG zero. **Audio Coding**: Introduction, MPEG coding, MPEG advanced audio coding, Dolby AC3(DOLBY DIGITAL) other standards.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Video Compression: Introduction, motion compensation, video signal representation, ITU-T recommendation H.261, model based coding, asymmetric applications, The MPEG- 1 video standard, The MPEG-2 video standard, ITU-T recommendation H.263, ITU-T recommendation H.264, MPEG-4 part 1.0 advanced video coding, MPEG-4 part 2 , packet video, ATM networks.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Introduction to data compression 4th edition, Khalid sayood. *Elsevier*. Reprinted2014.

Reference Books:

1. Data compression, The complete reference. 4th edition. David Salomon. Springer Year 2014.

OPERATING SYSTEMS

Sub Code :	**19SCS541**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Introduce concepts and terminology used in OS.
- Explain threading and multithreaded systems.
- Illustrate process synchronization and concept of Deadlock.
- Introduce Memory and Virtual memory management.
- Introduce File system and storage techniques.

Course Outcomes:

After studying this course, students will be able to:

CO1: Demonstrate need for OS and different types of OS.
CO2: Apply suitable techniques for management of different resources.
CO3: Use processor, memory, storage and file system commands.
CO4: Realize the different concepts of OS in platform of usage through case studies.
CO5: Analyze on different storage techniques.

Module I

Introduction to operating systems, System structures: What operating systems do; Computer System organization; Computer System architecture; Operating System structure; Operating System operations; Process management; Memory management; Storage management; Protection and Security; Distributed system; Special-purpose systems; Computing environments. Operating System Services; User - Operating System interface; System calls; Types of system calls; System programs; Operating system design and implementation; Operating System structure; Virtual machines; Operating System generation; System boot.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Process Management Process concept; Process scheduling; Operations on processes; Inter process communication. Multi-threaded Programming: Overview; Multithreading models; Thread Libraries; Threading issues. Process Scheduling: Basic concepts; Scheduling Criteria; Scheduling Algorithms; Multiple-processor scheduling; Thread scheduling. Process Synchronization: Synchronization: The critical section problem; Peterson's solution; Synchronization hardware; Semaphores; Classical problems of synchronization; Monitors.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Deadlocks : Deadlocks; System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock. Memory Management: Memory management strategies: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Virtual Memory Management: Background; Demand paging; Copy-on-write; Page replacement; Allocation of frames; Thrashing. File System, Implementation of File System: File system: File concept; Access methods; Directory structure; File system mounting; File sharing; Protection: Implementing File system: File system structure; File system implementation; Directory implementation; Allocation methods; Free space management.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Secondary Storage Structures, Protection: Mass storage structures; Disk structure; Disk attachment; Disk scheduling; Disk management; Swap space management. Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights, Capability- Based systems. Case Study: The Linux Operating System: Linux history; Design principles; Kernel modules; Process management; Scheduling; Memory Management; File systems, Input and output; Inter-process communication.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Principles 7th edition, Wiley-India, 2006.

Reference Books:

1. Ann McHoes Ida M Fylnn, Understanding Operating System, Cengage Learning, 6th Edition
2. D.M Dhamdhere, Operating Systems: A Concept Based Approach 3rd Ed, McGrawHill, 2013.
3. P.C.P. Bhatt, An Introduction to Operating Systems: Concepts and Practice 4th Edition, PHI(EEE), 2014.
4. William Stallings Operating Systems: Internals and Design Principles, 6th Edition, Pearson.

NATURAL LANGUAGE PROCESSING

Sub Code :	**19SCS542**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Learn the techniques in natural language processing.
- Be familiar with the natural language generation.
- Be exposed to Text Mining.
- Understand the information retrieval techniques.
- Case study in natural language based approaches.

Course Outcomes:

After studying this course, students will be able to:

CO1: Analyze the natural language text.
CO2: Generate the natural language.
CO3: Do Text mining.
CO4: Apply information retrieval techniques.
CO5: Analyze different case study in natural language based approaches and apply it accordingly.

Module I

Overview and language modeling: Overview: Origins and challenges of NLP- Language and Grammar-Processing Indian Languages- NLP Applications- Information Retrieval. Language Modeling: Various Grammar- based Language Models-Statistical Language Model.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Word level and syntactic analysis: Word Level Analysis: Regular Expressions- Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar-Constituency- Parsing-Probabilistic Parsing.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Extracting Relations from Text: From Word Sequences to Dependency Paths: Introduction, Subsequence Kernels for Relation Extraction, A Dependency-Path Kernel for Relation Extraction and Experimental Evaluation.

Mining Diagnostic Text Reports by Learning to Annotate Knowledge Roles: Introduction, Domain Knowledge and Knowledge Roles, Frame Semantics and Semantic Role Labeling, Learning to Annotate Cases with Knowledge Roles and Evaluations.

A Case Study in Natural Language Based Web Search: InFact System Overview, The GlobalSecurity.org Experience.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Evaluating Self-Explanations in iSTART: Word Matching, Latent Semantic Analysis, and Topic Models: Introduction, iSTART: Feedback Systems, iSTART: Evaluation of Feedback Systems,

Textual Signatures: Identifying Text-Types Using Latent Semantic Analysis to Measure the Cohesion of Text Structures: Introduction, Cohesion, Coh- Metrix, Approaches to Analyzing Texts, Latent Semantic Analysis, Predictions, Results of Experiments.

Automatic Document Separation: A Combination of Probabilistic Classification and Finite-State Sequence Modeling: Introduction, Related Work, Data Preparation, Document Separation as a Sequence Mapping Problem, Results.

Evolving Explanatory Novel Patterns for Semantically-Based Text Mining:
Related Work, A Semantically Guided Model for Effective Text Mining.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Information Retrieval and Lexical Resources: Information Retrieval: Design features of Information Retrieval Systems-Classical, Non classical, Alternative Models of Information Retrieval – valuation Lexical Resources: World Net-Frame Net- Stemmers-POS Tagger- Research Corpora.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:
3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Tanveer Siddiqui, U.S., "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.

2. Anne Kao and Stephen R. Poteet (Eds), “Natural Language Processing and Text Mining”, Springer- Verlag London Limited 2007.

Reference Books:

1. Daniel Jurafsky and James H Martin, “Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, 2nd Edition, Prentice Hall, 2008.
2. James Allen, “Natural Language Understanding”, 2nd edition, Benjamin/Cummings publishing company, 1995.
3. Gerald J. Kowalski and Mark.T. Maybury, “Information Storage and Retrieval systems”, Kluwer academic Publishers, 2000.P.C.P. Bhatt, An Introduction to Operating Systems: Concepts and Practice 4th Edition, PHI(EEE), 2014.

MANAGEMENT AND ENTREPRENEURSHIP

Sub Code :	**19SCS543**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Explain the principles of management, organization and entrepreneur.
- Discuss on planning, staffing, ERP and their importance.
- Infer the importance of intellectual property rights and relate the institutional support.
- Preparation of project and enterprise resource planning.
- Definition and characteristics of different types of enterprises.

Course Outcomes:

After studying this course, students will be able to:

CO1: Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship.

CO2: Utilize the resources available effectively through ERP.

CO3: Make use of IPRs and institutional support in entrepreneurship.

CO4: Make project identification, selection, report, and know its significance.

CO5: Analyze different types of enterprises.

Module I

Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, brief overview of evolution of management theories,. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social

feasibility study.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, **Enterprise Resource Planning: Meaning and Importance- ERP** and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India indusial policy 2007 on micro and small enterprises, case study (Microsoft), Case study(Captain G R Gopinath),case study (N R Narayana Murthy & Infosys), **Institutional support:** MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, **Introduction to IPR.**

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship - KanishkaBedi- Oxford University Press-2017.

Reference Books:

1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier-Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003.

MOBILE APPLICATION DEVELOPMENT

Sub Code :	**19SCS544**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Learn to setup Android application development environment.
- Illustrate user interfaces for interacting with apps and triggering actions.
- Interpret tasks used in handling multiple activities.
- Identify options to save persistent application data.
- Appraise the role of security and performance in Android applications.

Course Outcomes:

After studying this course, students will be able to:

CO1: Create, test and debug Android application by setting up Android development environment.

CO2: Implement adaptive, responsive user interfaces that work across a wide range of devices.

CO3: Infer long running tasks and background work in Android applications.

CO4: Demonstrate methods in storing, sharing and retrieving data in Android applications.

CO5: Analyze performance of android applications and understand the role of permissions and security.

Module I

Get started: Build your first app: Introduction to Android, Create your first android App., Layouts, Views and Resources, Text and scrolling views, Resource to help you learn, Activities: Understanding activities and Intents, The activity lifecycle and managing state, Activities and Implicit Intents, Testing, debugging and using support libraries.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

User Interaction: User input controls, Menus, Screen navigation, Recycler View, Delightful user experience: Drawables, Styles and Themes, Material Design, Providing Resources for Adaptive layouts, Testing your UI.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Background Tasks: AsyncTask and AsyncTask Loader, Connect to the internet, Broadcast Receivers, Services, Triggering, scheduling and optimizing background tasks: Notifications, Scheduling alarms, Transferring data efficiently.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

All about data: Preferences and Settings: Storing data, Shared Preferences, App setings, Storing data using SQLite: SQLite Primer, SQLite Database, Sharing data with content providers, Loading data using

Loaders.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Permissions, Performance and Security: Permissions, Performance and Security , Firebase and AdMob: Firebase and AdMob, Publish: Publish.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017. https://www.gitbook.com/book/google-developer-training/android-developer-fundamentals-course-concepts/details (Download pdf file from the above link)

Reference Books:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd,2014.
2. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD Publishers,2015.
3. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13:978-8126565580.
4. AnubhavPradhan, Anil V Deshpande, " Composing Mobile Apps" using Android, Wiley 2014, ISBN:978-81-265-4660-2

STRESS MANAGEMENT

Sub Code :	**19SCS545**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Understand the physiological systems that are affected by stressors.
- Understand the long-term effects and illnesses that can result from stressors.
- Understand the specific applications of stress as it relates to the workplace and different target groups.
- Create effective stress management plans for individual clients and for workplace environments.
- Enhancing significance of training and development, performance evaluation.

Course Outcomes:

After studying this course, students will be able to:

CO1: Identify the physiological systems that are affected by stressors.
CO2: Identify the long-term effects and illnesses that can result from stressors.
CO3: Identify the specific applications of stress.
CO4: Create effective stress management plans for individual clients.
CO5: Enhance the significance of training and development, performance evaluation.

Module I

UNDERSTANDING STRESS: Meaning – Symptoms – Work Related Stress – Individual Stress – Reducing Stress -sources of stress –consequence of stress- burnout-symptoms of Burnout stress verses Burnout-model of stress-strategies for coping stress (individual and organizational strategies) –case study.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

TIME MANAGEMENT: Techniques – Importance of Planning the day – developing concentration – Prioritizing Beginning at the start – Techniques for conquering procrastination – Sensible delegation – Taking the right breaks –Learning to say "No".

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

CAREER PLATEAU: Career plateau – Identifying Career plateaus – Structural and Content – Plateauing – Making a fresh start – Importance of Sabbaticals – Counseling out – Executive leasing – Sustaining a marketable Career.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

CRISIS MANAGEMENT: Implications – People issues – Structure issues – Environmental issues – Learning to keep calm - Preventing interruptions – Controlling crisis – Pushing new ideas – Empowerment – Work place Humour, Developing a sense of Humour – Learning to laugh – role of group cohesion and team spirit.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

SELF DEVELOPMENT: Improving personality – Leading with Integrity – Enhancing Creativity – Effective decision making – Sensible Communication – The Listening Game – Managing Self – Mediation for peace – Yoga for Life.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Internal Marks Distribution:

3 Internals Assessment (IA) Tests are conducted for 20 marks each and it will be reduced to **40 marks**.
Continuous Internal Evaluation (CIE): **5 marks**. (Seminars, Quiz, Surprise Test, Assignments)
Attendance: **5 marks**.

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer FIVE full questions, choosing at least ONE full question from each module.
08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Bhatia R.L., The Executive Track: An Action Plan for Self Development Wheeler Publishing, New Delhi.
2. Charavathy.S.K, "Human Values for Manager", McGraw Hill/Henely Management Series.

Reference Books:

1. Jeffr Davison, Managing Stress, Prentice Hall of India, New Delhi.
2. Jerrold S Greenberg, Comprehensive Stress Management, Jain Books, 2009.

DATA BASE MANAGEMENT SYSTEMS LABORATORY

Sub Code :	**19SCSL55**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

- Foundation knowledge in database concepts, technology and practice to groom students into well-informed database application developers.
- Strong practice in SQL programming through a variety of database problems.
- Develop database applications using front-end tools and back-end DBMS.

Course Outcomes:

After studying this course, students will be able to:

CO1: Create, Update and query on the database.

CO2: Demonstrate the working of different concepts of DBMS.

CO3: Implement, analyze and evaluate the project developed for an application.

Description (If any):

SQL Programming

- Design, develop, and implement the specified queries for the following problems using Oracle, MySQL, MS SQL Server, or any other DBMS under LINUX/Windows environment.
- Create Schema and insert at least 5 records for each table. Add appropriate database constraints.

Lab Experiments:

1 Consider the following schema for a Library Database:

BOOK(Book_id, Title, Publisher_Name, Pub_Year)

BOOK_AUTHORS(Book_id, Author_Name)

PUBLISHER(Name, Address, Phone)

BOOK_COPIES(Book_id, Branch_id, No-of_Copies)

BOOK_LENDING(Book_id, Branch_id, Card_No, Date_Out, Due_Date)

LIBRARY_BRANCH(Branch_id, Branch_Name, Address)

Write SQL queries to

1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun2017.
3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
5. Create a view of all books and its number of copies that are currently available in the Library.

2 Consider the following schema for Order Database: SALESMAN(Salesman_id, Name, City, Commission) CUSTOMER(Customer_id, Cust_Name, City, Grade, Salesman_id) ORDERS(Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)

Write SQL queries to

1. Count the customers with grades above Bangalore's average.
2. Find the name and numbers of all salesman who had more than one customer.
3. List all the salesman and indicate those who have and don't have customers in their cities (Use UNION operation.)
4. Create a view that finds the salesman who has the customer with the highest order of a day.
5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

3 Consider the schema for Movie Database:
ACTOR(Act_id, Act_Name, Act_Gender) DIRECTOR(Dir_id, Dir_Name, Dir_Phone) MOVIES(Mov_id, Mov_Title, Mov_Year, Mov_Lang,Dir_id) MOVIE_CAST(Act_id, Mov_id,Role)
RATING(Mov_id, Rev_Stars) Write SQL queries to

1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
5. Update rating of all movies directed by 'Steven Spielberg' to 5.

4 Consider the schema for College Database:
STUDENT(USN, SName, Address, Phone, Gender) SEMSEC(SSID, Sem, Sec)
CLASS(USN, SSID)
SUBJECT(Subcode, Title, Sem, Credits)
IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA) Write SQL queries to

1. List all the student details studying in fourth semester 'C'section.
2. Compute the total number of male and female students in each semester and in each section.
3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
5. Categorize students based on the following criterion: If FinalIA = 17 to 20 then CAT ='Outstanding'

If FinalIA = 12 to 16 then CAT = 'Average' If FinalIA< 12 then CAT = 'Weak'
Give these details only for 8th semester A, B, and C section students.

5 Consider the schema for Company Database:
EMPLOYEE(SSN, Name, Address, Sex, Salary, SuperSSN, DNo)
DEPARTMENT(DNo, DName, MgrSSN, MgrStartDate)
DLOCATION(DNo,DLoc)
PROJECT(PNo, PName, PLocation, DNo) WORKS_ON(SSN, PNo, Hours)
Write SQL queries to

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department
4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator).
5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs.6,00,000.

Conduction of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script.
4. Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

COMPUTER NETWORKS LABORATORY

Sub Code :	**19SCSL56**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

- Demonstrate operation of network and its management commands.
- Simulate and demonstrate the performance of GSM and CDMA.
- Implement data link layer and transport layer protocols.

