SRIT R19

COURSE STRUCTURE & SYLLABUS

B. Tech Regular Four-Year Degree Program

(Applied for the Batches admitted from 2019-2020)
&
B. Tech (LES) for the batches admitted from 2020-2021

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY
(Autonomous)

Affiliated to JNTUA & Approved by AICTE

Accredited by NAAC with 'A' Grade & Accredited by NBA (CSE, ECE & EEE) Rotarypuram Village, B K Samudram Mandal,
Ananthapuramu - 515701

COURSE STRUCTURE AND SYLLABI
(Based on AICTE Model Curriculum) SRIT-R19

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING

B. Tech (Regular- Full time)
(Effective for the students admitted into I Year from the Academic year **2019- 2020**)
&
B. Tech (Lateral Entry Scheme)
(Effective for the students admitted into II Year from the Academic year **2020- 2021**)

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY
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Rotarypuram Village, B K Samudram Mandal, Ananthapuramu - 515701.

B. Tech Course Structure

Semester 0
(Common for all branches of Engineering)

S.No.	Course Name	L-T-P-C
1.	Physical Activities -- Sports, Yoga and Meditation, Plantation	0-0-6-0
2.	Career Counseling	2-0-2-0
3.	Orientation to all branches -- career options, tools, etc.	3-0-0-0
4.	Orientation on admitted Branch --corresponding labs, tools and platforms	2-0-3-0
5.	Proficiency Modules & Productivity Tools	2-1-2-0
6.	Assessment on basic aptitude and mathematical skills	2-0-3-0
7.	Remedial Training in Foundation Courses	2-1-2-0
8.	Human Values & Professional Ethics	3-0-0-0
9.	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	2-1-2-0
10.	Concepts of Programming	2-0-2-0

I B.Tech I Semester

Course Code	Course Name	Subject Area	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		CIA	SEE	Total
194GA54101	Linear Algebra and Calculus	BSC	3	1	0	4	30	70	100
194GA56101	Applied Physics	BSC	3	0	0	3	30	70	100
194GA05101	Problem Solving & Programming	ESC	3	1	0	4	30	70	100
194GA03102	Engineering Graphics	ESC	1	0	4	3	30	70	100
194GA03104	Engineering Workshop Practices	ESC	0	0	2	1	30	70	100
194GA56102	Applied Physics Lab	BSC	0	0	3	1.5	30	70	100
194GA05102	Problem Solving & Programming Lab	ESC	0	0	4	2	30	70	100
					Total	18.5	210	490	700

I B. Tech II Semester

Course Code	Course Name	Subject Area	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		CIA	SEE	Total
194GA02201	Basic Electrical & Electronics Engineering	ESC	3	0	0	3	30	70	100
194GA54201	Transforms & Partial Differential Equations	BSC	3	1	0	4	30	70	100
194GA51201	Chemistry	BSC	3	0	0	3	30	70	100
194GA05201	Data Structures	ESC	3	0	0	3	30	70	100
194GA52101	Communicative English-1	HSMC	2	0	0	2	30	70	100
194GA52102	Communicative English-1Lab	HSMC	0	0	2	1	30	70	100
194GA05203	Computer Science & Engineering Workshop	ESC	0	0	2	1	30	70	100
194GA02202	Basic Electrical & Electronics Engineering Lab	ESC	0	0	3	1.5	30	70	100
194GA51202	Chemistry lab	BSC	0	0	3	1.5	30	70	100
194GA05202	Data Structures Lab	ESC	0	0	3	1.5	30	70	100
					Total	21.5	300	700	1000

II Year-I -Semester: (6Theory + 2Labs+1NCMC**)**

S. No.	Course No./ Code	Name of the Course	Category	L-T-P	Credits	Scheme of examination max. marks		
						CIA	SEE	Total
1	**194GA54301**	Multi Variable Calculus and Numerical Methods	BSC	2-1-0	3	30	70	100
2	**194GA05301**	Discrete Mathematics	PCC	2-1-0	3	30	70	100
3	**194GA51301**	English Language & Employability Skills for Engineers	HSMC	3-0-0	3	30	70	100
4	**194GA05302**	Database Management Systems	PCC	3-0-0	3	30	70	100
5	**194GA04307**	Digital Logic Design	PCC	3-0-0	3	30	70	100
6	**194GA05303**	Object Oriented Programming through Java	PCC	3-0-0	3	30	70	100
7	**194GA05304**	Data Base Management Systems Lab	PCC	0-0-3	1.5	30	70	100
8	**194GA05305**	Object Oriented Programming through Java Lab	PCC	0-0-3	1.5	30	70	100
9	**194GA5MC01**	Environmental Science	NCMC	2-0-0	-	30	-	30
				Total	21.0	270	560	830

L-Lecture, **T**- Tutorial, **P** – Practical

II Year-II -Semester: (6Theory + 2Labs + 1NCMC + 1SRP**)**

S. No.	Course No./ Code	Name of the Course	Category	L-T-P	Credits	Scheme of examination max. marks		
						CIA	SEE	Total
1	**194GA54402**	Probability & Statistics	BSC	3-0-0	3	30	70	100
2	**194GA05401**	Python Programming	PCC	3-0-0	3	30	70	100
3	**194GA05402**	Formal Languages and Automata Theory	PCC	3-0-0	3	30	70	100
4	**194GA05403**	Software Engineering	PCC	3-0-0	3	30	70	100
5	**194GA05404**	Computer Organization	PCC	3-0-0	3	30	70	100
6	**194GA05405**	Design and Analysis of Algorithms	PCC	3-0-0	3	30	70	100
7	**194GA05406**	Python Programming Lab	PCC	0-0-2	1	30	70	100
8	**194GA05407**	Software Engineering Lab	PCC	0-0-2	1	30	70	100
9	**194GA0MC04**	Life Sciences for Engineers	NCMC	2-0-0	-	30	-	30
10	**194GA05408**	Socially Relevant Project	PROJ	-	1	100	-	100
				Total	21.0	370	560	930

L-Lecture, **T**- Tutorial, **P** – Practical, **PROJ**-Project

V- Semester: III-I (6Theory + 2Labs+1NCMC**)**

S. No.	Course No./ Code	Name of the Course	Category	L-T-P	Credits	Scheme of examination max. marks		
						CIA	**SEE**	**Total**
1	**194GA05501**	Compiler Design	PCC	3-0-0	3	30	70	100
2	**194GA05502**	Computer Networks	PCC	3-0-0	3	30	70	100
3	**194GA05503**	Operating Systems	PCC	3-0-0	3	30	70	100
4	**194GA05504**	Web Development Technologies	PCC	3-0-0	3	30	70	100
5	**194GA05505** **194GA05506** **194GA05507**	**Professional Elective-I** 1. Artificial Intelligence 2. Internetworking with TCP/IP 3.Software Requirements & Estimation	PEC	3-0-0	3	30	70	100
6		**Open Elective-I**	OEC	3-0-0	3	30	70	100
7	**194GA0MC02**	Indian Constitution	NCMC	2-0-0	-	30	-	30
8	**194GA05510**	Computer Networks and OS Lab	PCC	0-0-3	1.5	30	70	100
9	**194GA05511**	Web Development Technologies Lab	PCC	0-0-3	1.5	30	70	100
				Total	21	270	560	830

L-Lecture, **T**- Tutorial, **P** – Practical

Open Elective-I (III B. Tech, I-Semester)

Course Code	**Course Name**	**Subject Area**	**Periods per week**			**Credits**	**Scheme of Examination Max. Marks**		
			L	T	P		CIA	SEE	Total
194GA01508	Air Pollution and Control Construction	OEC	3	0	0	3	30	70	100
194GA01509	Technology & Project Management	OEC	3	0	0	3	30	70	100
194GA02506	System Reliability Concepts	OEC	3	0	0	3	30	70	100
194GA02507	Soft Computing Techniques	OEC	3	0	0	3	30	70	100
194GA03509	Entrepreneurship	OEC	3	0	0	3	30	70	100
194GA03510	Additive manufacturing	OEC	3	0	0	3	30	70	100
194GA04508	Analog Electronics	OEC	3	0	0	3	30	70	100
194GA04509	Digital Electronics	OEC	3	0	0	3	30	70	100
194GA05508	Computer Organization & Operating System	OEC	3	0	0	3	30	70	100
194GA05509	Computer Graphics and Multimedia Animation	OEC	3	0	0	3	30	70	100
194GA02501	Business environment and policies	OEC	3	0	0	3	30	70	100
194GA52502	Managerial Economics and Financial Analysis	OEC	3	0	0	3	30	70	100

VI- Semester: III-II (6Theory + 2Labs +1NCMC + 1SRP**)**

S. No.	Course No./ Code	Name of the Course	Category	L-T-P	Credits	Scheme of examination max. marks		
						CIA	**SEE**	**Total**
1	**194GA05601**	Data Warehousing &Data Mining	PCC	3-0-0	3	30	70	100
2	**194GA05602**	Android Application Development	PCC	3-0-0	3	30	70	100
3	**194GA05603**	**Professional Elective-II:** AI Tools, Techniques and Applications	PEC	3-0-0	3	30	70	100
	194GA05604	Mobile Computing						
	194GA05605	Design Patterns						
4	**194GA05606**	**Professional Elective-III** Natural Language Processing	PEC	3-0-0	3	30	70	100
	194GA05607	Mobile and Adhoc Networks						
	194GA05608	Software Project Management						
5		**Open Elective-II**	OEC	3-0-0	3	30	70	100
6		**Open Elective-III**	OEC	3-0-0	3	30	70	100
7	**194GA0MC03**	Essence of Indian Traditional Knowledge	NCMC	2-0-0	-	30	-	30
8	**194GA05613**	Data Warehousing & Data Mining Lab	PCC	0-0-3	1.5	30	70	100
9	**194GA05614**	Android Application Development Lab	PCC	0-0-3	1.5	30	70	100
10	**194GA05615**	Socially Relevant Project	PROJ	-	1	100	-	100
				Total	22.0	370	560	930

L-Lecture, **T**- Tutorial, **P** – Practical, **PROJ**-Project

Open Elective-II (III B. Tech, II-Semester)

Course Code	Course Name	Subject Area	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		CIA	SEE	Total
194GA01609	Low-Cost Housing Techniques	OEC	3	0	0	3	30	70	100
194GA01610	Sustainable Development and Environment Management.	OEC	3	0	0	3	30	70	100
194GA02608	Wind Energy Conversion Systems	OEC	3	0	0	3	30	70	100
194GA02609	Intelligent Control Techniques	OEC	3	0	0	3	30	70	100
194GA03608	Non-Destructive Testing and Evaluation	OEC	3	0	0	3	30	70	100
194GA03609	Alternative Sources of Energy	OEC	3	0	0	3	30	70	100
194GA04609	Principles of Communication Systems	OEC	3	0	0	3	30	70	100
194GA04610	Basics of VLSI	OEC	3	0	0	3	30	70	100
194GA05609	Data Visualization	OEC	3	0	0	3	30	70	100
194GA05610	Mean Stack Technology	OEC	3	0	0	3	30	70	100
194GA52601	Management Science	OEC	3	0	0	3	30	70	100
194GA52602	Entrepreneurship Development	OEC	3	0	0	3	30	70	100

Open Elective-III (III B. Tech, II-Semester)

Course Code	Course Name	Subject Area	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		CIA	SEE	Total
194GA01611	Disaster Management & Mitigation	OEC	3	0	0	3	30	70	100
194GA01612	Architecture and Town Planning	OEC	3	0	0	3	30	70	100
194GA02610	Electrical Engineering Materials	OEC	3	0	0	3	30	70	100
194GA02611	Solar Energy Conversion Systems	OEC	3	0	0	3	30	70	100
194GA03610	Total Quality Management	OEC	3	0	0	3	30	70	100
194GA03611	Industrial Robotics	OEC	3	0	0	3	30	70	100
194GA04611	Introduction to Microcontrollers & Applications	OEC	3	0	0	3	30	70	100
194GA04612	Principles of Digital Signal Processing	OEC	3	0	0	3	30	70	100
194GA05611	Fundamentals of Virtual Reality (VR) / Augmented Reality (AR)	OEC	3	0	0	3	30	70	100
194GA05612	Relational Database Management Systems	OEC	3	0	0	3	30	70	100
194GA51601	Global Warming and Climate Changes	OEC	3	0	0	3	30	70	100
194GA51603	Soft Skills	OEC	3	0	0	3	30	70	100