Course Outcomes:

After studying this course, students will be able to:

CO1: Analyze and Compare various networking protocols.
CO2: Demonstrate the working of different concepts of networking.
CO3: Implement, analyze and evaluate networking protocols in NS2 / NS3.

Description (If any):

- For the experiments below modify the topology and parameters set for the experiment and take multiple rounds of reading and analyze the results available in log files. Plot necessary graphs and conclude. Use NS2/NS3.

Lab Experiments:

Part A

1. Implement three nodes point – to – point network with duplex links between them. Set the queue size, vary the bandwidth and find the number of packets dropped.
2. Implement transmission of ping messages/trace route over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.
3. Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.

Part B

Implement the following in Java:

1. Write a program for error detecting code using CRC-CCITT (16- bits).
2. Using TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present.
3. Write a program on datagram socket for client/server to display the messages on client side, typed at the server side.
4. Write a program for simple RSA algorithm to encrypt and decrypt the data.

Conduction of Practical Examination:

1. All laboratory experiments from part A and part B are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script.
4. Marks Distribution: Procedure+Conduction+Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

PROGRAMMING THE WEB LABORATORY

Sub Code :	**19SCSL57**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

- Design and develop static and dynamic webpages.
- Familiarize with Client-Side Programming, Server-Side Programming, Active server Pages.
- Learn Database Connectivity to web applications.

Course Outcomes:

CO1: Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.

CO2: Have a good understanding of Web Application Terminologies, Internet Tools other web services.

CO3: Learn how to link and publish websites.

Lab Experiments:

1. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.
2. Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.
3. Write a JavaScript code that displays text "TEXT-GROWING" with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays "TEXT-SHRINKING" in BLUE color. Then the font size decreases to5pt.
4. Develop and demonstrate a HTML5 file that includes JavaScript script that uses functions for the following problems:
   a. Parameter: A string
   b. Output: The position in the string of the left-most vowel
   c. Parameter: A number
   d. Output: The number with its digits in the reverse order
5. Design an XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, and Name of the College, Branch, Year of Joining, and email id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.
6. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
7. Write a PHP program to display a digital clock which displays the current time of the server.

8. Write the PHP programs to do the following:
   a. Implement simple calculator operations.
   b. Find the transpose of a matrix.
   c. Multiplication of two matrices.
   d. Addition of two matrices.

9. Write a PHP program named states.py that declares a variable states with value "Mississippi Alabama Texas Massachusetts Kansas". write a PHP program that does the following:
   a. Search for a word in variable states that ends in x as. Store this word in element 0 of a list named states List.
   b. Search for a word in states that begins with k and ends in s. Perform a case- insensitive comparison. [Note: Passing re.Ias a second parameter to method compile performs a case-insensitive comparison.] Store this word in element1 of states List.
   c. Search for a word in states that begins with M and ends in s. Store this word in element 2 of the list.
   d. Search for a word in states that ends in a. Store this word in element 3 of the list.
10. Write a PHP program to sort the student records which are stored in the database using selection sort.

Conduction of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

MOOC

Sub Code :	**19SCS58**	**IA Marks :**	**50**
Self Study Hours/Week:	**2**	**Credits :**	**2**

Course Objectives:

- To improve learnability
- Acquire additional knowledge in the field of study
- Skill development
- Industry readiness
- Increased confidence level

Course Outcomes:

On completion of this course, students will be able to:

CO1: Improve learnability
CO2: Acquire additional knowledge in the field of study
CO3: Develop the skill
CO4: Industry ready
CO5: Have more confidence level

About the Course:

- A common Online MOOC/SWAYAM/COURSERA Course is offered in Blended mode.
- The MOOC Coordinator will recommend a department specific common course in MOOC/SWAYAM/COURSERA to all the students of the batch.
- The assessment will be taken by the MOOC Coordinator for 50 Marks at the end of the Course and the remaining 50 marks will be awarded for the Course Completion.
- The student must attend all continuous assessment taken by the MOOC/COURSERA Course Faculty.

Assessment Method for MOOC/SWAYAM/COURSERA Course:

- The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course has to recommend a common course for the students to register the MOOC/SWAYAM/COURSERA Course for a Specific Title.
- The Students have to take all continuous assessment as recommended by the Course Faculty in the MOOC/SWAYAM/COURSERA Course for the internal assessment of 50 Marks.
- The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course is responsible to conduct Assessment (MCQs) for 50 Marks in the Internal Assessment of 100 Marks.

Sl. No.	Type of Assessment	Weightage	Marks
1	Continuous Assessment taken by the MOOC/Coursera Course Faculty	50	50
2	MOOC/SWAYAM/COURSERA Faculty Coordinator has to Conduct Assessment (MCQs & Assignments)	50	50
Total			**100**

PART – A : EMPLOYABILITY SKILLS ENHANCEMENT PROGRAMME 1 (ESEP 3)

Sub Code :	**19SQA59**	**IA Marks :**	**50**
Hrs/ Week :	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**25**

Course Objectives:

This course enables students to develop their ability to reason by introducing them to elements of formal reasoning. The primary focus will be on recognizing the logical structure of arguments. Topics will include types of statements, symbolism, logical connectives, logical relations, basic deductive inferences, truth tables, validity, invalidity, and soundness. To enhance the problem-solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.

Course Outcomes:

After studying this course, students will be able to:

- Understand the basic concepts of QUANTITATIVE ABILITY
- Understand the basic concepts of LOGICAL REASONING Skills
- Acquire satisfactory competency in use of VERBAL REASONING
- Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

PART – A

Sentence completion - "a. Using sentence clues. b. Using Hints.c. Structure Words.d. Visualize. e. Pro-active thinking. f. Reactive thinking (signpost words, root words, prefix suffix, sentence structure clues).g. Structure Words. h. Elimination.i. Working Backwards. " **Verbal classification -** "a. Familiarity. b. Systematic approcach.c. Logical thinking. d. Elimination. e. Practice makes perfect."

Time, Speed and Distance - "a. Basics of time, speed and distance b. Relative speed c. Problems based on trains d. Problems based on boats and streams e. Problems based on races"

"Average,Problems on Ages Profit and Loss, Discount"- "a. concept of Average b. Weighted Average c. Problems on Ages(based on average) d. Problems on ages (based on Ratio) e.Concept and Problem soving tecnic in Profit and Loss f. Successive Discount"

Syllogism and Venn diagrams, Blood Relations - " a. Syllogisms b. Venn Diagrams – Interpretation c. Venn Diagrams – Solving d.Basic concept and terminology in Blood Relations e. Option Elimination method in Blood Relation"

Logarithms, Algebra - "a. Logarithm concept and problem solving tecnic b. Different types of Algebraic expressions c.Different types of Algebraic equations"

Verbal reasoning - "a. Reading techniques. b. Removing assumptions.c. Managing time. d. Honing analytical skills. e. Practicing the right format. f. Learning from mistakes. "

Spotting errors - "a. Subject Verb Agreement.b. Right usage of Participles and Infinitives. c. Right usage of Verbs.d. Right usage of Adjectives. e. Checking spelling and punctuation errors. "

PART - B

Java
Network Security

Question paper pattern:

- 10 assessment tests will be conducted based on Multiple choice questions.
- Final marks are based on the test marks conducted during the semester.

Reference Books

1. Quantitative abilities by Arun Sharma
2. Quantitative Aptitude for Competitive Examinations by R S Agrawal
3. Verbal and Non-Verbal reasoning by R S Agrawal

PART-B: INTERNATIONAL CERTIFICATION COURSE ON CURRENT TRENDS

Sub Code :	**19SQA59**	**IA Marks :**	**50**
Self Study Hours/Week:	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**-**

Course Objectives:

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

Course Outcomes:

On completion of this course, students will be able to:

CO1: Have exposure on the latest development

CO2: Acquire new skills

CO3: Become Industry ready

CO4: Have more confidence

CO5: Get additional knowledge

About the Course:

- A common Certification Course on current trends will be offered to all the students of the batch.
- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.

Assessment Method

- Assessment will be conducted for 2 Hours duration for 50 Marks on completion of the course and based on the marks scored, grading will be done.

VI SEMESTER SYLLABUS

SYSTEM SOFTWARE AND COMPILER DESIGN

Sub Code :	**19SCS61**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Define System Software such as Assemblers, Loaders, Linkers and Macroprocessors.
- Familiarize with source file, object file and executable file structures and libraries.
- Describe the front-end and back-end phases of compiler and their importance to Students.
- Describe about language Processors and Lexical Analysis
- Familarize about syntax Processors

Course Outcomes:

After studying this course, students will be able to:
CO1: Explain system software such as assemblers, loaders, linkers and macroprocessors.
CO2: Design and develop lexical analyzers, parsers and code generators.
CO3: Utilize lex and yacc tools for implementing different concepts of system software.
CO4: Analyse about language Processors and Lexical Analysis
CO5: Explain about syntax processors

Module I

Introduction to System Software, Machine Architecture of SIC and SIC/XE. **Assemblers:** Basic assembler functions, machine dependent assembler features, machine independent assembler features, assembler design options.
Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Loaders and Linkers: Basic Loader Functions**,** Machine Dependent Loader Features, Machine Independent Loader Features, Loader Design Options, Implementation Examples.
Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Lex and Yacc : The simplest LEX program, Recognizing words with LEX, Symbol tables, Grammars, Parser-Lexer Communication, The parts of Speech Lexer, A YACC Parser, The Rule section, Running LEX and YACC, LEX and Hand written Lexers, Using LEX –Regular Expression, Examples of Regular Expressions, A word Counting Program, Parsing a Command Line.

10 Hours

Module IV

Introduction: Language Processors, The structure of a compiler, Applications of compiler technology, Programming language basics **Lexical Analysis:** The role of lexical analyzer, Input buffering, Specifications of token, recognition of tokens.

Syntax Analysis: Introduction, Role Of Parsers, Top Down Parsers, Bottom-Up Parsers, Simple LR parsers.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD's.

Intermediate code generation: Variants of syntax tree, Three address code **Code generation:** Issues in the Design of a code generator, The target language.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module.

08 Marks x 05 Question = **40 Marks.**

Text Books:

1. System Software by Leland. L. Beck, D Manjula, 3rd edition, 2012
2. Compilers-Principles, Techniques and Tools by Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman. Pearson, 2nd edition, 2007.
3. John R Levine, Tony Mason AND Doug Brown:Lex and Yacc, O'Reilly, SPD,1998.

Reference Books:

1. Systems programming – Srimanta Pal , Oxford university press, 2016
2. System programming and Compiler Design, K C Louden, Cengage Learning
3. System software and operating system by D. M. Dhamdhere TMG
4. Compiler Design, K Muneeswaran, Oxford University Press 2013.

MACHINE LEARNING

Sub Code :	**19SCS62**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Define machine learning and problems relevant to machine learning.
- Differentiate supervised, unsupervised and reinforcement learning
- Apply neural networks, Bayes classifier and k nearest neighbour, for problems appear in machine learning.
- Perform statistical analysis of machine learning techniques.
- Applying K nearest Neighbour and reinforcement learning

Course Outcomes:

After studying this course, students will be able to:

CO1: Identify the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.

CO2: Explain theory of probability and statistics related to machine learning

CO3: Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q, software

CO4: Explain about Bayes theorem

CO5: Analyse the Instant Learning

Module I

Introduction: Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning. **Concept Learning:** Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Decision Tree Learning: Decision tree representation, Appropriate problems for decision tree learning, Basic decision tree learning algorithm, hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Artificial Neural Networks: Introduction, Neural Network representation, Appropriate problems, Perceptrons, Backpropagation algorithm.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Bayesian Learning: Introduction, Bayes theorem, Bayes theorem and concept learning, ML and LS error hypothesis, ML for predicting probabilities, MDL principle, Naive Bayes classifier, Bayesian belief networks, EM algorithm.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Instance Based Learning: Introduction, k-nearest neighbor learning, locally weighted regression, radial basis function, cased-based reasoning.

Reinforcement Learning: Introduction, Learning Task, Q-Learning.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Tom M. Mitchell, Machine Learning**,** India Edition 2013, McGraw Hill Education.

Reference Books:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, h The Elements of Statistical Learning, 2nd edition, springer series in statistics.
2. EthemAlpaydın, Introduction to machine learning, second edition, MIT press.

PYTHON APPLICATION PROGRAMMING

Sub Code :	**19SCS631**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Learn Syntax and Semantics and create Functions in Python.
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python
- Build Web Services and introduction to Network and Database Programming in Python.

Course Outcomes:

After studying this course, students will be able to:

CO1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.

CO2: Demonstrate proficiency in handling Strings and File Systems.

CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.

CO4: Interpret the concepts of Object-Oriented Programming as used in Python.

CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

Module I

Why should you learn to write programs, Variables, expressions and statements, Conditional execution, Why should you learn to write programs: (1.1-1.11) Variables, expressions and statements: (2.1-2.13) Conditional execution: (3.1-3.9) Functions: (4.1-4.12)

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Iteration: Updating variables, The while statement, Infinite loops, "Infinite loops" and break, Finishing iterations with continue, Definite loops using for, Loop patterns, Debugging.

Strings: A string is a sequence, Getting the length of a string using len, Traversal through a string with a loop, String slices, Strings are immutable, Looping and counting, The in operator, String comparison, string methods, Parsing strings, Format operator, Debugging.

Files: (7.1-7.11)

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Lists: (8.1-8.16)

Dictionaries: Dictionary as a set of counters, Dictionaries and files, Looping and dictionaries, Advanced text parsing, debugging.

Tuples:(10.1-10.11)

Regular Expressions: Character matching in regular expressions, Extracting data using regular expressions, Combining searching and extracting, Escape character.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Classes and objects: User-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying, Debugging.

Classes and functions: Time, Pure functions, Modifiers, Prototyping versus planning, Debugging.

Classes and methods: Object-oriented features, Printing objects, Another example, A more complicated example, The init method, The_str_method, Operator overloading, Type-based dispatch, Polymorphism.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Networked programs: (12.1-12.8) **Using Web Services:** (13.1-13.8) **Using databases and SQL:** (14.1-14.10)

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", 1st Edition, CreateSpace Independent Publishing Platform, 2016. (http://do1.drchuck.com/pythonlearn/EN_us/pythonlearn.pdf) (Chapters 1 – 13, 15)
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2ndEdition, Green

Tea Press, 2015.(http://greenteapress.com/thinkpython2/thinkpython2.pdf) (Chapters 15, 16, 17) (Download pdf files from the above links)

Reference Books:

1. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd. ISBN-13: 978-8126556014
2. Mark Lutz, “Programming Python”, 4th Edition, O’Reilly Media, 2011.ISBN-13: 978-9350232873.
3. Wesley J Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365
4. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, “Data Structures and Algorithms in Python”,1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126562176
5. ReemaThareja, “Python Programming using problem solving approach”, Oxford university press, 2017.

DATA WAREHOUSING AND DATA MINING

Sub Code :	**19SCS632**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Define multi-dimensional data models.
- Explain rules related to association, classification and clustering analysis.
- Compare and contrast between different classification and clustering algorithms.
- Compare the classification methods
- Explain about cluster analysis

Course Outcomes:

After studying this course, students will be able to:

CO1: Identify data mining problems and implement the data warehouse.

CO2: Write association rules for a given data pattern.

CO3: Choose between classification and clustering solution.