VII- Semester: IV-I (5Theory +2Labs+Project Stage-I + Internship**)**

S. No.	Course No./ Code	Name of the Course	Category	L-T-P	Credits	Scheme of examination max. marks		
						IM	EM	Total
1	**194GA05701**	Machine learning	PCC	3-0-0	3	30	70	100
2	**194GA05702**	**Professional Elective-IV** Data Analytics	PEC	3-0-0	3	30	70	100
	194GA05703	Wireless Sensor Networks						
	194GA05704	Software Testing Methodologies						
3	**194GA05705**	**Professional Elective-V** Artificial Neural Networks	PEC	3-0-0	3	30	70	100
	194GA05706	Blockchain Fundamentals						
	194GA05707	Software Quality Assurance						
4	**194GA05708**	**Open Elective-IV** Fundamentals of Cyber Security	OEC	3-0-0	3	30	70	100
	194GA05709	Virtualization and Cloud Computing						
5	**194GA05710**	**Open Elective-V** Introduction to Artificial Intelligence	OEC	3-0-0	3	30	70	100
	194GA05711	Mobile Adhoc Networks						
7	**194GA05712**	Machine learning Lab	PCC	0-0-3	1.5	30	70	100
8	**194GA05713**	IoT Lab	PCC	0-0-3	1.5	30	70	100
9	**194GA05714**	Project Stage-I	PROJ	0-0-4	2	50	-	50
10	**194GA05715**	Industrial Training/Internship/Research Projects in National Laboratories/Academic Institutions	PROJ	-	2	100	-	100
				Total:	22.0	360	490	850

L-Lecture, **T**- Tutorial, **P** – Practical, **PROJ**-Project

Open Elective-IV (IV B. Tech, I-Semester)

Course Code	Course Name	Subject Area	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		CIA	SEE	Total
194GA01706	Remote Sensing & GIS	OEC	3	0	0	3	40	60	100
194GA01707	Industrial Waste and Waste Water Management	OEC	3	0	0	3	40	60	100
194GA02707	Energy Storage Systems	OEC	3	0	0	3	40	60	100
194GA02708	Electrical Safety Measures	OEC	3	0	0	3	40	60	100
194GA03710	Industrial Automation	OEC	3	0	0	3	40	60	100
194GA03711	Supply chain management	OEC	3	0	0	3	40	60	100
194GA04708	Electronic Instrumentation	OEC	3	0	0	3	40	60	100

194GA04709	Introduction to Image Processing	OEC	3	0	0	3	40	60	100
194GA05708	Fundamentals of Cyber Security	OEC	3	0	0	3	40	60	100
194GA05709	Virtualization and Cloud Computing	OEC	3	0	0	3	40	60	100
194GA54701	Optimization Techniques	OEC	3	0	0	3	40	60	100
194GA56701	Thin Film Technology and its Applications	OEC	3	0	0	3	40	60	100

Open Elective-V (IV B. Tech, I-Semester)

Course Code	**Course Name**	**Subject Area**	**Periods per week**			**Credits**	**Scheme of Examination Max. Marks**		
			L	T	P		CIA	SEE	Total
194GA01708	Airport, Docks and Harbor Engineering	OEC	3	0	0	3	40	60	100
194GA01709	Hydro Power Engineering	OEC	3	0	0	3	40	60	100
194GA02709	Design of PV systems	OEC	3	0	0	3	40	60	100
194GA02710	Advanced Power Electronics	OEC	3	0	0	3	40	60	100
194GA03712	Basics of Hybrid and Electric Vehicles	OEC	3	0	0	3	40	60	100
194GA03713	Instrumentation	OEC	3	0	0	3	40	60	100
194GA04710	Introduction to Embedded Systems	OEC	3	0	0	3	40	60	100
194GA04711	Design Thinking	OEC	3	0	0	3	40	60	100
194GA05710	Introduction to Artificial Intelligence	OEC	3	0	0	3	40	60	100
194GA05711	Mobile Adhoc Networks	OEC	3	0	0	3	40	60	100
194GA54702	Mathematical Modeling	OEC	3	0	0	3	40	60	100
194GA56702	Optical Physics and its Applications	OEC	3	0	0	3	40	60	100

VIII- Semester: IV-II (2Theory + Project Stage-II**)**

S. No.	Course No./ Code	Name of the Course	Category	L-T-P	Credits	Scheme of examination max. marks		
						IM	**EM**	**Total**
1	**194GA05801**	**Professional Elective-VI** Deep Learning	PEC	3-0-0	3	30	70	100
	194GA05802	Computer Forensics Cyber Security						
	194GA05803	Agile Methodologies						
2	**194GA05804**	**Open Elective-VI** Data Science	OEC	3-0-0	3	30	70	100
	194GA05805	Blockchain Technology and Applications						
3	**194GA05806**	Project Stage-II	PROJ	0-0-14	7	60	140	200
				Total:	13	120	280	400

L-Lecture, **T**- Tutorial, **P** – Practical, **PROJ**-Project

Open Elective-VI (IV B. Tech, II-Semester)

Course Code	**Course Name**	**Subject Area**	**Periods per week**			**Credits**	**Scheme of Examination Max. Marks**		
			L	T	P		CIA	SEE	Total
194GA01804	Green buildings	OEC	3	0	0	3	40	60	100
194GA01805	Road safety and practices	OEC	3	0	0	3	40	60	100
194GA02803	DC Microgrid and Control Systems	OEC	3	0	0	3	40	60	100
194GA02804	Fundamentals of Electric Vehicles Technology and Economics	OEC	3	0	0	3	40	60	100
194GA03805	Computer Integrated Manufacturing	OEC	3	0	0	3	40	60	100
194GA03806	Autotronics	OEC	3	0	0	3	40	60	100
194GA04804	Introduction to Internet of Things	OEC	3	0	0	3	40	60	100
194GA04805	Principles of modern CDMA/MIMO/OFDM wireless communications	OEC	3	0	0	3	40	60	100
194GA05804	Data Science	OEC	3	0	0	3	40	60	100
194GA05805	Blockchain Technology and Applications	OEC	3	0	0	3	40	60	100
194GA51801	Chemical materials for Renewable Energy sources	OEC	3	0	0	3	40	60	100
194GA52801	Effective Professional communication	OEC	3	0	0	3	40	60	100

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Linear Algebra & Calculus

(Common to all Branches)

I B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA54101	BSC	3	1	0	4	30	70	100

Objectives

- This course will illustrate the students in the concepts of Linear Algebra and calculus.
- To equip the students with standard concepts like differentiation, integration at an intermediate to advanced level of mathematics to develop the confidence and ability among the students to handle various applications in their respective core subjects.

Unit I - Linear Algebra (Matrices and Solution of equations)

Basic definitions of matrices Rank of a matrix by echelon form, Normal form, Normal form of PAQ, solving system of homogeneous and non-homogeneous equations linear equations, Eigen values and Eigen vectors and their properties.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Determine the rank of a matrix
2. Solving systems of non-homogeneous linear equations
3. Solving systems of homogeneous linear equations
4. Eigen values and eigenvectors

Unit II - Linear Algebra (Inverse of Matrix and reduction into various forms)

Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, Diagonalization of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Diagonal form and different factorizations of a matrix;
2. Identify special properties of a matrix, such as positive definite, etc.
3. Use this information to facilitate the calculation of matrix characteristics;
4. Understand quadratic forms and their conversions by orthogonal transformation

Unit III - Differential Equations (First order and First degree)

Formation of differential equations, Differential equations of 1^{st} order and 1^{st} degree-variable separable, Homogeneous equations and equations reducible to homogeneous, Exact, Non-exact, Linear and Bernoulli's equations. Applications of Differential equations of 1^{st} order and 1^{st} degree-Newton's law of cooling, Law of Natural growth and decay, Orthogonal trajectories.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Form the differential equations from the given situations
2. Solve the differential equations of first order and first degree
3. Understand the applications of differential equations

Unit IV - Differential Equations (Second and higher order)

Non-Homogeneous linear differential equations of second and higher order with constant co-efficient with RHS term of the type e^{ax}, $\sin ax$, $\cos ax$, polynomials in x, $e^{ax}V(x)$, $xV(x)$. Method of variation of parameters, Cauchy's and Legendre's linear equations, Applications to L- C-R Circuit problems and Deflection of Beams.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Identify the essential characteristics of linear differential equations with constant coefficients.
2. Solve the linear differential equations with constant coefficients by appropriate method.
3. Classify and interpret the solutions of linear differential equations.
4. Formulate and solve the higher order differential equation by analyzing physical situations.

Unit V - Multiple Integrals

Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates

Learning Outcomes:

At the end of this unit, the student will be able to

1. Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates
2. Apply double integration techniques in evaluating areas bounded by region
3. Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics-I & Mathematical methods, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
3. Engineering Mathematics Volume-I & Mathematical methods, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.

Reference Books:

1. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
3. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

Course Outcomes:

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

1. Solve the system of linear and differential equations and evaluate multiple integrals.
2. Understand various operations on matrices and Eigen values and Eigen vectors.
3. Determine the diagonalization of a matrix and quadratic forms.
4. Solve the Differential equations of first order Exact, Linear, Bernouli.
5. Solve the second and higher order differential equations by finding particular integral methods such as eax, sin ax, polynomials in x, eax V(x), x V(x).
6. Determine the surface and volume integrals of cardioids, lemniscates by using Double and Triple integrals.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Applied Physics

(Common to ECE, EEE, CSE)

I B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA56101	BSC	3	0	0	3	30	70	100

Objectives

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its engineering applications.
- To impart knowledge in basic concepts of LASERs and optical fibres along with its engineering applications.
- To explain the significant concepts of magnetic and dielectric materials with their potential applications in the emerging micro-devices.
- To understand the basic knowledge of band theory of solids and identify the importance of semiconductors in the functioning of electronic devices.
- To familiarize the concepts related to superconductors and nano materials with their fascinating applications.

Unit I - Physical Optics

Principle of Superposition – Interference of light – Interference in thin films by reflection – Newton's Rings –determination of the wavelength of a given monochromatic light and refractive index. Applications of interference.

Diffraction – Fresnel and Fraunhofer Diffraction – Single and Double-slit – Diffraction Grating – Applications of diffraction.

Polarization – Polarization by double refraction – Nicol's Prism – Half wave and Quarter wave plate –Applications of Polarization.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Explain about coherent sources and the conditions for sustained interference
2. Identify engineering applications of interference and diffraction
3. Analyze the differences between interference and diffraction with applications
4. Illustrate the concept of polarization of light and its applications
5. Classify ordinary polarized light and extraordinary polarized light

Unit II - Lasers and Fiber Optics

Introduction – Characteristics of LASER – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Pumping Mechanisms – He-Ne LASER, Semiconductor LASER – Applications of the LASER.

Introduction to Optical Fibers – Total Internal Reflection – Construction of optical fibers, Critical angle of propagation – Acceptance angle – Numerical Aperture – Classification of fibers based on refractive index profile & modes – Propagation of electromagnetic wave through optical fiber importance of V number – Block Diagram of Fiber-optic Communication system – Fiber Optics sensors – Medical Applications.

Learning Outcomes:

At the end of this Unit, the students will be able to

1. Understand the basic concepts of LASER light.
2. Apply the concepts to learn the types of LASERs.
3. Identifies the Engineering applications of LASERs.
4. Explain the working principle of optical fibers.
5. Classify optical fibers based on refractive index profile and mode of propagation.

6. Identify the applications of optical fibers in medical, communication and other fields.

Unit III - Band Theory of Solids and Semiconductors

De-Broglie Hypothesis – Schrodinger's Time Independent equation – Particle in one-dimensional potential well – Classical Free Electron Theory – Quantum Free Electron Theory - Fermi-Dirac Distribution – Sources of Electrical Resistance – Band theory of solids - Classification of Solids into Conductors, Semiconductors and Insulators.

Semiconductors: Intrinsic semiconductors - Extrinsic semiconductors; P-type & N-type - Drift and Diffusion currents –Einstein Relation – Hall effect – Applications of Hall effect – Direct and Indirect band gap semiconductors - Working principle of P-N Junction Diode - Applications of Semiconductors.

Learning Outcomes:

At the end of Unit, students will be able to

1. Describe the Schrodinger's wave equations of a particle
2. Explain classical and quantum free electron theory
3. Classify the solids into conductors, semiconductors and insulators
4. Explain the direct and indirect band gap semiconductors
5. Identify the type of semiconductor using Hall effect
6. Describe the working principle of semiconductor diode

Unit IV - Magnetic Materials and Dielectric Materials

Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of magnetic moments – Classification of Magnetic materials – Weiss theory of ferromagnetism (qualitative) – Hysteresis – soft and hard magnetic materials – Magnetic device Applications (Magnetic bubble memory).

Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic and Ionic (Quantitative), Orientation Polarizations (Qualitative) – Lorentz field – Clausius-Mossotti equation – Applications of Dielectrics: Ferro electricity.

Learning Outcomes:

At the end of Unit, students will be able to

1. Classify the magnetic materials based on susceptibility and their temperature dependence
2. Apply the concept of magnetism to magnetic devices
3. Explain the concepts of dielectric constant and polarization in dielectric materials
4. Describe various types of polarizabilities of dielectric materials
5. Discuss Lorentz field and Claussius- Mosotti relation in dielectrics
6. Explain the applications of dielectric and magnetic materials

Unit V - Superconductors and Nano materials

Superconductors – Properties – Meissner's effect – Penetration depth – Type-I and Type-II Superconductors – DC and AC Josephson Effects – BCS Theory – High T_C superconductors – Applications of superconductors.

Nano materials – surface area to volume ratio and quantum confinement – Properties of nano materials: Optical, Electrical, Magnetic and Mechanical properties – Synthesis of nano materials: Top-down – Ball Milling, Bottom-up – Chemical vapour deposition – Applications of Nano materials.

Learning Outcomes:

At the end of Unit, students will be able to

1. Explain how electrical resistivity of solids changes with temperature
2. Classify superconductors based on Meissner's effect
3. Explain BCS theory & Josephson effect in superconductors

4. Identify the nano size dependent properties of nano materials
5. Illustrate the methods for the synthesis and characterization of nano materials
6. Apply the basic properties of nano materials in various Engineering branches

Text Books:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Textbook of EngineeringPhysics" – S. Chand Publications, 11th Edition, 2019.
2. Shatendra Sharma, Jyotsna Sharma, "Engineering Physics", Pearson Education, 2018

Reference Books:

1. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2012.
2. T Pradeep "A Textbook of Nano Science and Nano Technology" – Tata McGrawHill, 2013
3. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc Graw Hill, 2008.
4. Halliday, Resnick and Walker "Fundamentals of Physics" Wiley India Pvt. Ltd.

Course Outcomes:

At the end of the course student will be able to

1. Calculate various physical parameters related to applied physics.
2. Explain the phenomenon of interference, diffraction and polarization and its applications.
3. Describe the construction and working of LASERs and Optical fiber and its applications in different fields.
4. Explain the classification of solids and conductivity in semiconductors.
5. Describe the classification of magnetic materials and types of polarization in dielectric materials.
6. Explain the theory of superconductivity and synthesis of nano materials.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Problem Solving & Programming

(Common to all Branches)

I B. Tech I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05101	**ESC**	3	1	0	4	30	70	100

Objectives

- Introduce the Concept of Algorithm and use it to solve computational problems.
- Teach the syntax and semantics of a C Programming language.
- Demonstrate the use of Control structures of C Programming language.
- Illustrate the methodology for solving Computational problems.

Unit I - Introduction to Programming, Algorithms, Flowcharts and C Programming

Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages. Fifth generation languages, Classification of Programming languages, Structured Programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

Introduction, standardization of C Language, developing programs in C, a simple C program, and parts of C Program revisited, structure of a C Program.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Understand the generations and classification of programming languages.
2. Solve complex problems using language independent notations.
3. Illustrate the steps in compilation of a C Program.

Unit II - Basics of C Programming, Input and output and Control Flow

Variable names, data types and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions precedence and order of evaluation.

Standard input and output, formatted output-printf, formatted input-scanf.

Statements and blocks, if else, else-if, switch, Loops-while and for, Loops-Do- while, break and continue, Goto and Labels.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Recognize the elements of C Programming language.
2. Recognize the formatted input/output functions for I/O operations.
3. Select the control flow structure for solving the problem.

Unit III - Functions and Program Structure, Factoring methods

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables, scope variables, header variables, register variables, block structure, initialization, recursion, the C processor.

Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers, generating prime numbers.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Apply modular approach for solving the problem.
2. Recognize the C pre-processor functions for pre-processing.

3. Solve mathematical problems using C Programming language.

Unit IV - Arrays, Strings & Pointers

Introduction, One-dimensional arrays, strings: one-dimensional character arrays, multi-dimensional arrays, array of strings.

Introduction, understanding memory addresses, address operator, pointer, void pointer, null pointer, use of pointers, arrays and pointers, pointers and strings. Pointers to pointers. Pointers to functions, dynamic memory allocation.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Apply String manipulation functions.
2. Structure the individual date elements to simplify the solutions.
3. Organize homogenous data.
4. Facilitate efficient memory utilization.

Unit V - User defined data types, Variables, Sorting, Searching and Some other Features

Introduction, Structures, unions, enumeration types, bit- fields.

Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, linear search, binary search.

Command line arguments, Variable-length argument list, formatted input- scanf, file access, Error handling- stderr and exit, Line Input and Output, Miscellaneous Functions.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Organize heterogeneous data.
2. Illustrate searching and sorting algorithms based on the type of the data.
3. Understand standard Input/output and Error operations.

Text Books:

1. PradipDey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.
2. R.G. Dromey, "How to Solve it by Computer", 2014, Pearson.
3. Brian W. Kernighan, Dennis M, Ritchie, "The C Programming Language", 2nd Edition, Pearson.

Reference Books:

1. RS Bichkar "Programming with C", 2012, Universities Press.
2. PelinAksoy, and Laura Denardis, "Information Technology in Theory", 2017, Cengage Learning.
3. Byron Gottfried and Jitender Kumar Chhabra, "Programming with C", 4th Edition, 2019, McGraw Hill Education.

Course Outcomes:

At the end of the course student should be able to

1. Recognize the importance of programming language independent constructs.
2. Write the program on a computer, edit, compile, debug, correct, recompile, and run.
3. Select the features of C language appropriate for solving a problem.
4. Apply pointers to file handling and dynamic memory allocation for effective resource utilization.
5. Solve real-world problems using C programs.
6. Organize the data which is more appropriate for solving a problem.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Engineering Graphics

(Common to EEE ECE & CSE)

I B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA03102	ESC	1	0	4	3	30	70	100

Objectives

- Bring awareness that Engineering Graphics is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.
- Instruct the utility of drafting & modelling by using AutoCAD.

Unit I - Introduction to drawing and Projections of points and Straight lines

Introduction to drawing- Principles of orthographic projection – Convention – First angle projections, projections of points. Projection of Straight lines in simple position, inclined to one plane and inclined to both the planes.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the significance of engineering graphics.
2. Sketch the projections of points with respect to different quadrants.
3. Sketch the projections of lines inclined to one or both planes.

Unit II - Projection of planes

Projection of planes, in simple position, inclined to one plane and inclined to both the planes.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Sketch the projections of planes in simple position.
2. Sketch the projections of planes inclined to one plane.
3. Sketch the projections of planes inclined to both planes.

Unit III - Section of solids

Projection of solids, Axis perpendicular to HP, VP, axis inclined to HP, VP and axis inclined to both HP & VP.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Sketch the projections of solids in simple position.
2. Sketch the projections of solids with axis inclined to one plane.
3. Sketch the projections of solids with axis inclined to both the planes.

Unit IV - Isometric projection and Ortho-ISO conversion

Principles of isometric projection- Isometric Scale- Conventions, Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Conversion of Ortho graphic views to isometric views.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain about isometric projections, isometric scale and conventions used.
2. Sketch the isometric views of lines, planes, simple solids.
3. Sketch Conversion of Ortho graphic views to isometric views.

Unit V - ISO-Ortho conversion and Introduction to AUTO CAD

Conversion of isometric Views to Orthographic Views, and. Introduction to AUTO CAD.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Sketch conversion of isometric Views to orthographic Views
2. Use AutoCAD tools in developing 2D and 3D models.

Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers

2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai

Reference Books:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers
2. A textbook of Engineering Drawing, P. J. Shah, S. Chand Publishers
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, K.C. John, PHI,2013
5. Engineering Drawing, B.V.R. Guptha, J.K. Publishers
6. Engineering Graphics using Auto CAD, T. Jeyapoovan, Vikas publishing house.

Course Outcomes:

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

1. Sketch the projections of points and lines.
2. Sketch the projections of planes with axis inclined to one and both planes manually.
3. Sketch the projections of solids in simple positions.
4. Sketch the projections of solids inclined to both planes.
5. Sketch isometric views of planes and simple solids and conversion of orthographic views to isometric views.
6. Sketch the conversion of isometric views to orthographic views and use AutoCAD tools in developing 2D and 3D models.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Engineering Workshop Practice

(Common to EEE, ECE & CSE)

I B. Tech I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA03104	**ESC**	0	0	2	1	30	70	100

Objectives

- To familiarize students with wood working, sheet metal operations, electrical house wiring, Arc welding skills, CNC machines and pick and place robot.

List of Experiments

Trade 1: Wood Working

Familiarity with different types of woods and tools used in wood working and make following joints

a) Half – Lap joint b)
b) Mortise and Tenon joint
c) Corner Dovetail joint or Bridle joint

Trade 2: Sheet Metal Working

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a) Tapered tray
b) Conical funnel
c) Elbow pipe
d) Brazing

Trade 3: Electrical Wiring

Familiarities with different types of basic electrical circuits and make the following connections

a) Parallel and series
b) Two-way switch
c) Godown lighting
d) Tube light
e) Three phase motors
f) Soldering of wires

Trade 4: Arc Welding

Familiarity with different types of tools used in Arc welding, and make the following joints

a) Lap joint
b) Butt joint.

Trade 5: CNC demonstration

Demonstration of CNC lathe, CNC Milling and 5 Axis robot arm.

Text Books:

1. K. Venkata Reddy Workshop Mannual 6th Ed., B.S. Publishers, 2013.
2. B.L. Juneja Workshop practice 1st Ed., Cengage, 2015.

Course Outcomes:

At the end of the course the student will be able to

1. Use tools for various workshop operations.
2. Apply wood working skills in real world applications.
3. Build different parts with metal sheets in real world applications.
4. Apply different types of basic electric circuit connections.
5. Demonstrate soldering.
6. Demonstrate CNC machine and industrial manipulator.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Mechanical Engineering Workshop

(Mechanical Engineering)

I B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA03105	ESC	0	0	2	1	30	70	100

Objectives

- Familiarize moulding and casting skills.
- Train on different types welding joints.
- Develop assemble or disassembly skills.
- Make plastic components.
- Familiarize with use power tools.
- Demonstrate assembly of computer and installation of software

List of Mechanical Engineering Workshop

Trade 1: Foundry Practice: (2 Sessions)

a) Determination of average grain size for sand sample using sieve shaker
b) Preparation of a green sand mould using single piece pattern
c) Preparation of a green sand mould using split piece pattern with core and demonstration of casting.

Trade 2: Welding Practice: (2 Sessions)

a) Lap joint, butt joint and T joint using arc welding.
b) Lap joint using resistance spot welding
c) Lap and butt joints using gas welding

Trade 3: Assembling/Disassembling Practice: (3 Sessions)

a) Bicycle
b) Clutch and carburetor
c) Two wheeler engine parts
d) Desktop Computer and installation of Operating system Software

Trade 4: Manufacture of a Plastic Component (2 Sessions)

a) Use of injection moulding machine
b) FRP composite using hand layup method
c) Joining of plastic components

Trade 5: Manufacturing any two domestic utility products with any material by above methods (2 Sessions) Use of Power Tools (2 Sessions)

Drilling, Cutting, Planing, Finishing, etc. on wood or metals

Text Books:

1. K. Venkata Reddy Workshop Mannual 6th Ed., B.S. Publishers, 2013.
2. B.L. Juneja Workshop practice 1st Ed., Cengage, 2015.

Course Outcomes:

At the end of the lab the student will be able to

1. Determine average grain size, and make moulds for different types of sand casting.
2. Develop different weld joints by using different types of welding techniques.
3. Assemble desktop computer and install operating system.
4. Assemble or disassemble of engine parts.
5. Make plastic components by using different methods.
6. Use power tools for different applications.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Applied Physics Lab

(Common to EEE, ECE & CSE)

I B. Tech I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA56102	**BSC**	0	0	3	1.5	30	70	100

Objectives

- Understands the concepts of interference and diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of the energy gap in the study of conductivity and hall-effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

List of Experiments

1. Determine the thickness of the wire using wedge shape method.
2. Determination of the radius of curvature of the lens by Newton's ring method.
3. Determination of wavelength by plane diffraction grating method.
4. Dispersive power of a diffraction grating.
5. Determination of dielectric constant by charging and discharging method.
6. Determine magnetic field along the axis of a circular coil carrying current.
7. Determine the resistivity of semiconductor by Four probe method.
8. Determine the energy gap of a semiconductor.
9. Study the variation of B versus H by magnetizing the magnetic material (B – H curve).
10. Determine the numerical aperture of a given optical fiber and hence to find its acceptance angle.
11. Determination of dispersive power of prism using the spectrometer.
12. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.

Note: In the above list, out of 12experiments, any 10 experiments must be performed in a semester

Reference Books:

1. S. Balasubramanian, M.N. Srinivasan "A Textbook of Practical Physics"–S Chand Publishers, 2017.

Course Outcomes:

At the end of the course the student will be able to

1. Recognize the importance of optical phenomena like interference, diffraction, dispersion and their applications.
2. Calculate the variation of magnetic field by passing current through the circular coil.
3. Determine the energy gap of a p-n junction diode and dielectric constant of a given material.
4. Determine the wavelengths of different colours from mercury Vapour lamp by using diffraction grating.
5. Determine the acceptance angle and numerical aperture of an optical fibre.
6. Determine the energy loss in magnetic materials from B-H curve.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Problem Solving & Programming Lab

(Common to all Branches)

I B. Tech I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05102	**ESC**	0	0	4	2	30	70	100

Objectives

- Learn C Programming Language.
- To make the students solve problems, implement algorithms using C language.