CO4: Write and Identify classification methods

CO5: Explain of the cluster analysis

Module I

Data Warehousing & modeling: Basic Concepts: Data Warehousing: A multitier Architecture, Data warehouse models: Enterprise warehouse, Data mart and virtual warehouse, Extraction, Transformation and loading, Data Cube: A multidimensional data model, Stars, Snowflakes and Fact constellations: Schemas for multidimensional Data models, Dimensions: The role of concept Hierarchies, Measures: Their Categorization and computation, Typical OLAP Operations.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Data warehouse implementation& Data mining: Efficient Data Cube computation: An overview, Indexing OLAP Data: Bitmap index and join index, Efficient processing of OLAP Queries, OLAP server Architecture ROLAP versus MOLAP Versus HOLAP. **:** Introduction: What is data mining, Challenges, Data Mining Tasks, Data: Types of Data, Data Quality, Data Preprocessing, Measures of Similarity and Dissimilarity.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Association Analysis: Association Analysis: Problem Definition, Frequent Item set Generation, Rule generation. Alternative Methods for Generating Frequent Item sets, FP-Growth Algorithm, Evaluation of Association Patterns.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Classification : Decision Trees Induction, Method for Comparing Classifiers, Rule Based Classifiers, Nearest Neighbour Classifiers, Bayesian Classifiers.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Clustering Analysis: Overview, K-Means, Agglomerative Hierarchical Clustering, DBSCAN, Cluster Evaluation, Density-Based Clustering, Graph- Based Clustering, Scalable Clustering Algorithms.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining,Pearson, First impression,2014.
2. Jiawei Han, MichelineKamber, Jian Pei: Data Mining -Concepts and Techniques, 3rd Edition, Morgan Kaufmann Publisher, 2012.

Reference Books:

1. Sam Anahory, Dennis Murray: Data Warehousing in the Real World, Pearson,Tenth Impression,2012.
2. Michael.J.Berry, Gordon.S.Linoff: Mastering Data Mining , Wiley Edition, second edtion,2012.

ADHOC NETWORKS

Sub Code :	**19SCS633**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Describe the wireless communication.
- Illustrate operations involved in Mobile IP.
- Discover the concepts of mobile computing and databases.
- Describe transport layer Protocols
- Describe about security in wireless sensor networks

Course Outcomes:

After studying this course, students will be able to:

CO1: Summarize various mobile communication systems.

CO2: Describe various multiplexing systems used in mobile computing.

CO3: Indicate the use and importance of data synchronization in mobile computing

CO4: Explain about transport Layer protocols and the goals.

CO5: Summarize the goals achieved ,Qos ,Security Requirements

Module I

Introduction: Ad hoc Networks: Introduction, Issues in Ad hoc wireless networks, Ad hoc wireless internet.MAC – 1: MAC Protocols for Ad hoc wireless Networks: Introduction, Issues in designing a MAC protocol for Ad hoc wireless Networks, Design goals of a MAC protocol for Ad hoc wireless Networks, Classification of MAC protocols, Contention based protocols with reservation mechanisms.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

MAC – 2: Contention-based MAC protocols with scheduling mechanism, MAC protocols that use directional antennas, Other MAC protocols. Routing – 1: Routing protocols for Ad hoc wireless Networks: Introduction, Issues in designing a routing protocol for Ad hoc wireless Networks.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Routing 1- contd : Classification of routing protocols, Table drive routing protocol, On-demand routing protocol.

Routing – 2: Hybrid routing protocol, Routing protocols with effective flooding mechanisms, Hierarchical routing protocols, Power aware routing protocols.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Transport Layer: Transport layer protocols for Ad hoc wireless Networks: Introduction, Issues in designing a transport layer protocol for Ad hoc wireless Networks, Design goals of a transport layer

protocol for Ad hoc wireless Networks, Classification of transport layer solutions, TCP over Ad hoc wireless Networks, Other transport layer protocols for Ad hoc wireless Networks.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Security: Security: Security in wireless Ad hoc wireless Networks, Network security requirements, Issues & challenges in security provisioning, Network security attacks, Key management, Secure routing in Ad hoc wireless Networks. QoS: Quality of service in Ad hoc wireless Networks: Introduction, Issues and challenges in providing QoS in Ad hoc wireless Networks, Classification of QoS solutions, MAC layer solutions, network layer solutions.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. C. Siva Ram Murthy & B. S. Manoj: Ad hoc Wireless Networks, 2nd Edition, Pearson Education, 2005.

Reference Books:

1. Ozan K. Tonguz and Gianguigi Ferrari: Ad hoc Wireless Networks, John Wiley, 2006.
2. Xiuzhen Cheng, Xiao Hung, Ding-Zhu Du: Ad hoc Wireless Networking, Kluwer Academic Publishers, 2004.

WIRELESS SENSOR NETWORKS AND MOBILE COMPUTING

Sub Code :	**19SCS634**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Describe the wireless communication.
- Illustrate operations involved in Mobile IP.
- Discover the concepts of mobile computing and databases.
- Describe about Data organization, Data Caching.
- Discuss Communication Symmetry

Course Outcomes:

After studying this course, students will be able to:

CO1: Summarize various mobile communication systems.

CO2: Describe various multiplexing systems used in mobile computing.

CO3: Indicate the use and importance of data synchronization in mobile computing.

CO4: Explain about data organization and Caching

CO5: Explain about data delivery mechanism

Module I

Mobile Communication, Mobile Computing, Mobile Computing Architecture, Mobile Devices Mobile System Networks, Data Dissemination, Mobility Management, Security Cellular Networks and Frequency Reuse, Mobile Smartphone, Smart Mobiles, and Systems Handheld Pocket Computers, Handheld Devices, Smart Systems, Limitations of Mobile Devices Automotive Systems.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

GSM-Services and System Architecture, Radio Interfaces of GSM, Protocols of GSM Localization, Call Handling Handover, Security, New Data Services, General Packet Radio Service High-speed Circuit Switched Data, DECT, Modulation, Multiplexing, Controlling the Medium Access Spread Spectrum, Frequency Hopping Spread Spectrum (FHSS),Coding Methods, Code Division Multiple Access, IMT-2000 3G Wireless Communication Standards, WCDMA 3G Communications Standards ,CDMMA2000 3G Communication Standards, I-mode, OFDM, High Speed Packet Access (HSPA) 3G Network Long-term Evolution, WiMaxRel 1.0 IEEE 802.16e, Broadband Wireless Access,4G Networks, Mobile Satellite Communication Networks.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

IP and Mobile IP Network Layers, Packet Delivery and Handover Management Location Management, Registration, Tunnelling and Encapsulation, Route Optimization Dynamic Host Configuration Protocol, VoIP, IPsec Conventional TCP/IP Transport Layer Protocols, Indirect TCP, Snooping TCP Mobile TCP, Other Methods of Mobile TCP-layer Transmission ,TCP over 2.5G/3G Mobile Networks.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Data Organization, Database Transactional Models – ACID Rules, Query Processing Data Recovery Process, Database Hoarding Techniques , Data Caching, Client-Server Computing for Mobile Computing and Adaptation Adaptation Software for Mobile Computing, Power-Aware Mobile Computing, Context-aware Mobile Computing.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Communication Asymmetry, Classification of Data-delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing techniques, Digital Audio Broadcasting (DAB), Digital Video Broadcasting Synchronization, Synchronization Software for Mobile Devices, Synchronization Software for Mobile Devices SyncML-Synchronization Language for Mobile Computing,Sync4J (Funambol), Synchronized Multimedia Markup Language (SMIL).

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Raj kamal: Mobile Computing, 2ND EDITION, Oxford University Press, 2007/2012 MartynMallik: Mobile and Wireless Design Essentials, Wiley India, 2003.

Reference Books:

1. Ashok Talukder, RoopaYavagal, Hasan Ahmed: Mobile Computing, Technology, Applications and Service Creation, 2nd Edition, Tata McGraw Hill, 2010.
2. ItiSahaMisra: Wireless Communications and Networks, 3G and Beyond, Tata McGraw Hill, 2009.

CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW

Sub Code :	**19SCS635**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Explain the concepts of Cyber security
- Illustrate key management issues and solutions.
- Familiarize with Cryptography and very essential algorithms
- Introduce cyber Law and ethics to be followed.
- Illustrate IT acts and aims

Course Outcomes:

After studying this course, students will be able to:

CO1: Discuss cryptography and its need to various applications.

CO2: Design and develop simple cryptography algorithms.

CO3: Understand cyber security and need cyber Law.

CO4: Understand the concept of Intrusion, worms, Authentication.

CO5: Discuss about IT acts, aims.

Module I

Introduction - Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Mathematical Background for Cryptography - Modulo Arithmetic's, The Greatest Comma Divisor, Useful Algebraic Structures, Chinese Remainder Theorem, Basics of Cryptography - Preliminaries, Elementary Substitution Ciphers, Elementary Transport Ciphers, Other Cipher Properties, Secret Key Cryptography – Product Ciphers, DES Construction.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Public Key Cryptography and RSA – RSA Operations, Why Does RSA Work?, Performance, Applications, Practical Issues, Public Key Cryptography Standard (PKCS), Cryptographic Hash - Introduction, Properties, Construction, Applications and Performance, Diffie-Hellman Key Exchange, Other Applications.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Key Management - Introduction, Digital Certificates, Public Key Infrastructure, Identity–based Encryption, Authentication–I - One way Authentication, Mutual Authentication, Dictionary Attacks,

Authentication – II – Centalised Authentication, The Needham-Schroeder Protocol, Kerberos, Biometrics, IPSec- Security at the Network Layer – Security at Different layers: Pros and Cons.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

IEEE 802.11 Wireless LAN Security - Background, Authentication, Confidentiality and Integrity, Viruses, Worms, and Other Malware, Firewalls – Basics, Practical Issues, Intrusion Prevention and Detection - Introduction, Prevention Versus Detection, Types of Instruction Detection Systems, DDoS Attacks Prevention/Detection.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

IT act aim and objectives, Scope of the act, Major Concepts, Important provisions, Attribution, acknowledgement, and dispatch of electronic records, Secure electronic records and secure digital signatures, Regulation of certifying authorities: Appointment of Controller and Other officers, Digital Signature certificates.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Cryptography, Network Security and Cyber Laws – Bernard Menezes, Cengage Learning, 2010 edition (Chapters-1,3,4,5,6,7,8,9,10,11,12,13,14,15,19(19.1-19.5),21(21.1-21.2),22(22.1-22.4),25

Reference Books:

1. Cryptography and Network Security- Behrouz A Forouzan, Debdeep Mukhopadhyay, Mc-GrawHill, 3rd Edition, 2015.
2. Cryptography and Network Security- William Stallings, Pearson Education, 7thEditionCyber Law simplified- VivekSood, Mc-GrawHill, 11th reprint , 2013.
3. Cyber security and Cyber Laws, Alfred Basta, Nadine Basta, Mary brown, ravindrakumar, Cengage learning.

WEB 2.0

Sub Code :	**19SCS641**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Design Client-Side programs using JavaScript and Server-Side programs using PHP.
- Infer Object Oriented Programming capabilities of PHP.
- Examine frameworks such as Ajax and Flex.
- Study the use of XML.
- Study the use of Action Script.

Course Outcomes:

After studying this course, students will be able to:

CO1: Construct and visually format Using Ajax

CO2: Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.

CO3: Appraise the principles of XML.

CO4: Understand the UI concepts.

CO5: Understand the concept of Actionscript.

Module I

Introduction, Ajax – 1: Web 2.0 and Rich Internet Applications, Overview of Ajax, Examples of usage of Ajax: Updating web page text, Chatting in real time, Dragging and dropping, Downloading images. Creating Ajax Applications: An example, Analysis of example ajax.html, Creating the JavaScript, Creating and opening the XMLHttpRequest object, Data download, Displaying the fetched data, Connecting to the server, Adding Server-side programming, Sending data to the server using GET and POST, Using Ajax together with XML.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Ajax – 2: Handling multiple XMLHttpRequest objects in the same page, Using two XMLHttpRequest objects, Using an array of XMLHttpRequest objects, Using inner functions, Downloading JavaScript, connecting to Google Suggest, Creating google.php, Downloading from other domains with Ajax, HTML header request and Ajax, Defeating caching, Examples.Building XML and working with XML in JavaScript, Getting the document element, Accessing any XML element, Handling whitespace in Firefox, Handling cross-browser whitespace, Accessing XML data directly, Validating XML, Further examples of Rich Internet Applications with Ajax.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Ajax – 3: Drawing user‟s attention to downloaded text, Styling text, colors and background using CSS, Setting element location in the web pages, Setting the stacking order of web page elements, Further examples of using Ajax. Displaying all the data in an HTML form, Working with PHP server variables, Getting the data in to array format, Wrapping applications in to a single PHP page, Validating input from the user, Validating integers and text, DOM, Appending new elements to a web page using the DOM and Ajax, Replacing elements using the DOM, Handling timeouts in Ajax, Downloading images with Ajax, Example programs.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Flex – 1 : Introduction: Understanding Flex Application Technologies, Using Flex Elements, Working with Data Services (Loading Data at Runtime), The Differences between Traditional and Flex Web Applications the Flex Framework: Using Flex Tool Sets, Creating Projects, Building Applications, Deploying Applications Framework Fundamentals: Understanding How Flex Applications Are Structured, Loading and Initializing Flex Applications, Understanding the Component Life Cycles, Loading One Flex Application into Another Flex Application, Differentiating Between Flash Player and the Flex Framework, Caching the Framework, Understanding Application Domains, Localization, Managing Layout: Flex Layout Overview, Making Fluid Interfaces, Putting It All Together.Flex – 2: MXML: Understanding MXML Syntax and Structure, Making MXML Interactive Working with UI Components: Understanding UI Components, Buttons, Value Selectors, Text Components, List-Based Controls, Pop-Up Controls, Navigators, Control Bars Customizing Application Appearance: Using Styles, Skinning components, Customizing the preloader, Themes, Runtime CSS.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Flex – 3: ActionScript: Using ActionScript, MXML and ActionScript Correlations, Understanding ActionScript Syntax, Variables and Properties, Inheritance, Interfaces, Handling Events, Error Handling, Using XML.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Steven Holzner: Ajax: A Beginner‟s Guide, Tata McGraw Hill, 2009. (Listed topics from Chapters 3, 4, 6, 7, 11, 12)
2. ChaficKazon and Joey Lott: Programming Flex 3, O‟Reilly, June 2009. (Listed topics from Chapters 1 to 8, 12 to 15)

Reference Books:

1. Jack Herrington and Emily Kim: Getting Started with Flex 3, O‟Reilly, 1st Edition, 2008.
2. Michele E. Davis and John A. Phillips: Flex 3 - A Beginner‟s Guide, Tata McGraw-Hill, 2008.
3. Colin Moock: Essential Actionscript 3.0, O‟Reilly Publications, 2007.
4. Nicholas C Zakas et al : Professional Ajax, Wrox Publications, 2006.

DESIGNING EMBEDDED SYSTEMS

Sub Code :	**19SCS642**	**IA Marks :**	**50**
Hrs./ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

- Provide a general overview of Embedded Systems.
- Show current statistics of Embedded Systems.
- Design, code, compile, and test real-time software.
- Integrate a fully functional system including hardware and software.
- Understanding of Design Environment.

Course Outcomes:

After studying this course, students will be able to:

CO1: Distinguish the characteristics of embedded computer systems.
CO2: Examine the various vulnerabilities of embedded computer systems.
CO3: Design and develop modules using RTOS.
CO4: Implement RPC, threads and tasks.
CO5: Explain the Simulators, Emulators, Design Environment.

Module I

Introduction, Complex Systems and Microprocessors, Embedded Systems Design Process, Formalism for System design, Design Example: Model Train Controller.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Instruction Sets, CPUS: Preliminaries, ARM Processor, Programming Input and Output, Supervisor mode, Exceptions, Traps, Coprocessors, Memory Systems Mechanisms, CPU Performance, CPU Power Consumption. Design Example: Data Compressor.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Bus Based Computer Systems: CPU Bus, Memory Devices, I/O devices, Component Interfacing, Designing with Microprocessor, Development and Debugging, System-Level Performance Analysis Design Example: Alarm Clock.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Real Time Operating System(RTOS)design-1: Basics of OS, Kernel, types of OSs, tasks, processes, Threads, Multitasking and Multiprocessing, Context switching, Scheduling Policies, Task Communication, Task Synchronization. Inter process Communication mechanisms.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Embedded Systems Development Environment: The Integrated Development Environment, Types of File generated on Cross Compilation, Dis-assembler /Decompiler, Simulators, Emulators, and Debugging, Target Hardware Debugging.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Marilyn Wolf, "Computer as Components, Principles of Embedded Computing System Design" 3rd edition, Elsevier-2014.