List of Experiments

1. Design a C program which reverses the number.
2. Design a C program which finds the second maximum number among the given list of numbers.
3. Construct a program which finds the k^{th} smallest number among the given list of numbers.
4. Design an algorithm and implement using C language the following exchanges a□b □c□d
5. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.
6. Implement the C program which computes the sum of the first n terms of the series Sum = 1 – 3 + 5 -7 + 9.
7. Design a C program which determines the numbers whose factorial values are between5000 and 32565.
8. Design an algorithm and implement using a C program which finds the sum of the infinite series$1 - x^2/2! + x^4/4! - x^6/6! + ...$
9. Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.
10. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.
11. Develop an algorithm which computes the all the factors between 1 to 100 for a given number and implement it using C.
12. Construct an algorithm which computes the sum of the factorials of numbers between m and n.
13. Design a C program which reverses the elements of the array.
14. Implement a C program to perform the following operations on Matrices:
    a. Addition b. Subtraction c. Multiplication
15. Implement C program to perform string manipulations.
16. Given a list of n numbers, design an algorithm which prints the number of stars equivalent to the value of the number. The starts for each number should be printed horizontally.
17. Implement the sorting algorithms: a. Insertion sort b. Exchange sort c. Selection sort
    d. Partitioning sort.
18. Illustrate the use of auto, static, register and external variables.
19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.
20. Design a C program which sorts the strings using array of pointers.

The above list is not exhaustive. Instructors may add some experiments to the above list. Moreover, 50% of the experiments are to be changed every academic year. Instructors can choose the experiments, provided those experiments are not repetitions.

Reference Books:

1. YashavantKanetkar, "Let Us C", 16th edition, BPB Publications.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.

Course Outcomes:

At the end of the course the student will be able to

1. Select the right control structure for solving the problem.
2. Analyze different sorting algorithms.
3. Find solutions for computational problems.
4. Develop C programs which utilize the memory efficiently using programming constructs like pointers.
5. Develop logic for solving different problems.
6. Understand the command line arguments and its applications.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Basic Electrical & Electronics Engineering

(Common to MEC & CSE)

I B.Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA02201	ESC	3	0	0	3	30	70	100

PART-A

Basic Electrical Engineering

Objectives

- To introduce basics of electric circuits.
- To teach DC and AC electrical circuit analysis.
- To explain working principles of transformers and electrical machines.
- To impart knowledge on Measuring Instruments.

Unit I – DC & AC Circuits

Electrical circuit elements (R - L and C) – Kirchhoff's laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - 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 RL - RC - RLC series circuits.

Learning Outcomes:

1. Recall Kirchoff's laws
2. Analyze simple electric circuits with DC excitation.
3. Apply network theorems to simple circuits.
4. Analyze single phase AC circuits consisting of series RL - RC - RLC combinations.

Unit II - DC & AC Machines

Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single Phase Transformer - OC and SC test on transformer - principle and operation of Induction Motor [Elementary treatment only]

Learning Outcomes:

1. Explain principle and operation of DC Generator &Motor.
2. Perform speed control of DC Motor.
3. Explain operation of transformer and induction motor.
4. Explain construction & working of induction motor – DC motor.

Unit III - Measuring Instruments

Introduction, classification of instruments, operating principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) and moving Iron instruments (Voltmeters and Ammeters)- Extension of range of the meters.

Learning Outcomes:

1. Explain principle and operation of Measuring Instruments.
2. Explain the need to Extend the range of the meters.

Text Books:

1. D. P. Kothari and I. J. Nagrath - "Basic Electrical Engineering" - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, "Principles of Power System" – S. Chand –2018.

Reference Books:

1. L. S. Bobrow - "Fundamentals of Electrical Engineering" - Oxford University Press - 2011.
2. E. Hughes - "Electrical and Electronics Technology" - Pearson -2010.
3. C.L. Wadhwa – "Generation Distribution and Utilization of Electrical Energy", 3rd Edition, New Age International Publications.

Course Outcomes:

After the completion of the course the student will be able to:

1. Apply concepts of KVL/KCL in solving DC circuits.
2. Choose correct rating of a transformer for a specific application.

3. Illustrate working principles of induction motor - DC Motor.

PART-B

Basic Electronics Engineering

Objectives:

- To provide comprehensive idea about working principle, operation and applications of PN junction & zener diodes, BJT, FET, MOSFET and operational amplifier.
- To introduce fundamentals of digital electronics
- To teach efficacy of electronic principles which are pervasive in engineering applications

Unit I – Analog Electronics-I

Overview of Semiconductors, PN junction diode, Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, special purpose diodes: schottky diode, tunnel diode, varactor diode, photodiode, phototransistor and LED.

Learning Outcomes:

1. Describe operation and characteristics of diodes.
2. Make use of diodes in simple, typical circuit applications.
3. Understand operation of special purpose diodes.

Unit II - Analog Electronics-II

BJT construction, operation, configuration and characteristics, JFET and MOSFET construction, operation, characteristics (CS configuration), applications Operational Amplifiers: Introduction, block diagram, basic op-amp circuits: Inverting, Non Inverting, summer, subtractor, voltage follower.

Learning Outcomes:

1. Describe operation and characteristics of BJT, JFET and MOSFET.
2. Make use of transistors in simple, typical circuit applications.
3. Understand operation of basic op-amp circuits.

Unit III – Digital Electronics

Introduction, Switching and Logic Levels, Digital Waveform, characteristics of digital ICs, logic gates, number systems, combinational circuits - adders, multiplexers, decoders; introduction to sequential circuits, flip flops, shift register, binary counter.

Learning Outcomes:

1. Explain different logic gates using truth table.
2. Distinguish combinational and sequential circuits.
3. Analyze various combinational circuits such as adders, multiplexers and decoders.
4. Understand functionality of flip-flops, shift registers and counters.

Text Books:

1. D.P. Kothari, I.J. Nagrath, Basic Electronics, 2nd edition, McGraw Hill Education (India) Private Limited
2. K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India Private Limited.

Reference Books:

1. R. Muthusubramanian, S. Salivahanan, "Basic Electrical and Electronics Engineering", Tata McGraw-Hill Education, Reprint2012.
2. David Bell, Electronic Devices and Circuits: Oxford University Press, 5th Edn. 2008.

Course Outcomes:

After the completion of the course the student will be able to:

1. Apply the diode characteristics in simple and typical circuit applications.
2. Apply the transistor characteristics in simple and typical circuit applications.
3. Apply the design procedure to combinational circuits, flip-flops and shift registers.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Transforms & Partial Differential Equations

(Common to all Branches)

I B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA54201	**BSC**	3	1	0	4	30	70	100

Objectives

- This Course aims at providing the student with knowledge on different types of transforms and Partial differential equations.

Unit I - Laplace Transforms

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function. Differentiation and integration of transform – Application of Laplace transforms to ordinary differential equations of first and second order.

Learning Outcomes:

At the end of this unit, students will be able to

1. Understand Laplace transforms.
2. Apply properties of Laplace transforms.
3. Understand Laplace transforms of special functions.
4. Apply Inverse Laplace transforms.
5. Apply Laplace transforms to solve Differential Equations.

Unit II - Fourier series

Fourier series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions- Parseval's formula- Complex form of Fourier series.

Learning Outcomes:

At the end of this unit, the students will be able to

1. Understand Fourier Series.
2. Determine Fourier Coefficients.
3. Understand Even and Odd functions.
4. Apply Fourier Series in arbitrary intervals.
5. Find Half range Fourier Sine and Cosine expansions.

Unit III - Fourier transforms

Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

Learning Outcomes:

At the end of this unit, the students will be able to

1. Calculate Fourier Sine and Cosine integrals.
2. Understand Fourier transforms.
3. Apply Fourier Sine and Cosine transforms in evaluating integrals.
4. Apply properties of Fourier transforms.
5. Understand Finite Fourier transforms.

Unit IV - Z-transforms

Z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand Z transforms.
2. Apply properties of Z transforms.
3. Understand Initial and Final value theorems.
4. Prove Convolution theorem in Z transforms.

5. Apply Z transforms to solve Difference Equations.

Unit V - Partial Differential Equations & Applications

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.

Learning Outcomes:

At the end of this unit, the students will be able to

1. Form Partial Differential Equations.
2. Solve Partial Differential Equations.
3. Understand Initial and boundary conditions problems.
4. Solve applications of Partial Differential Equations.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics-II, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
3. Engineering Mathematics Volume-II, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.

Reference Books:

1. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
3. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

Course Outcomes:

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

1. Solve different kinds of transforms and partial differential equations.
2. Solve the differential equations of first and second order by applying Laplace transform method.
3. Apply Fourier sine and cosine series expansions to evaluate and interpret the given functions.
4. Apply Fourier sine and cosine transform to evaluate the given functions.
5. Solve the difference equations by applying z-transform.
6. Solve one dimensional wave, heat and two dimensional Laplace's equation under initial and boundary conditions.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Chemistry

(Common to EEE ECE & CSE)

I B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA51201	**BSC**	3	0	0	3	30	70	100

Objectives

- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry and polymers.
- To impart the concept of soft and hard waters, softening methods of hard water.

Unit I - Water Quality and Treatment

Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity, acidity, Water treatment for domestic purpose (Chlorination, Bleaching powder, ozonization)

Industrial Use of water: For steam generation, troubles of Boilers: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

External Treatment: Ion-Exchange and Permutit processes. Demineralisation of brackish water: Reverse Osmosis and Electro dialysis.

Learning Outcomes:

At the end of this unit, students will be able to

1. List the differences between temporary and permanent hardness of water.
2. Explain the principles of reverse osmosis and electrodialysis.
3. Illustrate problems associated with hard water - scale and sludge.
4. Explain the working principles of different Industrial water treatment processes.

Unit II - Electrochemistry and Applications:

Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode) electrochemical cell, Nernst equation, cell potential calculations, numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations), photovoltaic cell – working and applications, photo galvanic cells with specific examples.

Primary cells – Zinc-air battery, Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells. Secondary cells – lead acid, and lithium ion batteries- working of the batteries including cell reactions

Learning Outcomes:

At the end of this unit, students will be able to

1. Apply Nernst equation for calculating electrode and cell potentials.
2. Differentiate between pH metry, potentiometric and conductometric titrations.
3. Explain the theory of construction of battery and fuel cells.
4. Solve problems based on cell potential.

Unit III - Fuels and Combustion

Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems.

Solid Fuels: Coal-Classification and Analysis (proximate), Coke: Characteristics of metallurgical coke, Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

Liquid Fuels: Petroleum: Refining of Petroleum, Gasoline- Octane Number, Diesel -Cetane Number, Synthetic Petrol: Bergius Processes, Fischer Troph"s synthesis Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol Gaseous Fuels: Natural gas, Producer gas, Water gas, Coal gas and Biogas.

Combustion: Basic principles and numerical problems.

Learning Outcomes:

At the end of this unit, students will be able to

1. Solve the numerical problems based on Calorific value.

2. Select suitable fuels for IC engines.
3. Explain calorific values, octane number, refining of petroleum.

Unit IV - Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.
Plastics - Thermoplastics and Thermosetting. Preparation, properties and applications of – Bakelite, Nylons, Processing and vulcanisation of natural rubber
Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications. Inorganic polymers (Polysilicon's)-preparation, properties and applications

Learning Outcomes:
At the end of this unit, students will be able to
1. Explain the different types of polymers and their applications.
2. Explain the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres.
3. Describe the mechanism of conduction in conducting polymers.
4. Discuss Buna-S and Buna-N elastomers and their applications.

Unit V - Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. Principle and applications of pH metry, potentiometry, conductometry, UV-Visible, IR and NMR Spectroscopies. Principles of Gas Chromatography (GC) and High-Performance Liquid Chromatography (HPLC), separation of gaseous mixtures and liquid mixtures.

Learning Outcomes:
At the end of this unit, students will be able to
1. Explain the different types of spectral series in electromagnetic spectrum.
2. Understand the principles of different analytical instruments.
3. Explain the different applications of analytical instruments.

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Engineering Chemistry, First Edition, Jayaveera KN, Subba Reddy GV and Ramachandraiah C, McGraw Hill Higher Education, New Delhi, 2013

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007
2. A Text book of Engineering Chemistry, 12th Edition, SS Dhara,Uma, S. Chand Publications, New Delhi, 2010.
3. Engineering Chemistry, First edition, K.B. Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH Publications India Pvt Limited, 2010.

Course Outcomes:

At the end of course, students will be able to
1. Explain the analysis of water, boiler troubles and demineralization techniques.
2. Calculate the emf of the cells and batteries by Nernst equation.
3. Able to explain the construction and working of batteries and fuel cells, redox and conductometric titrations.
4. Able to discuss the types, preparation, properties and applications of solid, liquid and gaseous fuels.
5. Able to discuss the types, preparation and properties of polymers.
6. Able to discuss the principle and applications of P^H metry, potentiometry, conductometry, gas and HPLC Chromatography.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Data Structures

(Common to EEE, MEC, ECE & CSE)

I B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05201	ESC	3	0	0	3	30	70	100

Objectives

- To teach the representation of solution to the problem using algorithm.
- To explain the approach to algorithm analysis.
- To introduce different data structures for solving the problems.
- To demonstrate modeling of the given problem as a graph.
- To elucidate the existing hashing techniques.

Unit I – Introduction to Data Structures

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Quick sort, How fast can we sort, Merge sort, Heap sort.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Analyze the given algorithm to find the time and space complexities.
2. Select appropriate sorting algorithm.
3. Design a sorting algorithm.

Unit II - Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Evaluate expressions.
2. Develop the applications using stacks and queues.
3. Construct the linked lists for various applications.

Unit III - Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: BTrees, B + Trees.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the concept of a tree.
2. Compare different tree structures.
3. Apply trees for indexing.

Unit IV - Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure.
Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Recognize the importance of Graphs in solving real world problems.
2. Apply various graph traversal methods to applications.
3. Design a minimum cost solution for a problem using spanning trees.
4. Select the appropriate hashing technique for a given application.
5. Design a hashing technique.

Unit V - Files and Advanced Sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.
Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Organize data in the form of Files.
2. Apply sorting on large amount of data.

Text Books:

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structures in C", 2nd Edition, Galgotia Book Source, Pvt. Ltd., 2004.
2. Alan L. Tharp, "File Organization and Processing", Wiley and Sons, 1988.

Reference Books:

1. D. Samanta, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Peter Bras, "Advanced Data Structures", Cambridge University Press, 2016.
3. Richard F.Gilberg, Behrouz A.Forouzan, "Data Structures A Pseudo code Approach with C", Second Edition, Cengage Learning 2005.

Course Outcomes:

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

1. Select Appropriate Data Structure for solving a real world problem.
2. Select appropriate file organization technique depending on the processing to be done.
3. Construct Indexes for Databases.
4. Analyze the Algorithms.
5. Develop Algorithm for sorting large files of data.
6. Develop algorithms for searching data and files.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Communicative English-I

(Common to all Branches)

I B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA52101	**HSMC**	2	0	0	2	30	70	100

Objectives

- To enable students improve their lexical, grammatical and communicative competence.
- To comprehend the given texts and respond appropriately.
- Focus on appropriate reading strategies and reinforce language skills for comprehension of various academic texts and authentic material.
- To provide them an intensive training in writing skills.

Unit I

Lesson: The Death Trap: *Saki*
Grammar: Noun-Pronoun Agreement, Subject-Verb Agreement
Vocabulary Building: Word Formation III–Prefixes and Suffixes from Other Languages Writing: Principles of good writing, paragraph writing
Speaking: Making Request and Responding to Them Reading: Time Management: On Saving Time by *Seneca*

Learning outcomes:
At the end of Unit, students will be able to:

1. Recognize the relation between noun and pronoun and construct meaningful sentences using subject-verb agreement rules to reduce errors in writing.
2. Construct new words using prefixes and suffixes to enlarge the lexical knowledge and connect ideas using the principles, techniques of paragraph writing and paraphrasing.
3. Apply the useful phrases for making requests and responding to them in day-to-day conversations.

Unit II

Lesson: Self-Improvement: How I Became a Public Speaker by *George Bernard Shaw*
Grammar: Articles, Tenses
Vocabulary Building: Word Formation II–Root words from Other Languages Writing: Punctuation and Spelling
Speaking: Getting Someone's Attention and Interrupting Reading: The Brook: *Alfred Tennyson*

Learning outcomes:
At the end of Unit, students will be able to:

1. Identify the use of articles and tenses in a context and recognize the purposes of punctuation and correct spelling for better writing skills.
2. Memorize the root words and other word formation strategies to enrich the vocabulary.
3. Express to others using appropriate phrases for improving speaking skills.

Unit III

Lesson: Values and Ethics: If (poem) by *Rudyard Kipling*
Grammar: Prepositions and Question tags
Vocabulary Building: Word Formation –Introduction to Word formation, Homophones, homographs and homonyms
Writing: If-Clauses and Sentences, Letter writing Speaking: Introducing Oneself and others Reading: On the Conduct of Life: *William Hazlitt*

Learning outcomes:
At the end of Unit, students will be able to

1. Understand the text to make effective comprehension and recall the use of prepositions and question tags
2. Define the uses of affixes and other word formation strategies to enhance vocabulary.
3. Recognize the differences between clauses and sentences to excel in writing skills and practice the techniques of introducing to improve better speaking skills.

Unit IV

Lesson: Innovation: Muhammad Yunus Grammar: Misplaced Modifiers, Modals Vocabulary Building: Synonyms and antonyms Writing: Essay writing
Speaking: Role Plays for practice of Conversations Reading: Chindu Yellama

Learning outcomes:

At the end of Unit, students will be able to

1. Identify the use of modifiers for producing meaningful and grammatically correct sentences.
2. Reproduce and rewrite the words in sentences by choosing similar and opposite words.
3. Apply the methods and techniques to write coherent and meaningful essays.
4. Practice the conversations using situations and apply the knowledge in enhancing their conversational skills.

Unit V

Lesson: Politics and the English Language: *George Orwell* Grammar: Redundancies and Clichés and conjunctions Vocabulary Building: Common Abbreviations
Writing: Writing a Summary Speaking: Formal Oral Presentations
Reading: Motivation: The Dancer with a White Parasol by *Ranjana Dave*

Learning outcomes:

At the end of Unit, students will be able to

1. Analyze the roles of redundancies and clichés in producing meaningful and grammatically correct sentences.
2. Discuss various commonly used abbreviations and explain their full forms for better understanding.
3. Develop a paragraph by applying the strategies of writing summaries to improve writing skills.
4. Design and develop oral presentations to perform in front of the audience.

Text Books:

1. Language and Life: A Skills Approach, Vol. I, Orient Blackswan Private Limited, First Edition 2018

Reference Books:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course Outcomes:

At the end of the course, students will be able to

1. Understand explicit and implicit meaning of a text.
2. Remember and produce academic vocabulary appropriately orally and in writing.
3. Apply relevant formats of letter writing, essay writing and writing summary.
4. Analyse the use of grammar to construct meaningful sentences with suitable word choices.
5. Evaluate comprehensive skills through listening and reading texts on Life Skills
6. Create situations in order to enhance speaking skills in introducing, requesting and responding.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Communicative English-I Lab

(Common to all Branches)

I B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA52102	HSMC	0	0	2	1	30	70	100

Objectives

- Students will be exposed to a variety of self instructional, learner friendly modes of language learning
- Students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.
- Students will learn better pronunciation through stress, intonation and rhythm
- Students will be trained to use language effectively to face interviews, group discussions, public speaking

List of Sessions

Session-I

1. Introduction to Phonetics
2. Vowels and consonants sounds

Session-II

1. Syllables
2. Syllabification

Session-III

1. Stress: Word & Sentence stress
2. Rules for stress

Session-IV

1. Intonation
2. Falling and rising tone

Session-V

1. Listening skills: Types of listening
2. Listening to small talks
3. Listening to vocabulary

Session-VI

1. Impromptu speech
2. Describing person/objects/situations

Session-VII

1. Giving directions
2. Telephonic skills

Session-VIII

1. Oral Presentations
2. Situational dialogues/Role plays

Session-IX

1. Debates
2. Group Discussions

Session-X

1. Reading Skills- Reading comprehension

Reference Books:

1. A Textbook of English Phonetics for Indian Students by T. Bala subramanian, Macmillan Publishers (2012).
2. Exercises in Spoken English, Part 1,2 & 3(1997), CIEFL Hyderabad, Oxford, India.
3. Communication Skills for Engineers by Sunita Mishra & C. Muralikrishna, Pearson Education India (2011).

Course Outcomes:

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

1. Remember Phonemic sounds and reading comprehension skills (LR)
2. Understand write-up skills through describing objects/places/persons (W).

3. Apply an enrich language to enhance for a better speaking skill through JAM, Small talks and Debates.
4. Analyze different ways of greetings in introducing oneself/others, to a well nit summarizing while listening lectures, using enrich vocabulary to reduce errors in speech and writing.
5. Evaluate various ways of communication- verbal and non-verbal cues.
6. Create awareness on mother tongue influence and neutralise it in order to improve fluency in spoken English.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Computer Science and Engineering Workshop

(Computer Science & Engineering)

I B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05203	**ESC**	0	0	3	1.5	30	70	100

Objectives

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations.
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system.
- Teach them how to connect two or more computers.
- Introduce to the Raspberry Pi board.
- Explain storytelling by creating Graphics, Webpages and Videos.

Preparing your Computer:

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps).Students should record the process of assembling and troubleshooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Productivity tools:

Task 5: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 6: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 7: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Networking:

Task 8: Wired network: Select a LAN cable, Identify the wires in the cable, Define the purpose of each wire, Study the RJ45 connecter, Use crimping tool to fix the cable to the connecter, Test the cable using LAN tester, Connect two or more computers using cross and straight cables, Configure the computers, share the data between the computers.

Task 9: Wireless network Connect the wireless LAN card or identify the built-in wireless LAN card, configure four computers using adhoc mode and share the data, connect four computers using infrastructure mode (Access point) and share the data.

IoT:

Task 10: Raspberry Pi
Study the architecture of Raspberry pi, configure software, Install SD card, Connect the cables, Install Raspbian (or any other) operating system, Configure Wi-Fi, Remotely connect to your Raspberry Pi.

Story Telling:
Task 11: Storytelling
Use Adobe spark or any other tool to create Graphics, Webpages, and Videos.

Reference Books:

1. B. Govindarajulu, "IBM PC and Clones Hardware Trouble shooting and Maintenance", 2nd edition, Tata McGraw-Hill, 2002
2. "MOS study guide for word, Excel, Powerpoint& Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. "Introduction to Information Technology", ITL Education Solutions limited, Pearson Education.
4. Rusen, "Networking your computers and devices", PHI
5. Bigelows, "Trouble shooting, Maintaining& Repairing PCs", TMH. https://www.adobe.com
6. https://www.raspberrypi.org

Course Outcomes:

At the end of the course the student will be able to

1. Construct a computer from its parts and prepare it for use.
2. Develop Documents using Word processors.
3. Develop presentations using the presentation tool.
4. Perform computations using spreadsheet tool.
5. Connect computer using wired and wireless connections.
6. Design Graphics, Videos and Web pages.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Basic Electrical & Electronics Engineering Lab

(Common to MEC & CSE)

I B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA02202	ESC	0	0	3	1.5	30	70	100

PART-A : Electrical Engineering Lab

Objectives:

- To Verify Kirchoff's laws
- To verify Superposition theorem.
- To learn performance characteristics of DC Machines.
- To perform open circuit & Short Circuit test on 1- Phase Transformer.
- To Study the I – V Characteristics of Solar PV Cell

List of Experiments

1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Open circuit characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Brake test on 3 - Phase Induction Motor.
7. I – V Characteristics of Solar PV cell
8. Brake test on DC Shunt Motor.

Note: Any 5 of the above experiments are to be conducted

Course Outcomes:

After the completion of this course students will be able to:

1. Verify Kirchoff's Laws & Superposition theorem.
2. Perform testing on AC and DC Machines.
3. Study I – V Characteristics of PV Cell

PART-B: Electronics Engineering Lab

Objectives:

- Describe construction, working and characteristics of diodes, transistors and operational amplifiers.
- Demonstrate how electronic devices are used for applications such as rectification, switching and amplification
- Build different building blocks in digital electronics using logic gates
- Explain functionality of flip-flops, shift registers and counters for data processing applications
- Explain functioning of various communication systems

List of Experiments

1. Draw and study the characteristics of Semi-conductor diode and Zener Diode.
2. Draw and study the input and output characteristics of Transistor in Common Emitter configuration.
3. Draw and study the static and transfer characteristics of FET in Common Source Configuration.
4. Construct half wave and full wave rectifier circuits. Find ripple factor and plot their output waveforms with and without filters.
5. Study the application of Op-amp as an Inverting amplifier, Non-inverting amplifier, Voltage follower, Summer and Subtractor.
6. Realization of logic gates, AND, OR, NOT, NAND, NOR,XOR.
7. Realization of Adders, Multiplexers and Decoders using logic gates.

8. Realization of flip-flops using logic gates.

Note: Any 5 of the above experiments are to be conducted

Course Outcomes:

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

1. Describe construction, working and characteristics of diodes, transistors and operational amplifiers.
2. Build different building blocks in digital electronics using logic gates.
3. Demonstrate electronic devices used for rectification applications.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Chemistry Lab

(Common to EEE, ECE and CSE)

I B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA51202	**BSC**	0	0	3	1.5	30	70	100

Objectives

- To Verify the fundamental concepts with experiments

List of Experiments

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Determination of Alkalinity of Water.
4. Estimation of Dissolved Oxygen by Winkler's method.
5. Conductometric estimation of strong acid using standard sodium hydroxide solution
6. pH metric titration of strong acid vs. strong base.
7. Estimation of Ferrous Iron by Dichrometry.
8. Potentiometry - determination of redox potentials and emfs.
9. Determination of Strength of an acid in Pb-Acid battery.
10. Preparation of a polymer.

Reference Books:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – Mendham J et al, Pearson Education, 2012.
2. Chemistry Practical– Lab Manual, First edition, Chandra Sekhar KB, Subba Reddy GV and Jayaveera KN, SM Enterprises, Hyderabad, 2014.