Reference Books:

1. Raj Kamal, "Embedded Systems: Architecture, Programming, and Design" 2nd / 3rd edition, Tata McGraw hill-2013**.**

SYSTEM SOFTWARE AND COMPILER DESIGN LABORATORY

Sub Code :	**19SCSL65**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

.

Course Objectives:

- To make students familiar with Lexical Analysis and Syntax Analysis phases of Compiler Design and implement programs on these phases using LEX & YACC tools and/or C/C++/Java.
- To enable students to learn different types of CPU scheduling algorithms used in Operating system.
- To make students able to implement memory management - page replacement and deadlock handling algorithms.
- To Understand the Bankers algorithm
- To enable students to learn Round Robin Scheduling algorithm

Course Outcomes:

CO1: Implement and demonstrate Lexer's and Parser's.
CO2: Evaluate different algorithms required for management.
CO3: Evaluate different algorithms required for scheduling.
CO4: Evaluate different algorithms required for allocation
CO5: Evaluate different algorithms required for communication used in operating system.

Lab Experiments:

1. Write a LEX program to recognize valid ***arithmetic expression.*** Identifiers in the expression could be only integers and operators could be + and *. Count the identifiers & operators present and print them separately.
2. Write YACC program to evaluate ***arithmetic expression*** involving operators: +, -, *, and /
3. Develop, Implement and Execute a program using YACC tool to recognize all strings ending with ***b*** preceded by ***n a's*** using the grammar ***an b*** (note: input ***n*** value)
4. Design, develop and implement YACC/C program to demonstrate ***Shift Reduce Parsing*** technique for the grammar rules: ***E ->E+T | T, T ->T*F | F, F ->(E) | id*** and parse the sentence: ***id + id * id***.
5. Design, develop and implement a C/Java program to generate the machine code using ***Triples*** for the statement ***A = -B * (C +D)*** whose intermediate code in three-address form:
   T1 = -B
   T2 = C + D
   T3 = T1 + T2
   A = T3
6. Write a LEX program to eliminate ***comment lines*** in a ***C*** program and copy the resulting program into a separate file.
7. Write YACC program to recognize valid ***identifier, operators and keywords*** in the given text (*C program*) file.

8. Design, develop and implement a C/C++/Java program to simulate the working of Shortest remaining time and Round Robin (RR) scheduling algorithms. Experiment with different quantum sizes for RR algorithm.
9. Design, develop and implement a C/C++/Java program to implement Banker's algorithm. Assume suitable input required to demonstrate the results.
10. Design, develop and implement a C/C++/Java program to implement page replacement algorithms LRU and FIFO. Assume suitable input required to demonstrate the results.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

MACHINE LEARNING LABORATORY

Sub Code :	**19SCSL66**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice.
- Make use of appropriate data sets to the Machine Learning algorithms.
- Implement and apply Machine Learning algorithms to solve real world problems.
- Implement Java/Python programs for various Learning algorithms.

Course Outcomes:

CO1: Understand the implementation procedures for the machine learning algorithms.
CO2: Design Java/Python programs for various Learning algorithms.
CO3: Apply appropriate data sets to the Machine Learning algorithms.
CO4: Identify and apply Machine Learning algorithms to solve real world problems.
CO5: Apply Data sets in implementing the machine learning algorithms

Lab Experiments:

1. Implement and demonstratethe **FIND-Salgorithm** for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the **Candidate-Elimination algorithm**to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based **ID3 algorithm**. Use an appropriate data set for building the decision tree and apply this knowledge toclassify a new sample.
4. Build an Artificial Neural Network by implementing the **Backpropagation algorithm** and test the same using appropriate data sets.
5. Write a program to implement the **naïve Bayesian classifier** for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the **naïve Bayesian Classifier** model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a **Bayesian network** considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply **EM algorithm** to cluster a set of data stored in a .CSV file. Use the same dataset for clustering using ***k*-Means algorithm**. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement ***k*-Nearest Neighbour algorithm** to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

10. Implement the non-parametric **Locally Weighted Regression algorithm** in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

PYTHON PROGRAMMING LABORATORY

Sub Code :	**19SCSL67**	**IA Marks :**	**50**
Hrs/ Week :	**1(L)+2(P)**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python.

Course Outcomes:

CO1: Apply object-oriented programming concepts to develop dynamic interactive Python applications.
CO2: Use the procedural statements: assignments, conditional statements, loops, method calls and arrays.
CO3: Design, code, and test small Python programs with a basic understanding of top-down design.

CO4: Use the compound data using Python lists, tuples, dictionaries.
CO5:Understanding of Reading and Writing of data.

Lab Experiments:

1. a) Input an array of n numbers and find separately the sum of positive numbers and negative numbers.
   b) Implement a Python Program to read a word and prints the number of letters, vowels and percentage of vowels in the word using dictionary.
2. a) Implement a python program to search an element using linear search.
   b) Implement a python program to search an element using binary search.
3. a) Python program to display Fibonacci sequence using recursion.
   b) Python program to demonstrate Inheritance.
4. a) Implement a python program to simulate stack.
   b) Python program to implement queue.
5. Using a stack evaluate an arithmetic expression.
6. a) Program to multiply two matrices.
   b) Program to find the roots of a quadratic equation.
7. a) Program to Insert a number in a sorted array.
   b) Write a Python Program to check whether the given string is palindrome or not using built in string manipulation methods.

8. a) Implement a Python Program to check a given sentence is a pangram or not using function/Module.
b) Implement a Python Program to Find Armstrong Number in an Interval.

9. Implement a Python Event driven Program for file operations :
1: to open file in read mode

2: open the file in write mode

3: current position of the file pointer

4: Reposition the pointer at the beginning
5: exit

10. Write an Object oriented Python program to create two Time objects: currentTime, which contains the current time; and breadTime, which contains the amount of time it takes for a bread maker to make bread. Then we'll use addTime to figure out when the bread will be done. Write the printTime function to display the time when the bread will be done by the bread maker.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

MINI PROJECT

Sub Code :	**19SCS68**	**IA Marks :**	**50**
Self Study/Practice Hrs / Week :	**4**	**Exam Hours :**	**-**
Credits :	**2**	**Exam Marks:**	**-**

Course Objectives:

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

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.

Instructions/Guidelines:

Students in consultation with the guide/s shall carry out literature survey/ visit industries to finalize the topic of the Project. Subsequently, the students shall collect the material required for the selected project, prepare synopsis and narrate the methodology to carry out the project work

Students should select a problem which addresses some basic home, office or other real life applications. Students have to collect an International Journal paper on the topics of their interest, prepare a write up and present with suitable demonstration by software or experimental work. Evaluation will be based on relevant topic student has studied, communication skill and reporting/documenting procedure.

Scheme of Evaluation:

CIE marks for the project report and seminar shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of 2 faculty members from the department with the senior most acting as the Chairman.

Each student, under the guidance of a Faculty, is required to

- Present the seminar on the selected Project orally and/or through power point slides.
- Answer the queries and involve in debate/discussion.
- Submit two copies of the typed report with a list of references.
- The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

Note: This course is a 2 credit course to be completed with only internal assessment mark. The student has to obtain 50% marks (25/50) in the internal assessment to pass the course. There is no semester end examination (SEE).

PART – A : EMPLOYABILITY SKILLS ENHANCEMENT PROGRAMME 4 (ESEP 4)

Sub Code :	**19SQA69**	**IA Marks :**	**50**
Hrs/ Week :	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**25**

Course Objectives:

This course enables students to develop their ability to reason by introducing them to elements of formal reasoning. The primary focus will be on recognizing the logical structure of arguments. Topics will include types of statements, symbolism, logical connectives, logical relations, basic deductive inferences, truth tables, validity, invalidity, and soundness. To enhance the problem-solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.

Course Outcomes:

After studying this course, students will be able to:

- Understand the basic concepts of QUANTITATIVE ABILITY
- Understand the basic concepts of LOGICAL REASONING Skills
- Acquire satisfactory competency in use of VERBAL REASONING
- Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

PART – A

Clocks, calendars, Direction Sence - "a. Concepts on Clocks b. angles between the hand of a clock c. concept of Calendar d. Concept of Leap year, days and date e. Basic concept and Problem solving tecnic for various types of problem in Direction sence"

Critical reasoning- "a. Argument – Identifying the Different Parts (Premise, assumption, conclusion) b. Types of Questions"

Surds, Indices and Simplification - "a. Surds b. Indices c. Simplification exercises"

Set Theory - "a. Set definition and formulas b. Power set c. Sub set d. Set multiplication"

Functions - "a. Roots of a function b. Domain and range c. Problems involving multiple functions"

Cryptarithmetic - Problem solving technique on cryptaithmetic

Trigonometry - "a. Heights and distance problems b. Identities, angles c. Simplification"

Letter and Symbol Series, Visual Sequence,Alpha numeric problems - "a.Problem solving tecnic for Letter and Symbol series b.Visual Sequnce C. Alpha numeric problems"

Analogy - "a. Synonyms/Antonyms b. Object/Purpose.c. Source/Product. d. Part/Whole.
e. Animal/Habitat. f. Characteristics. "

Letter and Email Writing - "a. Types (Formal, Informal, Semi-Formal).b. Formats.
c. Samples.d. Practice using the right salutations, greetings, subject line, addresses, conciseness and preciseness."

PART - B

Python
Pseudocodes

Question paper pattern:

- 10 assessment tests will be conducted based on Multiple choice questions.
- Final marks are based on the test marks conducted during the semester.

Reference Books

1. Quantitative abilities by Arun Sharma
2. Quantitative Aptitude for Competitive Examinations by R S Agrawal
3. Verbal and Non-Verbal reasoning by R S Agrawal

PART-B: INTERNATIONAL CERTIFICATION COURSE ON CURRENT TRENDS

Sub Code :	**19SQA69**	**IA Marks :**	**50**
Self Study Hours/Week:	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**-**

Course Objectives:

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

Course Outcomes:

On completion of this course, students will be able to:

CO1: Have exposure on the latest development
CO2: Acquire new skills
CO3: Become Industry ready
CO4: Have more confidence
CO5: Get additional knowledge

About the Course:

- A common Certification Course on current trends will be offered to all the students of the batch.
- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.

Assessment Method

- Assessment will be conducted for 2 Hours duration for 50 Marks on completion of the course and based on the marks scored, grading will be done.

VII SEMESTER SYLLABUS

INTERNET OF THINGS

Sub Code :	**19SCS71**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Assess the genesis and impact of IoT applications, architectures in real world.
- Illustrate diverse methods of deploying smart objects and connect them to network.
- Compare different Application protocols for IoT.
- Infer the role of Data Analytics and Security in IoT.
- Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry.

Course Outcomes:

CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CO3: Appraise the role of IoT protocols for efficient network communication.
CO4: Elaborate the need for Data Analytics and Security in IoT.
CO5: Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

Module I

What is IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute Stack.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Smart Objects: The "Things" in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

IP as the IoT Network Layer, The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Data and Analytics for IoT, An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture, Smart City Security Architecture, Smart City Use-Case Examples.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry,"IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1 stEdition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743)
2. Srinivasa K G, "Internet of Things",CENGAGE Leaning India, 2017

Reference Books:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1 stEdition, VPT, 2014. (ISBN: 978-8173719547)
2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)

CLOUD COMPUTING

Sub Code :	**19SCS721**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Explain the fundamentals of cloud computing
- Illustrate the cloud application programming and aneka platform
- Contrast different cloud platforms used in industry
- Learn application development
- Understand cloud computing architecture and its real time uses

Course Outcomes:

CO1: Explain cloud computing, virtualization and classify services of cloud computing
CO2: Illustrate architecture and programming in cloud
CO3: Describe the platforms for development of cloud applications and List the application of cloud.
CO4: Describe data intensive computing
CO5: Explain concurrent computing and its applications

Module I

Introduction ,Cloud Computing at a Glance, The Vision of Cloud Computing, Defining a Cloud, A Closer Look, Cloud Computing Reference Model, Characteristics and Benefits, Challenges Ahead, Historical Developments, Distributed Systems, Virtualization, Web 2.0, Service-Oriented Computing, Utility-Oriented Computing, Building Cloud Computing Environments, Application Development, Infrastructure and System Development, Computing Platforms and Technologies, Amazon Web Services (AWS), Google App Engine, Microsoft Azure, Hadoop, Force.com and Salesforce.com, Manjra soft Aneka Virtualization, Introduction, Characteristics of Virtualized, Environments Taxonomy of Virtualization Techniques, Execution Virtualization, Other Types of Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples Xen: Para virtualization, VMware: Full Virtualization, Microsoft Hyper-V

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Cloud Computing Architecture, Introduction, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds, Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud, Open Challenges, Cloud Definition, Cloud Interoperability and Standards Scalability and Fault Tolerance Security, Trust, and Privacy Organizational Aspects Aneka: Cloud Application Platform, Framework Overview, Anatomy of the Aneka Container, From the Ground Up: Platform Abstraction Layer, Fabric Services, foundation

Services, Application Services, Building Aneka Clouds, Infrastructure Organization, Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode, CloudProgramming and Management, Aneka SDK, Management Tools

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Concurrent Computing: Thread Programming, Introducing Parallelism for Single Machine Computation, Programming Applications with Threads, What is a Thread?, Thread APIs, Techniques for Parallel Computation with Threads, Multithreading with Aneka, Introducing the Thread Programming Model, Aneka Thread vs. Common Threads, Programming Applications with Aneka Threads, Aneka Threads Application Model, Domain Decomposition: MatrixMultiplication, Functional Decomposition: Sine, Cosine, and Tangent. High-Throughput Computing: Task Programming, Task Computing, Characterizing a Task, Computing Categories, Frameworks for Task Computing,Task-based Application Models, Embarrassingly Parallel Applications, Parameter Sweep Applications, MPI Applications, Workflow Applications with Task Dependencies, Aneka Task-Based Programming, Task Programming Model, Developing Applications with the Task Model, Developing ParameterS weep Application, Managing Workflows.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Data Intensive Computing: Map-Reduce Programming, What is Data-Intensive Computing?, Characterizing Data-Intensive Computations, Challenges Ahead, Historical Perspective, Technologies for Data-Intensive Computing, Storage Systems, Programming Platforms, Aneka MapReduce Programming, Introducing the MapReduce Programming Model, Example Application

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Cloud Platforms in Industry, Amazon Web Services, Compute Services, Storage Services, Communication Services, Additional Services, Google AppEngine, Architecture and Core Concepts, Application Life-Cycle, Cost Model, Observations, Microsoft Azure, Azure Core Concepts, SQL Azure, Windows Azure Platform Appliance. Cloud Applications Scientific Applications, Healthcare: ECG Analysis in the Cloud, Biology: Protein Structure Prediction, Biology: Gene Expression Data Analysis for Cancer Diagnosis, Geoscience: Satellite Image Processing, Business and Consumer Applications, CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi Mastering Cloud. Computing McGraw Hill Education

Reference Books:

1. Dan C. Marinescu, Cloud Computing Theory and Practice, Morgan Kaufmann, Elsevier 2013.

GENETIC ALGORITHMS

Sub Code :	**19SCS722**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- This course will introduce students to the mapping of evolution and evolutionary process namely Chromosomes and their changes through natural evolutionary operators onto a computational paradigm.
- The representation of chromosomes, objective function, operators and procedures are made known to students to take them forward to computational paradigm to solve the real world problems.
- To study genetic algorithm and its related applications
- Learn techniques in genetic search
- Learn applications and mapping onto computational paradigm

Course Outcomes:

CO1: Know the theory and concepts of genetic algorithms
CO2: Understand evolution, evolutionary process, chromosomes and genetic operators
CO3: Understand representations of chromosomes, cross over, mutation and genetic operators.
CO4: Understand the applications and mapping onto computational paradigm and solve real world problems
CO5: Case Studies on the use and applications of genetic operators and genetic algorithms enable the student to get a better knowledge.

Module I

Introduction: Robustness of Traditional Optimization and Search Methods, The goals of Optimization, How are Genetic Algorithms Different from Traditional Methods?, A simple genetic algorithm, Genetic algorithms at work – a simulation by hand, Grist for the Search Mill –important similarities, Similarity templates (Schemata), Learning the Lingo.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Genetic Algorithms Revisited: Mathematical Foundations – Who shall live and who shall die?
The fundamental theorem, Schema Processing at work: An example by hand revisited, the twoarmed and K-armed bandit problem, How many schemata are processed usefully?, The buildingblock hypothesis, another perspective: the minimal Deceptive problem, Schemata revisit: similarity templates as hyper planes.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Computer Implementation Of A Genetic Algorithm – Data structures, reproduction, crossover, and mutation, A time to reproduce, a time to cross, get with the main program, How well does it work? Mapping objective functions to fitness form, fitness scaling, codings, a multiparameter, mapped, fixed-point coding, discretization, Constraint Handling.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Techniques In Genetic Search – Dominance, diploidy and abeyance, inversion and other reordering operators, other micro operators, niche and speciation, multiobjective optimization -Knowledge-based techniques, genetic algorithms and parallel processors.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Multi objective evolutionary optimization:

Pareto optimality, multi-objective evolutionary algorithms: MOGA, NSGA-II, etc.

Applications of GA in engineering problems, job-shop scheduling and routing problems

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. David E.Goldberg, “Genetic Algorithms” – 1/e, Pearson Education.
2. Genetic algorithms in search, optimization and Mechine learning, By David E. Gold Berg Pearson Edition

Reference Books:

1. An Introduction to Genetic Algorithm by Melanie Mitchell
2. The Simple Genetic Algorithm Foundation & Theores by Michael P. Vosk

HIGH SPEED NETWORKS

Sub Code :	**19SCS723**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- To provide the basic concepts of frame relay and ATM networks.
- To know about the end to end performance parameters and techniques used by TCP.
- To update knowledge about the development in high speed networks.
- To know about window management
- To understand Protocol Mechanisms

Course Outcomes:

CO1: Understand the knowledge about Asynchronous transfer protocol and TCP/IP.
CO2: Identify different extents of quality of service to different applications.
CO3: Understand the advancement in protocols.
CO4: Analyze the different queuing techniques.
CO5: Acquire the knowledge about the progress of high speed networks

Module I

HIGH SPEED NETWORKS- Frame Relay Networks – Asynchronous transfer mode: ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories, AAL, High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel – Wireless LANs: applications, requirements, Architecture of 802.11

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

CONGESTION AND TRAFFIC MANAGEMENT-Queuing Analysis: Queuing Models, Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

TCP AND ATM CONGESTION CONTROL-TCP Flow control – TCP Congestion Control: Retransmission Timer Management, Exponential RTO back off, KARN‟s Algorithm, Window management – Performance of TCP over ATM -Traffic and Congestion control in ATM – Requirements, Attributes, Traffic Management Frame work, Traffic Control.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

INTEGRATED AND DIFFERENTIATED SERVICES-Integrated Services Architecture: Approach, Components, Services- Queuing Discipline: FQ, PS, BRFQ, GPS, WFQ – Random Early Detection - Differentiated Services.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

PROTOCOLS FOR QOS SUPPORT-RSVP: Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching: Operations, Label Stacking – RTP – Protocol Architecture, Data Transfer Protocol, RTCP

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2010.

2. Warland, Pravin Varaiya, "High performance communication networks", Second Edition, Jean Harcourt Asia Pvt. Ltd., , 2001.

Reference Books:

1. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

2. Abhijit S. Pandya, Ercan Sea, "ATM Technology for Broad Band Telecommunication Networks", CRC Press, New York, 2004.

ADVANCED COMPUTER ARCHITECTURE

Sub Code :	**19SCS724**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Describe computer architecture.
- Measure the performance of architectures in terms of right parameters.
- Summarize parallel architecture and the software used for them.
- Learn about bus, cache and shared memory.
- Know about the software for parallel programming

Course Outcomes:

CO1: Explain the concepts of parallel computing and hardware technologies
CO2: Compare and contrast the parallel architectures
CO3: Illustrate parallel programming concepts
CO4: Analyze the different generations of multicomputers
CO5: Acquire the knowledge about the parallel models

Module I

Theory of Parallelism: Parallel Computer Models, The State of Computing, Multiprocessors and Multicomputer ,Multivector and SIMD Computers ,PRAM and VLSI Models, Program and Network Properties ,Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanisms, System Interconnect Architectures, Principles of Scalable Performance, Performance Metrics and Measures, Parallel Processing Applications, Speedup Performance
Laws, Scalability Analysis and Approaches.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Hardware Technologies: Processors and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Bus, Cache, and Shared Memory ,Bus Systems ,Cache Memory Organizations, Shared Memory Organizations ,Sequential and Weak Consistency Models, Pipelining and Superscalar Techniques , Linear Pipeline Processors ,Nonlinear Pipeline Processors ,Instruction Pipeline Design ,Arithmetic Pipeline Design (Upto 6.4).

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Parallel and Scalable Architectures: Multiprocessors and Multicomputers, Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Three Generations of Multicomputers ,Message-Passing Mechanisms ,Multivector and SIMD Computers ,Vector Processing Principles Multivector Multiprocessors ,Compound Vector Processing ,SIMD Computer Organizations (Upto 8.4),Scalable, Multithreaded, and Dataflow Architectures, Latency-Hiding Techniques, Principles of Multithreading, Fine-Grain Multicomputers, Scalable and Multithreaded Architectures, Dataflow and HybridArchitectures

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Software for parallel programming: Parallel Models, Languages, and Compilers Parallel Programming Models, Parallel Languages and Compilers ,Dependence Analysis of Data Arrays ,Parallel Program Development and Environments, Synchronization and Multiprocessing Modes. Instruction and System Level Parallelism, Instruction Level Parallelism ,Computer Architecture ,Contents, Basic Design Issues ,Problem Definition, Model of a Typical Processor Compiler-detected Instruction Level Parallelism ,Operand Forwarding , Reorder Buffer,Register Renaming,Tomasulo's Algorithm,Branch Prediction,Limitations in Exploiting Instruction Level Parallelism ,Thread Level Parallelism.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Kai Hwang and Naresh Jotwani, Advanced Computer Architecture (SIE): Parallelism, Scalability, Programmability, McGraw Hill Education 3/e. 2015

Reference Books:

1. John L. Hennessy and David A. Patterson, Computer Architecture: A quantitative approach, 5th edition, Morgan Kaufmann Elseveir, 2013

MULTIMEDIA PROCESSING

Sub Code :	**19SCS725**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Gain fundamental knowledge in understanding the basics of different multimedia networks and applications.
- Understand digitization principle techniques required to analyze different media types.
- Analyze compression techniques required to compress text and image and gain knowledge of DMS.
- Analyze compression techniques required to compress audio and video.
- Gain fundamental knowledge about multimedia communication across different networks.

Course Outcomes:

CO1: Understand basics of different multimedia networks and applications.
CO2: Understand different compression techniques to compress audio and video.
CO3: Describe multimedia Communication Processing across Networks.
CO4: Compress different types of text and images using different compression
CO5: Analyse different media types to represent them in digital form.

Module I

Multimedia Communications: Introduction to multimedia communication , Multimedia information representation in detail, multimedia networks , multimedia applications , Application and networking terminology.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Information Representation: Introduction , Digitization principles, Text, Images, Audio and Video.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Text and image compression: Introduction, Compression principles, text compression, image Compression.

Distributed multimedia systems: Introduction, main Features of a DMS, Resource management of DMS, Networking, Multimedia operating systems

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Audio and video compression: Introduction, Audio compression, video compression, video compression principles, video compression.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Multimedia Communication Across Networks: Packet audio/video in the network environment, Video transport across generic networks, Multimedia Transport across ATM Networks

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Fred Halsall, ―Multimedia Communications‖, Pearson education, 2001 ISBN -9788131709948

2. K. R. Rao, Zoran S. Bojkovic, Dragorad A. Milovanovic, ―Multimedia Communication Systems‖, Pearson education, 2004. ISBN -9788120321458

Reference Books:

1. Raifsteinmetz, Klara Nahrstedt, ―Multimedia: Computing, Communications and Applications‖, Pearson education, 2002. ISBN -9788177584417

AGILE TECHNOLOGY

Sub Code :	**19SCS726**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Explain iterative,incremental development process leads to faster delivery of useful software
- Evaluate essence of agile development methods
- Illustrate the principles and practices of extreme programming
- Show the roles of prototyping in the software process
- Explain the Mastering Agility

Course Outcomes:

CO1: Define XP Lifecycle, XP Concepts, Adopting XP

CO2: Evaluate on Pair Programming, Root-Cause Analysis, Retrospectives, Planning, Incremental Requirements, Customer Tests

CO3: Demonstrate concepts to Eliminate Waste

CO4: Help seek technical excellence

CO5: Mastering Agility and its outcomes

Module I

Why Agile?: UnderstandingSuccess, Beyond Deadlines, The Importance of Organizational Success, Enter Agility, **How to Be Agile?:** Agile Methods, Don't Make Your Own Method, The Road to Mastery, Find a Mentor

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Understanding XP: The XP Lifecycle, The XP Team, XP Concepts, **Adopting XP:** Is XP Right for Us?, Go!, Assess Your Agility

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Practicing XP: Thinking: Pair Programming, Energized Work, Informative Workspace, Root-Cause Analysis, Retrospectives, **Collaborating:** Trust, Sit Together, Real Customer Involvement, Ubiquitous Language, Stand-Up Meetings, Coding Standards, Iteration Demo, Reporting, **Releasing:**"Done Done", No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation. **Planning:** Vision, Release Planning, The Planning Game, Risk Management, Iteration Planning, Slack, Stories, Estimating. **Developing:** Incremental requirements, Customer Tests, Test-Driven Development, Refactoring, Simple Design ,Incremental Design and Architecture, Spike Solutions, Performance Optimization, Exploratory Testing

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Mastering Agility: Values and Principles: Commonalities, About Values, Principles, and Practices, Further Reading, **Improve the Process:** Understand Your Project, Tune and Adapt, Break the Rules, **Rely on People :**Build Effective Relationships, Let the Right People Do the Right Things, Build the Process for the People, **Eliminate Waste :**Work in Small, Reversible Steps, Fail Fast, Maximize Work Not Done, Pursue Throughput

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Deliver Value: Exploit Your Agility, Only Releasable Code Has Value, Deliver Business Results, Deliver Frequently, **Seek Technical Excellence :**Software Doesn't Exist, Design Is for Understanding, Design Trade-offs, Quality with a Name, Great Design, Universal Design Principles, Principles in Practice, Pursue Mastery

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. The Art of Agile Development (Pragmatic guide to agile software development), James shore, Chromatic, O'Reilly Media, Shroff Publishers & Distributors, 2007

Reference Books:

1. Agile Software Development, Principles, Patterns, and Practices, Robert C. Martin, Prentice Hall; 1st edition, 2002
2. Agile and Iterative Development A Manger's Guide", Craig Larman Pearson Education, First Edition, India, 2004

SYSTEM MODELLING AND SIMULATION

Sub Code :	**19SCS727**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Explain the basic system concept and definitions of system;
- Discuss techniques to model and to simulate various systems;
- Analyze a system and to make use of the information to improve the performance.
- Learn when simulation is the appropriate tool and when it is not appropriate.
- Understand generation of pseudo-random numbers

Course Outcomes:

CO1: Explain the system concept and apply functional modeling method to model the activities of a static system

CO2: Describe the behavior of a dynamic system & create an analogous model for a dynamic system

CO3: Simulate the operation of a dynamic system and make improvement according to the simulation results.

CO4: Understand Model building, verification and validation

CO5: Useful statistical models, Discrete distributions.

Module I

Introduction: When simulation is the appropriate tool and when it is not appropriate, Advantages and disadvantages of Simulation; Areas of application, Systems and system environment; Components of a system; Discrete and continuous systems, Model of a system; Types of Models, Discrete-Event System Simulation Simulation examples: Simulation of queuing systems. General Principles.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Statistical Models in Simulation :Review of terminology and concepts, Useful statistical models,Discrete distributions. Continuous distributions,Poisson process, Empirical distributions.

Queuing Models: Characteristics of queuing systems,Queuing notation,Long-run measures of performance of queuing systems,Long-run measures of performance of queuing systems cont…,Steady-state behavior of M/G/1 queue, Networks of queues,

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Random-NumberGeneration: Properties of random numbers; Generation of pseudo-random numbers, Techniques for generating random numbers,Tests for Random Numbers, **Random- Variate Generation:** ,Inverse transform technique Acceptance-Rejection technique.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Input Modeling: Data Collection; Identifying the distribution with data, Parameter estimation, Goodness of Fit Tests, Fitting a non-stationary Poisson process, Selecting input models without data, Multivariate and Time-Series input models.

Estimation of Absolute Performance: Types of simulations with respect to output analysis ,Stochastic nature of output data, Measures of performance and their estimation, **Contd.. Textbook 1:**

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Measures of performance and their estimation,Output analysis for terminating simulations Continued..,Output analysis for steady-state simulations.

Verification, Calibration And Validation: Optimization: Model building, verification and validation, Verification of simulation models, Verification of simulation models,Calibration and validation of models, Optimization via Simulation.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol: Discrete-Event System Simulation, 5 th Edition, Pearson Education, 2010.

Reference Books:

1. Lawrence M. Leemis, Stephen K. Park: Discrete – Event Simulation: A First Course, Pearson Education, 2006.
2. Averill M. Law: Simulation Modeling and Analysis, 4 th Edition, Tata McGraw-Hill, 2007

DIGITAL SIGNAL PROCESSING

Sub Code :	**19SCS728**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Understand the frequency domain sampling and reconstruction of discrete time signals.
- Study the properties and the development of efficient algorithms for the computation of DFT.
- Realization of FIR and IIR filters in different structural forms.
- Learn the procedures to design of IIR filters from the analog filters using impulse invariance and bilinear transformation.
- Study the different windows used in the design of FIR filters and design appropriate filters based on the specifications.

Course Outcomes:

CO1: Determine response of LTI systems using time domain and DFT techniques.
CO2: Compute DFT of real and complex discrete time signals.
CO3: Computation of DFT using FFT algorithms and linear filtering approach.
CO4: Design and realize FIR and IIR digital filters
CO5: Understand the DSP processor architecture.

Module I

Discrete Fourier Transforms (DFT): Frequency domain sampling and Reconstruction of Discrete Time Signals, The Discrete Fourier Transform, DFT as a linear transformation, Properties of the DFT: Periodicity, Linearity and Symmetry properties, Multiplication of two DFTs and Circular Convolution, Additional DFT properties.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Linear filtering methods based on the DFT: Use of DFT in Linear Filtering, Filtering of Lon data Sequences.

Fast-Fourier-Transform (FFT) algorithms: Efficient Computation of the DFT: Radix-2 FFT algorithms for the computation of DFT and IDFT–decimation-in-time and decimation-in-frequency algorithms.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Design of FIR Filters: Characteristics of practical frequency –selective filters, Symmetric and Antisymmetric FIR filters, Design of Linear-phase FIR filters using windows - Rectangular, Hamming, Hanning, Bartlett windows. Design of FIR filters using frequency sampling method. Structure for FIR

Systems: Direct form, Cascade form and Lattice structures**.**

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

IIR Filter Design: Infinite Impulse response Filter Format, Bilinear Transformation Design Method, Analog Filters using Lowpass prototype transformation, Normalized Butterworth Functions, Bilinear Transformation and Frequency Warping, Bilinear Transformation Design Procedure, Digital Butterworth Filter Design using BLT. Realization of IIR Filters in Direct form I and II.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Digital Signal Processors: DSP Architecture, DSP Hardware Units, Fixed point format, Floating point Format, IEEE Floating point formats, Fixed point digital signal processors, Floating point processors, FIR and IIR filter implementations in Fixed point systems**.**

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Proakis & Monalakis, “Digital signal processing – Principles Algorithms & Applications”, 4th Edition, Pearson education, New Delhi, 2007. ISBN: 81-317-1000-9.
2. Li Tan, Jean Jiang, “Digital Signal processing – Fundamentals and Applications”, Academic Press, 2013,ISBN: 978-0-12-415893.