Course Outcomes:

At the end of the course, students will be able to

1. Determine the redox potentials and emf of solutions by potentiometry.
2. Determine the weight of prepared of organic polymers.
3. Estimate the hardness, alkalinity and dissolved oxygen of water.
4. Estimate the amount of Cu+2, Fe+2 in given samples.
5. Determine the strength of acids by conductometer& PH meter.
6. Determine the strength of acid in Pb acid battery.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Data Structures Lab

(Common to EEE, MEC, ECE and CSE)

I B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05202	ESC	0	0	3	1.5	30	70	100

Objectives

- To introduce to the different data structures.
- To elucidate how the data structure selection influences the algorithm complexity.
- To explain the different operations that can be performed on different data structures.
- To introduce to the different search and sorting algorithms.

List of Experiments

1. String operations using array of pointers.
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements. The time for other operations like I/O etc should not be considered while computing time.
4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List.
5. Stack implementation using arrays.
6. Stack implementation using linked lists.
7. Queue implementation using arrays. Implement different forms of queue. While implementing you should be able to store elements equal to the size of the queue. No positions should be left blank.
8. Queue implementation using linked lists.
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search.
11. Depth first search.
12. Travelling sales man problem.
13. File operations.
14. Indexing of a file.
15. Reversing the links (not just displaying) of a linked list.
16. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using 'Ladies first' principle. You may create new linked lists if necessary.
17. An expression can be represented in three ways: infix, prefix and postfix. All the form are necessary in different contexts. Write modules to convert from one form to anothe form.
18. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table. The values can be of different data types. Numerical operations like summation, average etc can be performed onrows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table. User may like to remove row/column. Create table datatype and support different operations on it.

Reference Books:

1. Data Structures using C and C++, Yedidyah Langsam. Moshe J. Augenstein Aaron M. Tenenbaum, 2nd Edition, PHI.
2. Data Structures using C & C++, Rajesh K. Shukla, Wiley-India.
3. ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson.

Course Outcomes:

At the end of the lab the student will be able to

1. Select the data structure appropriate for solving the problem.
2. Implement searching and sorting algorithms.
3. Design new data types.
4. Illustrate the working of stack and queue.
5. Organize the data in the form of files.
6. Implement applications of graphs and trees.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Multivariable Calculus & Numerical methods

(Common to all branches of Engineering)

II B. Tech I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA54301	**BSC**	2	1	0	3	30	70	100

Objectives

- This course aims at providing the student with the knowledge on the concepts of Vector Calculus.
- Various numerical methods for solving equations, interpolating the polynomials, evaluation of integral equations and solution of differential equations.
- Fitting of various curves.

Unit I – Vector Calculus

Gradient – Divergence – Curl and their properties; Vector integration – Line integral- Potentia function – Area – Surface and volume integrals. Vector integral theorems: Greens theorem – Stokes and Gauss Divergence Theorem (Without proof). Application of Green's, Stoke's and Gauss's Theorems.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the concepts of Gradient – Divergence – Curl and their properties in vectors.
2. Solve problems on Vector integration – Line integral- Area – Surface and volume integrals.
3. Solve problems on Vector integral theorems: Greens theorem – Stokes and Gauss Divergence Theorem.
4. Apply of Green's, Stoke's and Gauss's Theorems to evaluate the length, surface area and
5. volume enclosed by curves.

Unit II – Functions of single and several variables

Functions of single variable; limit, continuity, and differentiability**,** Mean value theorems, local maxima and minima**,** Taylor's and Maclaurin's Series - Functions of several variables –Partia derivatives-Total derivatives– Jacobian – Maxima and Minima of Functions of two variables, Lagrange's method of undetermined Multipliers with three variables only.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Solve problems on function of single variables i.e. continuity, and differentiability**.**
2. Solve problems on Mean value theorems, local maxima and minima**,** Taylor's and Maclaurin's Series.
3. Understand Partial derivatives-Total derivatives– Jacobian – Maxima and Minimaof Functions.
4. Apply Lagrange's method of undetermined Multipliers to obtain maxima and minima.

Unit III – Numerical Solution of Equations & Interpolation

Bisection method-Iterative method-Newton Raphson method-Regula falsi method. Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Calculate the roots of equation using Bisection method and Iterative method.
2. Calculate the roots of equation using Regula falsi method and Newton Raphson method.
3. Understand the concept of interpolation.
4. Derive interpolating polynomial using Newton's forward and backward formulae.
5. Derive interpolating polynomial using Lagrange's formulae.
6. Derive interpolating polynomial using Gauss forward and backward formulae.

Unit IV - Numerical Differentiation

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Modified Euler's Method-Runge-Kutta Methods.

Learning Outcomes:

At the end of this unit, the student will be able to

1. solve initial value problems to ordinary differential equations using Taylor's method.
2. solve initial value problems to ordinary differential equations using Euler's method and Runge Kutta methods.

Unit V Numerical Integration & Curve fitting

Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule

Curve fitting: Fitting of a straight line – Second degree curve – Exponential curve-Power curve by method of least squares.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Solve integral equations using Simson's 1/3 and Simson's 3/8 rule.
2. Solve integral equations using Trapezoidal rule.
3. Understand curve fitting.
4. Understand fitting of several types of curves.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers, 44th Edition.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India, 9th Edition.

Reference Books:

1. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers, 2008.
2. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier, 2002.

Course Outcomes:

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

1. Solve problems on function of several variables, interpolation methods, curve fitting problems and find the solution of equations by numerical methods.
2. Calculate the Maxima and Minima of Functions of several variables.
3. Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals.
4. Solve equations numerically and derive various Interpolation formulae,
5. Solve ordinary differential equations by Taylor's series-Picard's Method of successive Approximations-Modified Euler's Method-Runge-Kutta Methods.
6. Solve the curve fitting problems and also to solve integration problems numerically.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Discrete Mathematics

(Computer Science and Engineering)

II B. Tech I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05301	**PCC**	2	1	0	3	30	70	100

Objectives

- This course will introduce and illustrate in the elementary discrete mathematics for computer science and engineering students.
- To equip the students with standard concepts like formal logic notation, methods of proof, induction, sets, relations, graph theory, permutations and combinations, counting principles.

Unit I – Mathematical Logic

Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof. Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Simplify and evaluate basic logic statements using truth tables.
2. Express a logic sentence in terms of predicates, quantifiers and logical connectives.
3. Apply rules of inference and methods of proof including direct and indirect proof forms.
4. Understand the inference theory for predicate calculus.

Unit II – Set Theory

Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion, Relations: Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, Functions: Bijective Functions, Composition of Functions, Inverse Functions, Permutation Functions, Recursive Functions, Lattice and its Properties.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the operations of sets and use Venn diagrams to solve applied problems.
2. Determine the domain and range of a function and apply the properties of functions to application problems.
3. Identify the types of functions, finding the inverse of function and perform the composition of functions.
4. Understand about lattice and its properties.

Unit III - Algebraic Structures and Number Theory

Algebraic Structures: Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism,
Isomorphism.

Number Theory: Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the various algebraic structures and their properties.
2. Use elementary number theory including divisibility properties , prime numbers ,GCD and perform modulo arithmetic.

3. Apply algorithm such as Euclidean and theorems such as Fermat's and Euler's for solving the problems.

Unit IV – Combinatorics

Basic of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, The Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Know the fundamentals of counting and understanding the difference between permutation and combination.
2. Solve the counting problems by applying product and sum rules , permutations and combinations.
3. Understand the pigeonhole principle and its applications.
4. Apply Binomial Theorem for solving problems.

Unit V – Graph Theory

Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Coloring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees

.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Determine if a graph is simple / multi-graph, directed / undirected, cyclic/acyclic.
2. Represent a graph using adjacency list and adjacency matrix and apply graph theory to problems in computer networks.
3. Determine if a graph has Euler or Hamilton path / circuit.
4. Understand about spanning tree and apply the algorithms for spanning trees in solving the problems.

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill, 2015.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill, 2008.

Reference Books:

1. Advanced Engineering Mathematics, by Erwin Kreyszig, 10th Edition,Wiley India, 2014.
2. Higher Engineering Mathematics, by B.V.Ramana, Sixth Reprint, Mc Graw Hill publishers, 2008.
3. Advanced Engineering Mathematics, by Alan Jeffrey, 1st Edition, Elsevier, 2010.

Course Outcomes:

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

1. Understand the logical connectives, normal forms, predicates and verify the validity ofan argument by the rules of inference.
2. Explain functions and its properties such as homomorphism and isomorphism.
3. Explain the general Properties of Semigroups, Monoids, Groups, and Lattices.
4. Illustrate the concepts like partially ordered relation (POSET), compatibility relation and Equivalence relations.
5. Find Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Apply Chromatic number of a graph and spanning trees in a graph.
6. Apply the concepts of permutations, combinations, principle of inclusion and exclusion, binomial and multinomial theorems to solve the counting problems.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

English Language and Employability Skills for Engineers

(Common to all branches of Engineering)

II B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA51301	HSMC	3	0	0	3	30	70	100

Objectives

- Focus on appropriate reading strategies to become more competent, efficient and perceptive academic reader who is able to comprehend the contents and main ideas of what is read.
- Help to speak comprehensibly at the advanced level like group discussions, technical presentations, small talks.
- Facilitate necessary listening skills in order to follow and comprehend discourse such as lectures, conversations, interviews and discussions.
- Provide knowledge of grammatical structures and vocabulary to use meaningfully and appropriately in written and spoken forms.
- Impart effective writing strategies and demonstrate the same in preparing resume, E-mail, project proposal useful for both academic and professional careers.

Unit I – Lexical Competence and Effective Business Writing skills

Listening: Comprehend the information by listening to phone messages, orders, and lectures.
Vocabulary: Academic and Technical vocabulary Usage.
Grammar: Framing questions open and closed type and Cause and Effect.
Writing: Writing Agenda and Minutes; Writing Notices and Memos.
Speaking: Small talks.

Learning Outcomes:

At the end of the Unit, the student will be able to

1. Improve the comprehensive ability through listening various audio and visual aids.
2. Use academic and technical vocabulary to face competitive exams and improve lexical competence.
3. Demonstrate the ability to use cause and effect phrases and frame open and closed end questions for effective written communication.
4. Familiar with writing agendas, minutes, notices and memos in a clear and accurate manner.
5. Develop speaking abilities to perform in small or short talks.

Unit II – Professional Email Writing Skills and Video Conferencing

Listening: Predicting the content by listening to short audio clips.
Vocabulary: Academic andTechnical Collocations Usage.
Grammar: Report speech.
Writing: Writing Professional E-mails in English.
Speaking: Conducting Meetings and Video Conferencing.

Learning Outcomes:

At the end of the Unit, the student will be able to

1. Comprehend and predict the content by listening to short audios and videos.
2. Use technical collocations; improve lexical competence to communicate ideas more effectively.
3. Recognize the importance of using reported speech.
4. Understand the various ways of writing professional e-mail for official communication.
5. Conduct meetings by using appropriate phrases and procedures in effective and efficient manner.

Unit III – Resume Preparation and Non-verbal Cues

Reading: Summarizing, Paraphrasing, and Note making
Vocabulary: One word substitutions.

Grammar: Degrees of comparison and simple, compound and complex sentences.

Writing: Writing Winning Resumes and Cover letters.

Speaking: Advanced Conversation techniques and Facial Expressions.

Learning outcomes:

At the end of the Unit, students will be able to

1. Evaluate research and technical articles by using summarizing, paraphrasing and note making strategies.
2. Apply appropriate substitutions while writing technical texts.
3. Identify the components and use of adjectives in the sentence.
4. Prepare a well knit cover letter along with resume for applying jobs globally.
5. Enhance their conversational competence in various advanced situations.

Unit IV – Academic Writing and Presentation Skills

Reading: Critical Reading.

Vocabulary: Idiomatic expressions.

Grammar: Compare and contrast using connectives.

Writing: Effective Technical Paper Writing.

Speaking: Technical presentations-Oral/Power Point Presentations and Kinesics.

Learning outcomes:

At the end of the Unit, students will be able to

1. Enhance logical thinking by comprehending technical texts through critical reading.
2. Use Idiomatic expressions to exhibit their lexical competence and get thorough knowledge in the usage of different forms of sentences.
3. Apply connectives for comparing and contrasting while writing technical texts.
4. Practice the unique qualities of technical reports.
5. Make use of well developed layout for effective technical presentations both oral and Power Point.

Unit V – Employability Skills: Group Discussions and Interview Etiquettes

Vocabulary: Academic Vocabulary Assessment.
Grammar: Common errors in a sentence.
Writing: Project Proposal Writing.
Speaking: Group discussion etiquette, Interview etiquette and Proximics.

Learning outcomes:

At the end of the Unit, students will be able to

1. Take assessment in academic vocabulary by exhibiting his lexical competence.
2. Identify and rectify the common errors in sentences for better communication.
3. Write proposals for various funding projects to get accomplish their research ideas.
4. Enhance employability opportunities by practicing discussions and face confidently the Interviews in campus requirements.