Reference Books:

1. Sanjit K Mitra, “Digital Signal Processing, A Computer Based Approach”, 4th Edition, McGraw Hill Education, 2013.
2. Oppenheim & Schaffer, “Discrete Time Signal Processing” , PHI, 2003.
3. D.GaneshRao and Vineeth P Gejji, “Digital Signal Processing” Cengage India Private Limited, 2017, ISBN: 9386858231

DEEP LEARNING

Sub Code :	**19SCS729**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- To present the mathematical, statistical and computational challenges of building neural networks
- To study the concepts of deep learning
- To introduce dimensionality reduction techniques
- To enable the students to know deep learning techniques to support real-time applications
- To examine the case studies of deep learning techniques

Course Outcomes:

CO1: Understand basics of deep learning
CO2: Implement various deep learning models
CO3: Realign high dimensional data using reduction techniques
CO4: Analyze optimization and generalization in deep learning
CO5: Explore the deep learning applications

Module I

Machine Learning Basics: Learning Algorithms, Capacity, Overfitting and Underfitting, Hyperparameters and Validation Sets, Estimator, Bias and Variance, Maximum Likelihood Estimation, Bayesian Statistics, Supervised Learning Algorithms, Unsupervised Learning Algorithms, Stochastic Gradient Decent, building a Machine Learning Algorithm, Challenges Motivating Deep Learning.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Deep Feedforward Networks: Gradient-Based Learning, HiddenUnits, ArchitectureDesign, Back-Propagation. **Regularization:** Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, SparseRepresentations, Bagging, Dropout.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

Optimization for Training Deep Models: How Learning Differs from Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms.Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates. **Convolutional Networks:** The Convolution Operation,Motivation,Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function, StructuredOutputs, DataTypes, Efficient Convolution Algorithms, Random or Unsupervised Features.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

Sequence Modelling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks. Long short-term memory

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Practical Methodology: PerformanceMetrics, Default Baseline Models, Determining Whether to Gather More Data, Selecting Hyperparameters, Debugging Strategies, Example: Multi-Digit Number Recognition. **Applications:** Vision, NLP, Speech.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Deep Learning Lan Good fellow and Yoshua Bengio and Aaron Courville MIT Press 2016

Reference Books:

1. Neural Networks:Asystematic Introduction Raúl Rojas 1996
2. Pattern Recognition and machine Learning Chirstopher Bishop 2007

BIG DATA AND ANALYTICS

Sub Code :	**19SCS720**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Understand fundamentals of Big Data analytics
- Explore the Hadoop framework and Hadoop Distributed File system
- Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data
- Employ MapReduce programming model to process the big data
- Understand various machine learning algorithms for Big Data Analytics, Web Mining and Social Network Analysis

Course Outcomes:

CO1: Understand fundamentals of Big Data analytics.
CO2: Investigate Hadoop framework and Hadoop Distributed File system.
CO3: Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data.
CO4: Demonstrate the MapReduce programming model to process the big data along with Hadoop tools.
CO5: Use Machine Learning algorithms for real world big data.

Module I

Introduction to Big Data Analytics: Big Data, Scalability and Parallel Processing, Designing Data Architecture, Data Sources, Quality, Pre-Processing and Storing, Data Storage and Analysis, Big Data Analytics Applications and Case Studies.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module II

Introduction to Hadoop (T1): Introduction, Hadoop and its Ecosystem, Hadoop Distributed File System, MapReduce Framework and Programming Model, Hadoop Yarn, Hadoop Ecosystem Tools.

Hadoop Distributed File System Basics (T2): HDFS Design Features, Components, HDFS User Commands.

Essential Hadoop Tools (T2): Using Apache Pig, Hive, Sqoop, Flume, Oozie, HBase.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module III

NoSQL Big Data Management, MongoDB and Cassandra: Introduction, NoSQL Data Store, NoSQL Data Architecture Patterns, NoSQL to Manage Big Data, Shared-Nothing Architecture for Big Data Tasks, MongoDB, Databases, Cassandra Databases.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module IV

MapReduce, Hive and Pig: Introduction, MapReduce Map Tasks, Reduce Tasks and MapReduce Execution, Composing MapReduce for Calculations and Algorithms, Hive, HiveQL, Pig.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Module V

Machine Learning Algorithms for Big Data Analytics: Introduction, Estimating the relationships, Outliers, Variances, Probability Distributions, and Correlations,

Regression analysis, Finding Similar Items, Similarity of Sets and Collaborative Filtering, Frequent Itemsets and Association Rule Mining.

Text, Web Content, Link, and Social Network Analytics: Introduction, Text mining, Web Mining, Web Content and Web Usage Analytics, Page Rank, Structure of Web and analyzing a Web Graph, Social Network as Graphs and Social Network Analytics

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Raj Kamal and Preeti Saxena, “Big Data Analytics Introduction to Hadoop, Spark, and Machine-Learning”, McGraw Hill Education, 2018 ISBN: 9789353164966, 9353164966
2. Douglas Eadline, "Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem", 1st Edition, Pearson Education, 2016. ISBN-13: 978-9332570351

Reference Books:

1. Tom White, “Hadoop: The Definitive Guide”, 4th Edition, O’Reilly Media, 2015.ISBN-13: 978-9352130672
2. Boris Lublinsky, Kevin T Smith, Alexey Yakubovich, "Professional Hadoop Solutions", 1stEdition, Wrox Press, 2014ISBN-13: 978-8126551071
3. Eric Sammer, "Hadoop Operations: A Guide for Developers and Administrators",1stEdition, O'Reilly Media, 2012.ISBN-13: 978-9350239261
4. Arshdeep Bahga, Vijay Madisetti, "Big Data Analytics: A Hands-On Approach", 1st Edition, VPT Publications, 2018. ISBN-13: 978-0996025577

ARTIFICIAL INTELLIGENCE

Sub Code :	**19SCS731**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- To impart knowledge about Artificial Intelligence.
- To give understanding of the main abstractions and reasoning for intelligent systems.
- To enable the students to understand the basic principles of Artificial Intelligence in various applications
- To make the students to apply AI Techniques
- To understand the basic of natural language processing.

Course Outcomes:

The students should be able to:

CO1: Identify the AI based problems
CO2: Apply techniques to solve the AI problems
CO3 Define learning and explain various learning techniques
CO4: Discuss on expert systems
CO5: Apply Natural Language techniques

Module I

What is artificial intelligence What is artificial intelligence?, Problems, Problem Spaces and search, Heuristic search technique , Search Strategies: Problem spaces (states, goals and operators), problem solving by search, Heuristics and informed search.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Knowledge Representation Issues , Knowledge Representation Issues, Using Predicate Logic, Representing knowledge using Rules

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Symbolic Reasoning under Uncertainty, Symbolic Reasoning under Uncertainty, Statistical reasoning, Weak Slot and Filter Structures.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Strong slot-and-filler structures, Strong slot-and-filler structures, Game Playing. Key Application Areas: Expert system, decision support systems, Speech and vision, Information Retrieval, Semantic Web

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Natural Language Processing, Natural Language Processing, Learning, Expert Systems. Regular expressions, Finite State Automata, word recognition, lexicon. Grammar and NLP Stages

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. E. Rich , K. Knight & S. B. Nair - Artificial Intelligence, 3/e, McGraw Hill.

Reference Books:

1. Artificial Intelligence: A Modern Approach, Stuart Rusell, Peter Norving, Pearson Education 2nd Edition.
2. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems – Prentice Hal of India.
3. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem Solving", Fourth Edition, Pearson Education, 2002.
4. Artificial Intelligence and Expert Systems Development by D W Rolston-Mc Graw hill.
5. N.P. Padhy "Artificial Intelligence and Intelligent Systems" , Oxford University Press-2015

BLOCK CHAIN

Sub Code :	**19SCS732**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Explore the driving force behind the crypto currency Bitcoin.
- Along with the Decentralization allows to learn about Cryptography,
- It will allows to learn Bitcoins with its alternative coins
- Explore about Smart contracts and outside of currencies.
- Allows Students to apply block chain technology in different fields.

Course Outcomes:

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

CO1: Understand the types, benefits and limitation of blockchain.

CO2: Explore the blockchain decentralization and cryptography concepts.

CO3: Enumerate the Bitcoin features and its alternative options.

CO4: Describe and deploy the smart contracts

CO5 : Apply in IOT and health care monitoring

Module I

Blockchain : Distributed systems, History of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain, Benefits and limitations of blockchain.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Decentralization and Cryptography: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Decentralized organizations. Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Bitcoin and Alternative Coins A: Bitcoin, Transactions, Blockchain, Bitcoin payments B: Alternative Coins, Theoretical foundations, Bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Smart Contracts and Ethereum 101: Smart Contracts: Definition, Ricardian contracts. Ethereum 101:Introduction, Ethereum blockchain, Elements of the Ethereum blockchain, Precompiled contracts.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Alternative Blockchains: Blockchains Blockchain-Outside of Currencies: Internet of Things, Government, Health, Finance, Media.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text books:

1. Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Author- Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1- 78712-544-5, 2017

Reference Books :

1. Bitcoin and Cryptocurrency Technologies, Author- Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, Princeton University, 2016
2. Blockchain Basics: A Non-Technical Introduction in 25 Steps, Author- Daniel Drescher, Apress, First Edition, 2017
3. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O'Reilly Media, First Edition, 2014

VIRTUAL REALITY

Sub Code :	**19SCS733**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Understand the fundamental concepts relating to Virtual Reality such as presence, immersion, and engagement
- Read deeply, understand, and critique academic research papers relating to Virtual Reality
- Create simple computer generated environments for virtual exploration
- Program interactive elements for virtual experiences
- Work successfully with a group of peers from a variety of disciplines on a team project

Course Outcomes:

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

CO1: Explain fundamentals of virtual reality systems
CO2: Summaries the hardware and software of the VR
CO3: Analyze the applications of VR
CO4: Application of VR
CO5: Human interaction with VR techniques.

Module I

Definition of VR, modern experiences, historical perspective. Hardware, sensors, displays, software, virtual world generator, game engines, human senses, perceptual psychology, psychophysics. Geometric modeling, transforming rigid bodies, yaw, pitch, roll, axis-angle representation, quaternions, 3D rotation inverses and conversions, homogeneous transforms, transforms to displays, look-at and eye transforms, canonical view and perspective transforms, viewport transforms.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Light propagation, lenses and images, diopters, spherical aberrations, optical distortion; more lens aberrations; spectral properties; the eye as an optical system; cameras; visual displays. Parts of the human eye, photoreceptors and densities, scotopic and photopic vision, display resolution requirements, eye movements, neural vision structures, sufficient display resolution, other implications of physiology on VR. Depth perception, motion perception, vection, stroboscopic apparent motion, color perception, combining information from multiple cues and senses, implications of perception on VR.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Graphical rendering, ray tracing, shading, BRDFs, rasterization, barycentric coordinates, VR rendering problems, anti-aliasing, distortion shading, image warping (time warp), panoramic

rendering. Velocities, acceleration, vestibular system, virtual world physics, simulation, collision detection, avatar motion, vection

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Tracking systems, estimating rotation, IMU integration, drift errors, tilt and yaw correction, estimating position, camera-feature detection model, perspective n-point problem, sensor fusion, lighthouse approach, attached bodies, eye tracking, inverse kinematics, map building, SLAM. Remapping, locomotion, manipulation, social interaction, specialized interaction mechanisms.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Sound propagation, ear physiology, auditory perception, auditory localization; Fourier analysis;macoustic modeling, HRTFs, rendering, auralization. Perceptual training, recommendations for developers, best practices, VR sickness, experimental methods that involve human subjects Touch, haptics, taste, smell, robotic interfaces, telepresence, brain-machine interfaces.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. VIRTUAL REALITY Steven M. LaValle. Cambridge University Press 2016.

Reference Books:

1. HANDBOOK OF VIRTUAL ENVIRONMENTS: Design, Implementation, and Applications Kelly S. Hale Kay M. Stanney CRC Press 2nd Edition, 2015

STORAGE AREA NETWORKS

Sub Code :	**19SCS734**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Evaluate Storage Architectures.
- Define backup, recovery, disaster recovery, business continuity, and replication.
- Examine emerging technologies including IP-SAN.
- Understand logical and physical components of storage infrastructures.
- Define information security and identify different storage virtualization technologies.

Course Outcomes:

The students should be able to:

CO1: Identify key challenges in managing information and analyze different storage networking technologies and virtualization

CO2: Explain components and the implementation of NAS

CO3: Describe CAS architecture and types of archives and forms of virtualization

CO4 : Ilustrate the storage infrastructure and management activities

CO5: Identify components of managing and monitoring the data centre.

Module I

Storage System : Introduction to Information Storage: Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing. Data Center Environment: Application, Host (Compute), Connectivity, Storage. Data Protection: RAID: RAID Implementation Methods, RAID Techniques, RAID Levels, RAID Impact on Disk Performance. Intelligent Storage Systems: Components of Intelligent Storage System, Storage Provisioning.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Storage Networking Technologies : Fibre Channel Storage Area Networks: Components of FC SAN, FC connectivity, Fibre Channel Architecture, Zoning, FC SAN Topologies, Virtualization in SAN. IP SAN and FCoE: iSCSI, FCIP, FCoE. Network Attached Storage: Components of NAS, NAS I/O Operation, NAS File-Sharing Protocols, File-Level Virtualization, Object-Based Storage and Unified Storage: Object-Based Storage Devices, Content-Addressed Storage, Unified Storage.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Backup, Archive and Replication : Introduction to Business Continuity: Information Availability, BC Terminology, BC Planning Lifecycle, Failure Analysis, BC Technology Solutions. Backup and Archive: Backup Methods, Backup Topologies, Backup Targets, Data Deduplication for Backup, Backup in Virtualized Environments, Data Archive. Local Replication: Replication Terminology,

Uses of Local Replicas, Local Replication Technologies, Local Replication in a Virtualized Environment. Remote Replication: Remote Replication Technologies, Three-Site Replication, Remote Replication and Migration in a Virtualized Environment.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Cloud Computing and Virtualization : Cloud Enabling Technologies, Characteristics of Cloud Computing, Benefits of Cloud Computing, Cloud Service Models, Cloud Deployment Models, Cloud Computing Infrastructure, Cloud Challenges and Cloud Adoption Considerations. Virtualization Appliances: Black Box Virtualization, In-Band Virtualization Appliances, Outof-Band Virtualization Appliances, High Availability for Virtualization Appliances, Appliances for Mass Consumption. Storage Automation and Virtualization: Policy-Based Storage Management, Application-Aware Storage Virtualization, Virtualization-Aware Applications.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Securing and Managing Storage Infrastructure : Securing and Storage Infrastructure: Information Security Framework, Risk Triad, Storage Security Domains, Security Implementations in Storage Networking, Securing Storage Infrastructure in Virtualized and Cloud Environments. Managing the Storage Infrastructure : Monitoring the Storage Infrastructure, Storage Infrastructure Management activities, Storage Infrastructure Management Challenges, Information Lifecycle management, Storage Tiering.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Information Storage and Management, Author :EMC Education Services, Publisher: Wiley ISBN: 9781118094839
2. Storage Virtualization, Author: Clark Tom, Publisher: Addison Wesley Publishing Company ISBN : 9780321262516

Reference Books:

1. John R. Vacca, Michael Erbschloe, " The Essential Guide to Storage Area Networks," Prentice Hall, January 2002,

SOFTWARE ARCHITECTURE

Sub Code :	**19SCS735**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives :

This course will enable students to

- Explain principles in the design of object oriented systems.
- Understand a range of design patterns.
- Discuss suitable patterns in specific contexts
- Allows students to learn about client – server interactions
- Analyze the system architectures.

Course Outcomes :

The students should be able to:

CO1 : Design and implement codes with higher performance and lower complexity

CO2 : Demonstrate code qualities needed to keep code flexible

CO3: Illustrate design principles and be able to assess the quality of a design with respect to these principles.

CO4 : Understand the Design Patterns

CO5 : Learn different system Architectures.

Module I

Introduction: what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. What is object-oriented development? , key concepts of object oriented design other related concepts, benefits and drawbacks of the paradigm

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Analysis a System: Analysis a System: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Design Pattern Catalog : Design Pattern Catalog: Structural patterns, Adapter, bridge, composite, decorator, facade, flyweight, proxy.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Interactive systems and the MVC architecture : Interactive systems and the MVC architecture: Introduction , The MVC architectural pattern, analyzing a simple drawing program , designing the

system, designing of the subsystems, getting into implementation , implementing undo operation , drawing incomplete items, adding a new feature , pattern based solutions.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Designing with Distributed Objects : Designing with Distributed Objects: Client server system, java remote method invocation, implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Object-oriented analysis, design and implementation, brahma dathan, sarnathrammath, universities press,2013
2. Design patterns, erich gamma, Richard helan, Ralph johman , john vlissides ,PEARSON Publication,2013.

Reference Books:

1. Frank Bachmann, ReginеMeunier, Hans Rohnert “Pattern Oriented Software Architecture” – Volume 1, 1996.
2. William J Brown et al., "Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis", John Wiley, 1998.

DISTRIBUTED COMPUTING SYSTEMS

Sub Code :	**19SCS736**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- To expose students to both the abstraction and details of file systems.
- To introduce concepts related to distributed computing systems.
- To focus on performance of systems design.
- To explore on issues related to systems design decisions.
- To know about the challenges of system design

Course Outcomes:

The students should be able to:

CO1: Explain the characteristics of a distributed system along with its and design challenges
CO2: Illustrate the mechanism of IPC between distributed objects
CO3: Describe the distributed file service architecture
CO4: understand the important characteristics of SUN NFS.
CO5: Discuss concurrency control algorithms applied in distributed transactions

Module I

Characterization of Distributed Systems: Introduction, Examples of DS, Resource sharing and the Web, Challenges System Models: Architectural Models, Fundamental Models

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Inter Process Communication: Introduction, API for Internet Protocols, External Data Representation and Marshalling, Client – Server Communication, Group Communication Distributed Objects and RMI: Introduction, Communication between Distributed Objects, RPC, Events and Notifications

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Operating System Support: Introduction, The OS layer, Protection, Processes and Threads, Communication and Invocation , Operating system architecture Distributed File Systems: Introduction, File Service architecture, Sun Network File System

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Time and Global States: Introduction, Clocks, events and process status, Synchronizing physical clocks, Logical time and logical clocks, Global states Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Distributed Transactions: Introduction, Flat and nested distributed transactions, Atomic commit protocols, Concurrency control in distributed transactions, distributed deadlocks

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. George Coulouris, Jean Dollimore and Tim Kindberg: Distributed Systems – Concepts and Design, 5thEdition, Pearson Publications, 2009

Reference Books:

1. Andrew S Tanenbaum: Distributed Operating Systems, 3rd edition, Pearson publication, 2007
2. Ajay D. Kshemkalyani and MukeshSinghal, Distributed Computing: Principles, Algorithms and Systems, Cambridge University Press, 2008
3. SunitaMahajan, Seema Shan, " Distributed Computing", Oxford University Press,2015

ADVANCED DATABASE MANAGEMENT SYSTEMS

Sub Code :	**19SCS737**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives :

This course will enable students to

- To provide overview of indexing and hashing techniques
- To impart knowledge of query processing and optimization
- To provide an overview of distributed database systems.
- To introduce the concept of document oriented database.
- To create awareness about potential security threats to a database and mechanisms to handle it.

Course Outcomes:

The student will be able to :

CO1: Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.

CO2: Use Structured Query Language (SQL) for database manipulation.

CO3: Design and build simple database systems

CO4: Develop application to interact with databases.

CO5: Understand data warehouse , OLAP and OLTP

Module I

Review of Relational Data Model and Relational Database Constraints: Relational model concepts; Relational model constraints and relational database schemas; Update operations, anomalies, dealing with constraint violations, Types and violations. Overview of Object-Oriented Concepts – Objects, Basic properties. Advantages, examples, Abstract data types, Encapsulation, class hierarchies, polymorphism, examples.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Object and Object-Relational Databases: Overview of OOP; Complex objects; Identity, structure etc. Object model of ODMG, Object definition Language ODL; Object Query Language OQL; Conceptual design of Object database. Overview of object relational features of SQL; Object-relational features of Oracle; Implementation and related issues for extended type systems; syntax and demo examples, The nested relational model. Overview of C++ language binding;

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Parallel and Distributed Databases: Architectures for parallel databases; Parallel query evaluation; Parallelizing individual operations; Parallel query optimizations; Introduction to distributed databases; Distributed DBMS architectures; Storing data in a Distributed DBMS; Distributed

catalog management; Distributed Query processing; Updating distributed data; Distributed transactions; Distributed Concurrency control and Recovery.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Data Warehousing, Decision Support and Data Mining: Introduction to decision support; OLAP, multidimensional model; Window queries in SQL; Finding answers quickly; Implementation techniques for OLAP; Data Warehousing; Views and Decision support, View materialization, Maintaining materialized views. Introduction to Data Mining; Counting co-occurrences; Mining for rules; Tree-structured rules; ROC and CMC Curves; Clustering; Similarity search over sequences; Incremental mining and data streams; Additional data mining tasks.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Enhanced Data Models for Some Advanced Applications: Active database concepts and triggers; Temporal, Spatial, and Deductive Databases – Basic concepts. More Recent Applications: Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.
2. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill

Reference Books:

1. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-GrawHill, 2013.
2. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.

DATA SCIENCE

Sub Code :	**19SCS738**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Students will develop relevant programming abilities.
- Students will demonstrate proficiency with statistical analysis of data.
- Students will develop the ability to build and assess data-based models.
- Students will execute statistical analyses with professional statistical software.
- Students will apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively

Course Outcomes:

At the end of the course the student will be able to

CO1: Define data science and its fundamentals

CO2: Demonstrate the process in data science

CO3: Explain machine learning algorithms necessary for data sciences

CO4: Illustrate the process of feature selection and analysis of data analysis algorithms

CO5: Visualize the data and follow of ethics

Module I

Introduction: What is Data Science? Big Data and Data Science hype – and getting past the hype, Why now? – Datafication, Current landscape of perspectives, Skill sets. Needed Statistical Inference: Populations and samples, Statistical modeling, probability distributions, fitting a model, - Introduction to R

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Exploratory Data Analysis and the Data Science Process: Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA,The Data Science Process, Case Study: RealDirect (online real estate firm). Three Basic Machine Learning Algorithms: Linear Regression, kNearest Neighbors (k-NN), k-means

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

One More Machine Learning Algorithm and Usage in Applications: Motivating application: Filtering Spam, Why Linear Regression and k-NN are poor choices for Filtering Spam, Naïve Bayes and why it works for Filtering Spam, Data Wrangling: APIs and other tools for scrapping the Web

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Feature Generation and Feature Selection (Extracting Meaning From Data): Motivating application: user (customer) retention. Feature Generation (brainstorming, role of domain expertise, and place for imagination), Feature Selection algorithms. Filters; Wrappers; Decision Trees; Random Forests. Recommendation Systems: Building a User-Facing Data Product, Algorithmic ingredients of a Recommendation Engine, Dimensionality Reduction, Singular Value Decomposition, Principal Component Analysis, Exercise: build your own recommendation system

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Mining Social-Network Graphs: Social networks as graphs, Clustering of graphs, Direct discovery of communities in graphs, Partitioning of graphs, Neighborhood properties in graphs, Data Visualization: Basic principles, ideas and tools for data visualization. Data Science and Ethical Issues, Discussions on privacy, security, ethics, Next-generation data scientists

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books :

1. Doing Data Science Cathy O'Neil and Rachel Schutt Straight Talk From The Frontline.O'Reilly 2014
2. Mining of Massive Datasets. v2.1 Jure Leskovek, Anand Rajaraman and Jeffrey Ullman Cambridge University Press 2014

Reference Books:

1. Data Mining: Concepts and Techniques Jiawei Han, Micheline Kamber and Jian Pei ThirdEdition 2012.
2. Machine Learning: A Probabilistic Perspective Kevin P. Murphy 2013

ADVANCED MICRPROCESSOR

Sub Code :	**19SCS739**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Study of architecture and programming of 8086 microprocessor
- Study of features of different peripheral devices and standard buses
- Know the features of advanced microprocessors
- Students will demonstrate skill of ARM
- Be able to interface input/output devices like Keyboard, LED, LCD, sensors with ARM7TDMI

Course Outcomes:

After learning the course the students should be able to:

CO1 : Become familiar with importance and applications of advance microprocessor

CO2: Understand architecture of ARM processor

CO3: Understand instruction set of ARM processor

CO4: Be able to write hybrid (assembly & C) program for ARM microprocessor

CO5: Analyze given program to find out program output

Module I

Introduction: Need of advance microprocessors, Difference between RISC and CISC, RISC Design philosophy, ARM Design Philosophy, History of ARM microprocessor, ARM processor family, Development of ARM architecture

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

The ARM Architecture and Programmers Model : The Acorn RISC Machine, ARM Core data flow model, Architectural inheritance, The ARM7TDMI programmer's model: General purpose registers, CPSR, SPSR, ARM memory map, data format, load and store architecture, Core extensions, Architecture revisions, ARM development tools

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

ARM Instruction set: Data processing instructions, Arithmetic and logical instructions, Rotate and barrel shifter, Branch instructions, Load and store instructions, Software interrupt instructions, Program status register instructions, Conditional execution, Multiple register load and store instructions, Stack instructions, Thumb instruction set, advantage of thumb instructions, Assembler rules and directives, Assembly language programs for shifting of data, factorial calculation, swapping register contents, moving values between integer and floating point registers

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

C Programming for ARM: Overview of C compiler and optimization, Basic C data types, C Looping structures, Register allocations, function calls, pointer aliasing, structure arrangement, bitfields, unaligned data and Endianness, Division, floating point, Inline functions and inline assembly, Portability issues. C programs for General purpose I/O, general purpose timer, PWM Modulator, UART,I2C Interface, SPI Interface, ADC, DAC

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Memory management units: Moving from memory protection unit (MPU) to memory management unit (MMU), Working of virtual memory, Multitasking, Memory organization in virtual memory system, Page tables, Translation look aside buffer, Caches and write buffer, Fast context switch extension,

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. ARM Assembly Language Programming & Architecture By. Muhammad Ali Mazidi,Kindle edition
2. Arm Assembly Language, Fundamentals and Techniques, 2nd edition, William Hohl, Christppher Hinds, CRC Press

Reference Books:

1. Arm System Developer's Guide, Designing and Optimizing Software, Andrew N. Sloss, Dominic Symes, Chris Wwight, Elsevier
2. Arm System-on-chip Architecture, 2nd Edition, Steve Furber, Pearson publication
3. Embedded Systems By. Lyla Das, Pearson publication

CYBER SECURITY

Sub Code :	**19SCS730**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives :

This course will enable students to

- The learner will be able to examine secure software development practices.
- The learner will understand principles of web security.
- The learner will be able to incorporate approaches for risk management and best practices.
- The learner will gain an understanding of cryptography, how it has evolved, and some key encryption techniques used today.
- The learner will develop an understanding of security policies (such as confidentiality, integrity, and availability), as well as protocols to implement such policies.

Course Outcomes:

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

CO1: Define cyber security, cyber law and their roles

CO2: Demonstrate cyber security cybercrime and forensics.

CO3: Infer legal issues in cybercrime,

CO4: Demonstrate tools and methods used in cybercrime and security.

CO5: llustrate evidence collection and legal challenges

Module I

Introduction to Cybercrime: Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals?, Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens. Cyberoffenses: How Criminals Plan Them: How Criminals Plan the Attacks, Social Engineering, Cyberstalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Understanding Computer Forensics: Introduction, Historical Background of Cyberforensics, Digital Forensics Science, The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Setting up a Computer Forensics Laboratory: Understanding the Requirements, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Computer Forensics from Compliance Perspective, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing, Antiforensics.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Introduction to Security Policies and Cyber Laws: Need for An Information Security Policy, Information Security Standards – Iso, Introducing Various Security Policies and Their Review Process, Introduction to Indian Cyber Law, Objective and Scope of the it Act, 2000, Intellectual Property Issues, Overview of Intellectual - Property - Related Legislation in India, Patent, Copyright, Law Related to Semiconductor Layout and Design, Software License.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives Sunit Belapure and Nina Godbole Wiley India Pvt Ltd 2013
2. Introduction to information security and cyber laws Surya Prakash Tripathi, Ritendra Goyal, Praveen Kumar Shukla Dreamtech Press 2015

Reference Books :

1. Cybersecurity: Managing Systems, Conducting Testing, and Investigating Intrusions Thomas J. Mowbray John Wiley & Sons,
2. Cyber Security Essentials James Graham, Ryan Olson, Rick Howard CRC Press 2010

SOCIAL AND WEB ANALYTICS

Sub Code :	**19SCS741**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- Understand and apply key concepts in social media metrics.
- Understand and apply social media analytics tools.
- Collect social media data.
- Monitor consumers and competitors and glean deeper consumer insights based on advanced social media data modeling.
- Students will demonstrate skill in data management.

Course Outcomes:

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

CO1: Demonstrate the semantic web technologies like RDF Ontology and others

CO2: Learn the various semantic web applications

CO3: Identify the architectures and challenges in building social networks

CO4: Analyze the performance of social networks using electronic sources

CO5: Develop social media strategy and measure social media campaign effectiveness

Module I

Web Intelligence Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Knowledge Representation for the Semantic Web Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Ontology Engineering, Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Semantic Web Applications, Services and Technology Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base, XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Social Network Analysis and semantic web What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books :

1. Thinking on the Web Berners Lee, Godel and Turing Wiley inter science 2008
2. Social Networks and the Semantic Web Peter Mika Springer 2007

Reference Books :

1. Semantic Web and Semantic Web Services Liyang Lu Chapman and Hall CRC Publishers `
2. Programming the Semantic Web T.Segaran, C.Evans, J.Taylor O'Reilly.

INFORMATION SECURITY

Sub Code :	**19SCS742**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- To understand basics of Cryptography and Network Security.
- To be able to secure a message over insecure channel by various means.
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
- To understand various protocols for network security
- To protect against the threats in the networks.

Course Outcomes:

The students should be able to:

CO1: Analyze the Digitals security lapses

CO2: Illustrate the need of key management

CO3 : Incorporate approaches for incident analysis and response.

CO4: Understand Confidentiality, Integrity and Availability of a data.

CO5 : Understand the use of cryptography on the internet

Module I

Introduction. How to Speak Crypto. Classic Crypto. Simple Substitution Cipher. Cryptanalysis of a Simple Substitution. Definition of Secure. Double Transposition Cipher. One-time Pad. Project VENONA. Codebook Cipher. Ciphers of the Election of 1876. Modern Crypto History. Taxonomy of Cryptography. Taxonomy of Cryptanalysis.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

What is a Hash Function? The Birthday Problem.Non-cryptographic Hashes. Tiger Hash. HMAC. Uses of Hash Functions. Online Bids. Spam Reduction. Other Crypto-Related Topics. Secret Sharing. Key Escrow. Random Numbers. Texas Hold 'em Poker. Generating Random Bits. Information Hiding.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Random number generation Providing freshness Fundamentals of entity authentication Passwords Dynamic password schemes Zero-knowledge mechanisms Further reading Cryptographic Protocols Protocol basics From objectives to a protocol Analysing a simple protocol Authentication and key establishment protocols

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Key management fundamentals Key lengths and lifetimes Key generation Key establishment Key storage Key usage Governing key management Public-Key Management Certification of public keys The certificate lifecycle Public-key management models Alternative approaches

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Cryptographic Applications Cryptography on the Internet Cryptography for wireless local area networks Cryptography for mobile telecommunications Cryptography for secure payment card transactions Cryptography for video broadcasting Cryptography for identity cards Cryptography for home users

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Information Security: Principles and Practice, 2nd Edition by Mark Stamp Wiley

2. Everyday Cryptography: Fundamental Principles and Applications Keith M. Martin Oxford Scholarship Online: December 2013

Reference Books:

1. Applied Cryptography Protocols, Algorithms, and Source Code in C by Bruce Schneier

SOFTWARE TESTING

Sub Code :	**19SCS743**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
		Total Hours :	**50**

Course Objectives:

This course will enable students to

- To study fundamental concepts in software testing
- To discuss various software testing issues
- To find the solutions for the software unit test, integration and system testing problems.
- To expose the advanced software testing topics, such as object-oriented software testing methods.
- To know more about how software testing used in different Applications

Course Outcomes:

The students should be able to:

CO1: Discuss test cases for any given problem

CO2: Compare the different testing techniques

CO3: Illustrate the problem into suitable testing model

CO4: Understand the appropriate technique for the design of flow graph.