Reference Books:

1. Remedial English Grammar. F.T. Wood. Macmillan.2007
2. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
3. Communication Skills. Sanjay Kumar and Pushpalatha. Oxford University Press. 2011
4. Practical English Usage. Michael Swan. OUP. 1995.
5. Technical Communication Principles and Practice. Raman, Meenakshi and Sharma, Sangeeta Third Edition. New Delhi: Oxford University Press. 2015. Print.
6. Technical Communication by Meenakshi Raman & Sangeetha Sarma, OU Press, 3rd edition, 2014.
7. English for Technical Communication for Engineering students, Aysha Vishwamohan, Tata Mc Graw Hill, 2009.
8. Effective Technical Communication, Ashrif Rizvi, Tata Mc Graw Hill, 2011.
9. Communicative English, E.Suresh Kumar & P. Sreehari, Orient Blackswan, 2009.

Course Outcomes:

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

1. Able to remember the topic, the content and piece of information by listening.
2. Able to understand and produce appropriate academic vocabulary in oral and written

communication.

3. Able to apply relevant formats of resume writing, E-mails and project proposals.
4. Able to analyse the use of grammar to construct meaningful sentences with suitable word choices.
5. Able to evaluate comprehensive skills through listening and reading prescribed text book.
6. Able to create opportunities by enhancing speaking skills to perform in small talks, group discussions and Interviews.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Database Management Systems

(Computer Science and Engineering)

II B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05302	PCC	3	0	0	3	30	70	100

Objectives

- To understand design and implementation of a database system.
- To understand database designs, database modeling.
- To understand the management of a database.

Unit I – Introduction to Databases

Database System Applications, Purpose of Database Systems, Views Of Data, Database Languages, Relational Databases. Database Design, Database Storage And Querying, Database Architecture, Database Users and Administrator and History of Databases.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Determine the levels of data abstractions and data independence.
2. Determine the importance of DDL and DML statements.
3. Determine the need of Data Models and the Usage.
4. Illustrate the process of Database Design.
5. Illustrate the role of Database Users and functionality of Administrator.
6. Illustrate Database Architecture and its importance.
7. Perform Data manipulation operations.
8. Describe the history of Databases.

Unit II – Relational databases

Relational Model: Structure of Relational Databases, Database Schema, Keys, Relational Query languages, Relational Algebra, Tuple Relational Calculus and Domain Relational calculus. Relational Operations.

SQL: SQL data definition, Basic Structure of SQL Queries, Additional Basic operations, Set Operations, Null Values, Aggregate Functions, Nested Queries, Modification of databases, Join Expressions, views, Transactions, Integrity Constraints, SQL datatypes and schemas, Authorization, Functions and procedures, Triggers, Recursive Queries.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Identify the keys for a database schema.
2. Construct Relational Algebra and Calculus Equations.
3. Construct an SQL query Using DML and DDL Statements.
4. Construct view for the database schema.
5. Implement and construct functions, procedures and triggers for a Database.

Unit III – Database Design

Database Design with E-R Model: Overview of the Design Process, The Entity-Relational Model, Constraints, Removing Redundant Attributes in Entity set, Reduction to Relational Schema, Enitity-Relationship Design issues, Extended E-R features, Alternative Notions for Modelling, Other accepts of Database Design.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, Decomposition using multivalued Dependencies. More Normal forms, Database-Design Process, Modelling Temporal Data.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Construct E-R Model for a given specifications of an organization.
2. Construct Functional Dependencies Using axioms.
3. Identify Database Refinement using Normal Forms.
4. Identify keys for a given Database Schema.
5. Perform Join Operations for a database Schema.
6. Apply Decomposition using fictional dependencies and multivalued Dependencies.
7. Determine and use Query Optimization Algorithms and Decomposition Algorithms.

Unit IV – Transaction Management

Fundamentals of Transaction: Transaction Concept, A simple Transaction Model, storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transactional Isolation and Atomicity, Transaction Isolation levels, Implementation of Isolation Levels, Transactions as SQL Statements.

Concurrency Control in Transactions: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation Protocols, Multiversion Schemes. **Recovery system:** Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management and Failure with Loss of Non-volatile.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Illustrate properties of a transaction and transaction model.
2. Identify if a given schedule is a serializability or not.
3. Illustrate transactions using SQL statements.
4. Illustrate concurrency control protocols.
5. Determine whether the given schedule is a concurrent schedule or not.
6. Illustrate recovery algorithms.
7. Understand the importance of Database recovery Mechanisms.

Unit V – Data Storage and Querying

Storage and File Structure: Overview of physical storage media, magnetic disk and flash storage, RAID, tertiary storage, File Organization, Organization of Records in Files, Data-Dictionary Storage, Database Buffer.

Indexing and hashing: Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL, Query processing and Optimization.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Demonstrate physical media storage devices.
2. Calculate storage access time for a given media specification.
3. Illustrate various file Organization methods.
4. Demonstrate the importance of Data-Dictionary storage.
5. Demonstrate importance of indexing and its structures.
6. Perform operations of B+-Trees indexing andhashing.
7. Construct an SQL index for a given Database.

Text Books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill, 2011.
2. "Database Management Systems", Raghurama Krishan, McGraw Hill, 2003.

Reference Books:

1. "Principles of Database and Knowledge – Base Systems", Vol 2 by J. D. Ullman, Computer Science Press, 1989.
2. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education, 2007.
3. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley, 1996.

Course Outcomes:

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

1. Demonstrate the fundamentals of database management systems.
2. Design and Refine a database using ER Model, Relational Model and normalization.
3. Illustrate a transaction model with various concurrency control Protocols and Recovery Mechanisms.
4. Construct SQL Queries, Functions, stored procedures, and triggers for a Relational Databases.
5. Solve access time for a media with various File Organization.
6. Make use of Operations of B+ Tree Indexing and Hashing indexing.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Digital Logic Design

(Computer Science Engineering)

II B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA04307	PCC	3	0	0	3	30	70	100

Objectives

- Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.
- Understand the fundamental principles of digital design.
- Acquaint with classical hardware design for both combinational and sequential logic circuits.

UNIT I- Number Systems and Switching Functions:

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage And Registers, Binary Logic.

Boolean Algebra and Logic Gates: Basic Definitions, Axiomatic Definition of Boolean algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Define Number systems and perform Number base conversions.
2. Carryout the Conversion from one number base system to another number base system.
3. Use basic Theorems & Properties of Boolean algebra for simplifying Boolean expressions.
4. Illustrate the logic gates and its logic operations.

UNIT II- Gate- Level Minimization

The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, other Minimization Methods.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Carryout boolean functions by using n-variable K-map (n=1,2,3,4,5).
2. Construct NAND-NOR Implementation and other two level Implementation.
3. Describe the Simplification of boolean expressions using standard methods.
4. Use tabular method for simplification of boolean functions.

UNIT III - COMBINATIONAL LOGIC

Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

Learning Outcomes:

At the end of this unit, the student will be able to

2. Draw the combinational logic circuits for the given specifications Draw the sequential logic circuits for the given specifications.

UNIT IV - SYNCHRONOUS SEQUENTIAL LOGIC

Sequential Circuits, Latches, Flips-Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers, Shift Registers, Ripple Counters, Synchronous counters, other counters.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Draw the sequential logic circuits for the given specifications
2. Describe asynchronous sequential circuits.
3. Analyze state equation for mealy and moore finite state machines.

4. Solve sequential logic circuits with the acquired knowledge of flip-flops.

UNIT V - MEMORY AND PROGRAMMABLE LOGIC:

Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable Array Logic. **Digital Logic Circuits:** RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter- Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Classify semiconductor memories.
2. Carryout the design of PLDs for given boolean functions.
3. Analyze digital logic circuits.

Text Books:

1. Switching and Finite Automata Theory-ZviKohavi&Niraj K. Jha, 3rdEdition, Cambridge.
2. Digital Design-Morris Mano, PHI, 3rd Edition.

Reference Books:

1. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012.
2. Digital Logic Design, R.D. Sudhakar Samuel, Elsevier.
3. Fundamentals of Logic Design, 5/e, Roth, Cengage.
4. Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
5. Digital Logic Design, Leach, Malvino, Saha,TMH.
6. Modern Digital Electronics, R.P. Jain, TMH.

Course Outcomes:

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

1. Describe the basic concepts of binary numbers, Boolean functions, logic gates, combinational & sequential logic circuits, Programmable devices and digital logic circuits.
2. Use basic theorems and properties of Boolean algebra for simplifying Boolean expressions.
3. Carryout the Boolean functions by using n variable K-map.
4. Draw the combinational & sequential logic circuits for the given specifications or constraints.
5. Analyze sequential logic circuits with the acquired knowledge of flip-flops.
6. Draw the Programmable devices and digital circuits by using given design procedures.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Object Oriented Programming through Java

(Computer Science & Engineering)

II B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05303	PCC	3	0	0	3	30	70	100

Objectives

- Study the syntax, semantics and features of Java Programming Language.
- Learn the method of creating Multi-threaded programs and handle exceptions.
- Learn Java features to create GUI applications & perform event handling.

Unit I – Introduction to Java, Data types, Arrays and Variables, Operators, Control Statements, Introducing Classes

Introduction to Java: Object Oriented Programming, History and Evolution of java, Java's magic: The byte code, Java Buzzwords, Java Keywords, Lexical issues, The Java class Libraries
Data Types, Operators and Control Statements: Java Data Types, Variables and Constants, Naming Conventions, Type conversion and casting, Automatic Type Promotion in Expressions, Arrays, Strings, Operators, Precedence & Associativity of operators, Expression evaluation, Java's selection Statements, Iteration statements, Jump Statements.
Introducing Classes and Methods: Class Fundamentals, Declaring Objects, Assuming Object reference Variables, Introducing Methods, Constructors, this Keyword, Garbage Collection. Overloading Methods and Constructors, Argument passing, Recursion, Introducing Access Control, understanding static, Command Line Arguments, Exploring the String class.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Classify suitable data type for the given problem scenario.
2. Implement type casting and type promotion.
3. Use control statements to affect the program execution flow.
4. Use language constructs for efficient problem solving.

Unit II – Inheritance, Exception Handling

Inheritance: Basics of Inheritance, super keyword, creating a multi level hierarchy, method overriding, dynamic method dispatch, Abstract classes, using final with inheritance, Introducing Nested and Inner classes.
Exception Handling: Exception Handling Fundamentals, Exception Types, Using try and catch, Multiple catch clauses, Nested try statements, throw, throws, finally, Java Built-in Exceptions, creating user-defined exceptions, Chained Exceptions, Three Recently added Exceptions features.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Implement concepts of inheritance to find solution to the given problem.
2. Use exception handling mechanism to handle runtime errors.

Unit III – Packages and Interfaces

Packages and Interfaces: Basics of Packages, Access protection, Importing Packages, Creating and Importing User-defined Packages.
Interfaces: Declaring, Implementing and Extending Interfaces, using static methods in an Interface, using final keyword in interfaces.
Multithreaded Programming: Multithreading in Java, The Java Thread Model, Life Cycle of a Thread, The main thread, Creating Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Inter Thread Communication, Suspending, resuming and stopping threads, Obtaining a thread state, The finalize() method.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Understand interface and its methods.
2. Analyze the suitable packages for the given problem scenario.
3. Explain thread and its methods.

Unit IV – I/O, Applets, Collections Framework

Input-Output and Applets: I/O classes and Interfaces, The Byte streams, Character streams, Predefined streams, Automatically closing a file, Applet fundamentals, Overriding paint(), enumerations, type wrappers, auto boxing, annotations.
Collections Framework: Overview, Collection Interfaces, Collection Classes. Working with Maps, Comparators.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Understand byte stream and character stream.
2. Use applets to design static web applications.
3. Use the pre packaged data structure to design collection framework programs.

Unit V – Introduction to AWT, Event Handling, Swings

Introduction to AWT: Windows, Graphics and Text: AWT classes, window fundamentals, frame windows, creating a frame window in an applet, creating a windowed program, displaying information within a window, Graphics, Color, Fonts, Managing text output using FontMetrics.
Event Handling in Java: The Delegation Event Model, Event Classes and Event Listener Interfaces. **AWT Controls, Layout Mangers, and Menus:** AWT Control Fundamentals, Labels, Buttons, Check Boxes, CheckboxGroup, Choice Controls, Lists, Scroll Bars, TextField and TextArea, Layout Managers, Menu Bars and Menus, Dialog Boxes, FileDialog.
Swings: Swing Features, MVC Connection, Components and Containers, JLabel, ImageIcon, JTextField, Swing Buttons, Check Boxes, Radio Buttons, JTabbedPane, JScrollPane, JList, JComboBox, JTree, and JTable.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Understand AWT fundamentals.
2. Use AWT framework to sketch a window.
3. Analyze AWT controls for the given problem.
4. Use Swing framework to sketch a window.

Text Books:

1. "The Complete Reference -Java", Herbert Schildt, Mc GRAW HILL Edition, 9th Edition, 2016.
2. "Java – How to Program", Paul Deitel, Harvey Deitel, PHI, 8th Edition.

Reference Books:

1. "A Programmers Guide to Java SCJP", Third Edition, Mughal, Rasmussen, Pearson, 2009.
2. "Programming with Java" T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition, 2011.
3. "Java Fundamentals - A Comprehensive Introduction", Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.