CO5: Understand the use of Testing.

Module I

Basics of Software Testing: Basic definitions, Software Quality , Requirements, Behaviour and Correctness, Correctness versus Reliability, Testing and Debugging, Test cases, Insights from a Venn diagram, Identifying test cases, Test-generation Strategies, Test Metrics**,** Error and fault taxonomies , Levels of testing, Testing and Verification, Static Testing.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module II

Problem Statements: Generalized pseudo code, the triangle problem, the NextDate function, the commission problem, the SATM (Simple Automatic Teller Machine) problem, the currency converter, Saturn windshield wiper Functional Testing: Boundary value analysis, Robustness testing, Worst-case testing, Robust Worst testing for triangle problem, NextDate problem and commission problem, Equivalence classes, Equivalence test cases for the triangle problem, NextDate function, and the commission problem, Guidelines and observations, Decision tables, Test cases for the triangle problem, NextDate function, and the commission problem, Guidelines and observations.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module III

Fault Based Testing: Overview, Assumptions in fault based testing, Mutation analysis, Fault-based adequacy criteria, Variations on mutation analysis. Structural Testing: Overview, Statement testing, Branch testing, Condition testing, Path testing: DD paths, Test coverage metrics, Basis path testing,

guidelines and observations, Data –Flow testing: Definition-Use testing, Slicebased testing, Guidelines and observations.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module IV

Test Execution: Overview of test execution, from test case specification to test cases, Scaffolding, Generic versus specific scaffolding, Test oracles, Self-checks as oracles, Capture and replay Process Framework :Basic principles: Sensitivity, redundancy, restriction, partition, visibility, Feedback, the quality process, Planning and monitoring, Quality goals, Dependability properties ,Analysis Testing, Improving the process, Organizational factors. Planning and Monitoring the Process: Quality and process, Test and analysis strategies and plans, Risk planning, monitoring the process, Improving the process, the quality team.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Module V

Integration and Component-Based Software Testing: Overview, Integration testing strategies, Testing components and assemblies. System, Acceptance and Regression Testing: Overview, System testing, Acceptance testing, Usability, Regression testing, Regression test selection techniques, Test case prioritization and selective execution.Levels of Testing, Integration Testing: Traditional view of testing levels, Alternative life-cycle models, The SATM system, Separating integration and system testing, A closer look at the SATM system, Decomposition-based, call graph-based, Path-based integrations.

Teaching Pedagogy: *Chalk and talk using PPT and Demo to explain the Concept*

10 hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems/ Case study	Regular Mode of Assessment	15
2	One Open Book Written Exam at the end of the Module 4	Regular Mode of Assessment	10
3	Assignments on Advanced Topics (group of size 2/individual)	Regular Mode of Assessment	10
4	MCQ based Test at the end of each Module	2 Marks for each Module	10
5	Attendance	As per the Guidelines given in the Regulations	5
		Total	**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2008. (Listed topics only from Chapters 1, 2, 5, 6, 7, 9, 10, 12, 13)
2. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, Wiley India, 2009. (Listed topics only from Chapters 3, 4, 16, 17, 20,21, 22,24)
3. Aditya P Mathur: Foundations of Software Testing, Pearson Education, 2008.(Listed topics only from Section 1.2, 1.3, 1.4, 1.5, 1.8,1.12,6. 2.1,6. 2.4 .

Reference Books:

1. Software testing Principles and Practices – Gopalaswamy Ramesh, SrinivasanDesikan, 2 nd Edition, Pearson, 2007.
2. Software Testing – Ron Patton, 2nd edition, Pearson Education, 2004.
3. The Craft of Software Testing – Brian Marrick, Pearson Education, 1995.
4. AnirbanBasu, Software Quality Assurance, Testing and Metrics, PHI, 2015.
5. NareshChauhan, Software Testing, Oxford University press.

INTERNET OF THINGS LABORATORY

Sub Code :	**19SCSL75**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

This course will enable students to

- Students will be explored to the interconnection and integration of the physical world and the cyber space.
- They are also able to design & develop IOT Devices.
- Understand IOT applications and design Techniques
- Working with IoT system involving prototyping, programming and data analysis.
- Learn real time intrusion detection in smart homes

Course Outcomes:

CO1: Able to understand the application areas of IOT ·
CO2: Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO3: Able to understand building blocks of Internet of Things and characteristics.
CO4: To create an environment for research, design, development and testing of IoT solutions,
CO5: Provide students unique interdisciplinary learning and innovation experiences with IoT technologies

Laboratory Experiments

1. Familiarization with concept of IOT, Arduino/Raspberry Pi and perform necessary software installation.
2. Study of different operating systems for Raspberry-Pi /Beagle board. Understanding the process of OS installation on Raspberry-Pi /Beagle board
3. Study of Connectivity and configuration of Raspberry-Pi /Beagle board circuit with basic peripherals, LEDS. Understanding GPIO and its use in program.
4. Understanding connectivity of Raspberry-Pi /Beagle board with camera
5. Write an application using Raspberry-Pi /Beagle board to control the operation of stepper motor
6. Write a server application to be deployed on Raspberry-Pi /Beagle board. Write client applications to get services from the server application
7. Real Time Intrusion Detection for Smart Home
8. Create a small dashboard application to be deployed on cloud.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

CLOUD COMPUTING LABORATORY

Sub Code :	**19SCSL76**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**

Course Objectives:

This course will enable students to

- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- To learn to implement and use parallel programming using Hadoop

Course Outcomes:

CO1: Configure various virtualization tools such as Virtual Box, VMware workstation.
CO2: Design and deploy a web application in a PaaS environment.
CO3: Learn how to simulate a cloud environment to implement new schedulers.
CO4: Install and use a generic cloud environment that can be used as a private cloud.
CO5: Manipulate large data sets in a parallel environment.

Laboratory Experiments

1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
8. Install Hadoop single node cluster and run simple applications like wordcount.

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	10
4	MCQ /Viva at the end of each lab session	2 marks for each Module	5
5	Attendance	As per the guidelines given in the regulations	5
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
5. Change of experiment is allowed only once and marks allotted to the procedure partto be made zero.

PROJECT PHASE I

Sub Code :	**19SCS77**	**IA Marks :**	**100**
Hrs/ Week :	**2P+2S**	**Credits :**	**2**

Course Objectives:

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

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.

Course Outcomes:

Each student, under the guidance of a Faculty, is required to:

CO1: Present the seminar on the selected topic orally and/or through power point slides.

CO2: Answer the queries and involve in debate/discussion.

CO3: Submit two copies of the typed report with a list of references.

CO4: The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

CO5: Demonstrate the knowledge, skills and attitudes of a professional engineer.

Instructions:

Students in consultation with the guide/s shall carry out literature survey/ visit industries to finalize the topic of the Project. Subsequently, the students shall collect the material required for the selected project, prepare synopsis and narrate the methodology to carry out the project work

Scheme of Examination:

CIE marks for the project report and seminar shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of two faculties from the department with the senior most acting as the Chairman.

Marks Distribution in Phase 1: (100 Marks): (Synopsis 30 + Evaluation of the work 40 + Report 30)

Guide: 40%

Internal: 30%

Final Review: 30%

Phase 1 - 1st Presentation (30 Marks):

Identification of Problem Domain and Detailed Analysis – 10 marks

Study of the Existing Systems and Feasibility of Project Proposal – 10 marks

Objectives and Methodology of the Proposed Work using SPEED (student platform for Engineering education development) format – 10 marks

Phase 1 - 2nd Presentation (40 Marks):
Design Methodology - 10 marks
Planning of Project Work and Team Structure – 10 marks
Demonstration and Presentation – 20 marks

Phase 1 - 3rd Presentation (30 Marks):
Incorporation of suggestions – 10 marks
Project Demonstration – 10 marks
Presentation – 10 marks

ESEP – MOOC

Sub Code:	**19SCS78**	**IA Marks :**	**50**
Self Study Hours/Week:	**2**	**Credits:**	**02**

Course Objectives:

- To improve learnability
- Acquire additional knowledge in the field of study
- Skill development
- Industry readiness
- Increased confidence level

Course Outcomes:

On completion of this course, students will be able to:

CO1: Improve learnability
CO2: Acquire additional knowledge in the field of study
CO3: Develop the skill
CO4: Industry ready
CO5: Have more confidence level

About the Course:

- A common Online MOOC/SWAYAM/COURSERA Course is offered in Blended mode.
- The MOOC Coordinator will recommend a department specific common course in MOOC/SWAYAM/COURSERA to all the students of the batch.
- The assessment will be taken by the MOOC Coordinator for 25 Marks at the end of the Course and the remaining 25 marks will be awarded for the Course Completion.
- The student must attend all continuous assessment taken by the MOOC/COURSERA Course Faculty.

Assessment Method for MOOC/SWAYAM/COURSERA Course:

- The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course has to recommend a common course for the students to register the MOOC/SWAYAM/COURSERA Course for a Specific Title.
- The Students have to take all continuous assessment as recommended by the Course Faculty in the MOOC/SWAYAM/COURSERA Course for the internal assessment of 25 Marks.
- The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course is responsible to conduct Assessment (MCQs) for 25 Marks in the Internal Assessment of 50 Marks.

Sl. No.	Type of Assessment	Weightage	Marks
1	Continuous Assessment taken by the MOOC/Coursera Course Faculty	50	25
2	MOOC/SWAYAM/COURSERA Faculty Coordinator has to Conduct Assessment (MCQs & Assignments)	50	25
Total			**50**

ESEP - EMPLOYABILITY SKILL ENHANCEMENT PROGRAMME - PATENT FILING & IPR

Sub Code:	**19SCS79**	**IA Marks :**	**50**
Hrs / Week :	**2**	**Credits:**	**02**

Course Objectives:

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

Course Outcomes:

On completion of this course, students will be able to:

CO1: Have exposure on the latest development

CO2: Acquire new skills

CO3: Become Industry ready

CO4: Have more confidence

CO5: Get additional knowledge

About the Course:

- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.

Assessment Method

- Assessment will be conducted for 2 Hours duration for 50 Marks on completion of the course and based on the marks scored, grading will be done.

VIII SEMESTER SYLLABUS

TECHNICAL SEMINAR

Sub Code :	**19SCS81**	**IA Marks :**	**100**
Self Study Hours/Week:	**4**	**Credits :**	**2**

Course Objectives:

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

- Demonstrate a sound technical knowledge of their selected Seminar topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.

Course Outcomes:

Each student, under the guidance of a Faculty, is required to:

CO1: Present the seminar on the selected topic orally and/or through power point slides.

CO2: Answer the queries and involve in debate/discussion.

CO3: Submit two copies of the typed report with a list of references.

CO4: The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

CO5: Demonstrate the seminar with sound technical knowledge and communication skills

Instructions:

Students in consultation with the guide/s shall carry out literature survey/ visit industries to finalize the topic of the Seminar. Subsequently, the students shall collect the material required for the selected Seminar, prepare synopsis and narrate the methodology to carry out the Seminar work

Scheme of Examination:

CIE marks for the project report and seminar shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of two faculty from the department with the senior most acting as the Chairman.

INTERNSHIP

Sub Code :	**19SCS82**	**IA Marks :**	**50**
Credits:	**3**	**Exam Marks:**	**50**

Course Objectives:

- Demonstrate a sound technical knowledge of their internship area / topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.

Course Outcomes:

Each student, under the guidance of a Faculty, is required to:

CO1: Present the work done in his/her internship on the selected topic orally and/or through power point slides.

CO2: Answer the queries and involve in debate/discussion.

CO3: Submit two copies of the typed report with a list of references.

CO4: The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

CO5: Demonstrate the presentation with sound technical knowledge and communication skills

Instructions:

Following are the guidelines to be followed for the Internship Programme:

1. The Internship Programme duration is of Four weeks.

2. The internship can be carried out in any industry / R and D Organization / Research Institute / Educational institute of repute.

3. The institutions may also suggest the students to enroll for the Internshala platform for free internships as there is MoU with the AICTE for the beneficial of the affiliated Institutions (https://internshala.com/)

4. The Examination of Internship will be carried out in line with the University Project Viva-Voce examination.

5. The Department/college shall nominate staff member/s to facilitate, guide and supervise students under internship.

6. The students shall report the progress of the internship to the guide in regular intervals and seek his/her advice.

7. After the completion of Internship, students shall submit a report with completion and attendance certificates to the Head of the Department with the approval of both internal and external guides.

8. There will be 50 marks for CIE (Seminar: 25, Internship report: 25) and 50 marks for Viva - Voce conducted during SEE. The minimum requirement of CIE marks shall be 50% of the maximum marks.

9. The internal guide shall award the marks for seminar and internship report after evaluation. He/she will also be the internal examiner for Viva-Voce conducted during SEE.

10. The external guide from the industry shall be an examiner for the viva voce on Internship. Viva-Voce on internship shall be conducted at the college and the date of Viva-Voce shall be fixed in consultation with the external Guide. The Examiners shall jointly award the Viva- Voce marks.

11. In case the external Guide expresses his inability to conduct viva voce, the Chief Superintendent of the institution shall appoint a senior faculty of the Department to conduct viva-voce along with the internal guide. The same shall be informed in writing to the concerned Chairperson, Board of Examiners (BOE).

12. The students are permitted to carry out the internship anywhere in India or abroad. The University will not provide any kind of financial assistance to any student for carrying out the Internship.

PROJECT (WITH PATENT APPLICATION)

Sub Code :	**19SCS83**	**IA Marks :**	**100**
Practice Hours/Week:	**24**	**Exam Marks:**	**100**
Credits :	**13**		

Course Objectives:

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.

Course Outcomes:

Each student, under the guidance of a Faculty, is required to:

CO1: Present the seminar on the selected Project orally and/or through power point slides.

CO2: Answer the queries and involve in debate/discussion.

CO3: Submit the typed report with a list of references.

CO4: The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

CO5: Demonstrate the knowledge

Instructions:

Students in consultation with the guide/s shall carry out literature survey/ visit industries to finalize the topic of the Project. Subsequently, the students shall collect the material required for the selected project, prepare synopsis and narrate the methodology to carry out the project work

1. Two reviews will be conducted (excluding the zeroth review and final review). Apart from this the guides have to review the project and the project report as per the specified guidelines.
2. The students have to submit the abstract (as per the given format) and based on willingness of the guide the students are permitted for Project work.
3. The assessments will be done in the scaling of 1-5 for each component of the project done through rubrics.

Scheme of Examination:

CIE marks for the project report and seminar shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of two faculty from the department with the senior most acting as the Chairman.

Distribution of the Marks:

IA Mark: 100 Marks (Evaluation of the work 40 + Demonstration 30 + Report 30)

External Exam: 100 Marks

Total: 200 Marks

Guide: 40%

Internal: 30%
Final Review: 20%
Publication: 10% (Scopus indexed/TR indexed journal)

Evaluation by the Guide (50 Marks):
Self Motivation and Determination – 10 marks
Working within a Team – 10 marks
Regularity – 10 marks
Technical Knowledge and Awareness related to the Project – 20 marks

Project Report Evaluation (50 Marks):
Project Report – 20 marks
Description of Concepts and Technical Details – 10 marks
Conclusion and Discussion – 10 marks
Journal Publication – 10 marks

External Project Evaluation: 100 Marks (SEE)