Course Outcomes:

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

1. Describe elements of Java, arrays, Strings and Overloading and advanced overloading.
2. Explain Inheritance, interfaces, threads, Input/output streams and AWT.
3. Develop programs using type casting, type promotion control statements, language constructs and Inheritance for efficient problem solving.
4. Implement inter thread communication, applets for web server communication and able to develop programs using Collection Framework.
5. Develop programs using AWT frame work and layout manager, Swing frame work and layout manager to sketch a window.
6. Analyze data types, Class type, packages and AWT controls suitable for the given problem scenario.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Database Management systems Laboratory

(Computer Science Engineering)

II B. Tech I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05304	PCC	0	0	3	1.5	30	70	100

Objectives

- To understand the fundamentals of SQL and PL/SQL.
- To use DDL, DML statements for design of database Schemas.
- To use features of Query language like aggregate functions, group-by clause.
- To use set operations and set comparison operators for evaluating complex queries.
- To use PL/SQL language constructs to implement triggers, stored procedures, stored functions and cursors.

List of Experiments:

1. Write SQL queries to CREATE TABLES for various databases using DDL commands (i.e. CREATE, ALTER, DROP, TRUNCATE).
2. Write SQL queries to MANIPULATE TABLES for various databases using DML commands (i.e. INSERT, SELECT, UPDATE, DELETE,).
3. Write SQL queries to create VIEWS for various databases (i.e. CREATE VIEW, UPDATE VIEW, ALTER VIEW, and DELETE VIEW).
4. Write SQL queries to perform RELATIONAL SET OPERATIONS (i.e. UNION, UNION ALL, INTERSECT, MINUS, CROSS JOIN, NATURAL JOIN).
5. Write SQL queries to perform SPECIAL OPERATIONS (i.e. ISNULL, BETWEEN, LIKE, IN, EXISTS).
6. Write SQL queries to perform JOIN OPERATIONS (i.e. CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN)
7. Write SQL queries to perform AGGREGATE OPERATIONS (i.e. SUM, COUNT, AVG, MIN, MAX).
8. Write SQL queries to perform ORACLE BUILT-IN FUNCTIONS (i.e. DATE, TIME).
9. Write SQL queries to perform KEY CONSTRAINTS (i.e. PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT).
10. Write a PL/SQL program for calculating the factorial of a given number.
11. Write a PL/SQL program for finding the given number is prime number or not.
12. Write a PL/SQL program for displaying the Fibonacci series up to an integer.
13. Write PL/SQL program to implement Stored Procedure on table.
14. Write PL/SQL program to implement Stored Function on table.
15. Write PL/SQL program to implement Trigger on table.
16. Write PL/SQL program to implement Cursor on table.

Reference Books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill, 2011.
2. Steven Feuerstein. OraclePL/SQL Programming, 2014.

Course Outcomes:

At the end of the lab, students will be able to

1. Implement a database schema for a given specifications.
2. Insert, alter and modify the database schema and its instances.
3. Write SQL query for a given requirement.
4. Evaluate equivalent SQL queries for a given requirement.
5. Develop PL/SQL triggers, stored procedures, stored functions for a database.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Object Oriented Programming using Java Laboratory

(Computer Science Engineering)

II B. Tech I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05305	**PCC**	0	0	3	1.5	30	70	100

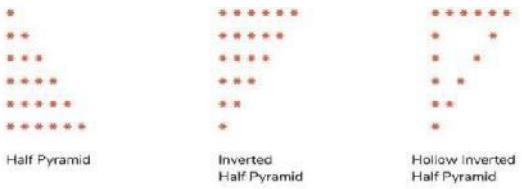
Objectives

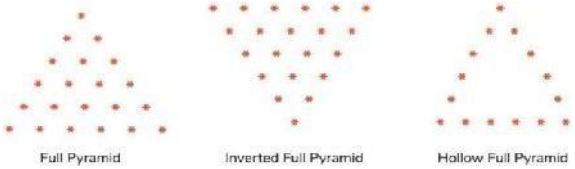
- Learn to use object orientation to solve problems and use java language to implement them.
- To experiment with the syntax and semantics of java language and gain experience with java programming.

List of Experiments:

1. Preparing and practice – Installation of Java software, study of any Integrated development environment, sample programs on operator precedence and associativity, class and package concept, scope concept, control structures, constructors and destructors. Learn to compile, debug and execute java programs.

2. Write Java program(s) that print following pyramid patterns.



3. 

4. Write Java program(s) on use of inheritance, preventing inheritance using final, abstract classes.
5. Write Java program(s) on dynamic binding, method overloading and overriding.
6. Write Java program(s) on ways of implementing interface.
7. Write Java program(s) which uses the exception handling features of the language, creates exceptions and handles them properly, uses the predefined exceptions, and create own exceptions
8. Write a program for the following
   a. Develop an applet that displays a simple message.
   b. Develop an applet for waving a Flag using Applets and Threads.
9. Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read.
10. Display the complete set of unique values input after the user enters each new value.
11. Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads
12. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.
13. Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and

second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.

14. Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
15. Design a simple calculator which performs all arithmetic operations. The interface should look like the calculator application of the operating system. Handle the exceptions if any.
16. Write a java program to handle mouse events and keyboard events.
17. Write a java program that allows conduction of object type examination containing multiple choice questions, and true/false questions. At the end of the examination when the user clicks a button the total marks have to be displayed in the form of the message.
18. Write a java program that creates menu which appears similar to the menu of notepad application of the Microsoft windows or any editor of your choice.
19. Write a java program that creates dialog box which is similar to the save dialog box of the Microsoft windows or any word processor of your choice.
20. Write a java program to find and replace pattern in a given file.
21. Use inheritance to create an exception super class called ExceptionA and exception sub classes ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC.
22. Write a Java program which opens a connection to standard port on well-known server, sends the data using socket and prints the returned data.
23. Create an interface for stack with push and pop operations. Implement the stack in two ways: fixed size stack and Dynamic stack (stack size is increased when stack is full).
24. Create multiple threads to access the contents of a stack. Synchronize thread to prevent simultaneous access to push and pop operations.
25. Write java program(s) that use collection framework classes Array List, Linked List, Hash Map, Linked Hash Map, Tree Map, Tree Set, Hash Table, Iterator, List Iterator.
26. Write a Java program to connect with any Database by using JDBC(Java Database Connectivity) specification.

Reference Books:

1. "Java: How to Program", P.J.Deitel and H.M.Deitel, PHI, 8th Edition.
2. "Object Oriented Programming through Java", P.Radha Krishna, Universities Press, 2007.
3. "Thinking in Java", Bruce Eckel, Pearson Education, 2006.

Course Outcomes:

At the end of the lab, students will be able to

1. Apply of data types, variables and control structures to solve problems.
2. Apply object-oriented concepts to solve problems including generating series primes, searching a pattern in a file.
3. Design, write, debug and execute applet programs using Integrated Development Environment.
4. Develop programs using threads, collection framework and swing concepts.
5. Apply I/O stream and networking classes to develop client and server interaction.
6. Apply the concepts and create solution effectively as a member or leader in a team during the development of a software project.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Probability & Statistics

(Common to CSE, ME & CIV)

II B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA54402	**BSC**	3	0	0	3	30	70	100

Objectives

This course aims at providing the student with the knowledge on

- The theory of Probability and random variables.
- Usage of statistical techniques like testing of hypothesis, testing of significance, chi-square test and basic concepts of Queuing theory.

Unit I - Elementary Statistics

Introduction to statistics- definition-advantages-limitations-frequency distribution tables-Arithmetic mean, median, mode for grouped and ungrouped data-variance, standard deviation, co-efficient of variation. Correlation –properties, correlation co-efficient-Regression-properties-Regression co- efficient- relation between correlation co-efficient and Regression co-efficient.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the fundamentals of Statistical techniques.
2. Evaluate the measures of central tendency for grouped and ungrouped data.
3. Understand the Correlation & regression and their properties.
4. Evaluate the Correlation coefficient, rank correlation, regression coefficients and obtain relation between them.

Unit II - Probability theory

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Define the terms trial, events, sample space, probability, and laws of probability.
2. Use of probabilities of events in finite sample spaces from experiments.
3. Apply Baye's theorem to real time problems.
4. Explain the notion of random variable, distribution functions and expected value.

Unit III -Random variables & Distributions

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties-Uniform distribution-exponential distribution.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the concept of Probability Distributions.
2. Apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies.
3. Understand the concept of Normal Distributions and their properties

Unit IV - Testing of Hypothesis

Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the concept of estimation, interval estimation and confidence intervals.
2. Apply the concept of hypothesis testing for large samples.

Unit V - Testing of significance

Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes. Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Apply the concept of testing hypothesis for small samples.
2. Estimate the goodness of fit.
3. Explain the Concept of Queuing theory & apply in real time problems.

Text Books:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna publishers, 44th Edition.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India, 9th Edition.

Reference Books:

1. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers, 2008.
2. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier, 2002.

Course Outcomes:

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

1. Understand the concepts of probability, sampling distributions, test of hypothesis and Queuing theory.
2. Explain the characteristics through correlation and regression tools.
3. Apply Probability theory to find the chances of happening of events.
4. Understand various probability distributions and calculate their statistical constants.
5. Solve the problems on testing of hypothesis in large samples.
6. Solve the problems on testing of hypothesis in small samples and Queuing models.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Python Programming

(Computer Science & Engineering)

II B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05401	PC	3	0	0	3	30	70	100

Objectives

- To understand the basics of Scripting Language.
- To get exposure on problems solving approaches of computer science.
- To use various packages in solving problems.

Unit I – Introduction, Types, Operators and Expressions

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the programming in Python using the REPL (Shell).
2. Categorize the types, operators and expressions in python programming.

Unit II – Data Structures & Functions

Data Structures - Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Classify the data into data structures.
2. Use the functions in solving python-based solutions.

Unit III – Modules, Python Packages & Brief Tour of the Standard Library

Modules: Creating modules, import statement, from import statement, name spacing.

Python packages: Introduction to PIP, Installing Packages via PIP, Using Python Packages Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

Brief Tour of the Standard Library - Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the importing of modules and their importance.
2. Understand the PIP package in installing the python packages.
3. Use the error handling techniques in python.
4. Know the different libraries available in python.

Unit IV – Objects and their Use, Object Oriented Programming

Objects and Their Use: Software objects, Turtle graphics - Creating a turtle graphics window, the default turtle, Fundamental turtle attributes and behavior, Additional turtle attributes, Creating multiple turtles.
Object Oriented Programming: Encapsulation, Inheritance, and Polymorphism.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Use the software objects in Turtle graphics.
2. Understand the concepts of Object-Oriented Programming in python.

Unit V – GUI Programming, Testing

GUI Programming - Tkinter Overview - tkinter pragmatics, Documentation, Extensions, structure; tkinter coding alternatives, adding buttons and callbacks-lambda, bound method, callable class object, Binding events; adding multiple widgets, Reusable GUI Components with classes, Dialogs, Entry, check buttons and Radio buttons, Scales, Menus.
Testing: Why testing is required? Basic concepts of testing, Unit testing in Python, Writing Test cases, Running Tests.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Understand the basics of GUI programming in python.
2. Use the Tkinter package in designing the Graphical User Interface.
3. Represent and run the test cases.

Text Books:

1. Learning Python, Mark Lutz, Orielly Publications – 5th edition, 2013
2. Introduction to Computer Science using Python: A Computational Problem-Solving Focus - Charles Dierbach, Wiley India Edition, 2016.

Reference Books:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson, 2017.
2. Think Python: Allen Downey, Green Tea Press, 2012.
3. Fundamentals of Python: Kenneth Lambert and B.L. Juneja, Cengage Learning, Third Edition, 2012.

Course Outcomes:

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

1. Describe fundamentals of Python programming and its applications.
2. Implement Python programs using data types, Operators and Control statements.
3. Determine Python data structures and its operations for accessing data.
4. Carry out modular programming using functions and packages.
5. Implement the OOPs concepts in Python Programming.
6. Represent the Standard Libraries for Interfaces, graphics and fundamentals of testing.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Formal Languages and Automata Theory

(Computer Science and Engineering)

II B. Tech II Semester							SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05402	**PCC**	3	0	0	3	30	70	100

Objectives

- To understand the properties of Formal Languages, Deterministic and Non Deterministic Finite Automata.
- To construct finite automata for regular expressions.
- To Illustrate the Context free languages and grammars, Normalizing CFG.
- To differentiate the deterministic and nondeterministic PDA.
- To apply the properties of Turing machines to solve the real time problems.

Unit I – Introduction

Finite Automata preliminaries: Strings, Alphabet, Language Operations, Finite State Machine definitions, Finite Automation Model, Acceptance of strings and languages, Non-deterministic Finite Automation, Equivalence between NFA and DFA, conversion of NFA into DFA, Equivalence between two FSM's, Minimization of FSM, Moore and Mealy machines, Applications of FA's, NFA with ε moves.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the basics of formal languages and its operations.
2. Illustrate conversions and equivalences of finite automata.
3. Differentiate Deterministic and Non-Deterministic automata.
4. Know the importance of finite automata in compiler design.

Unit II – Regular Sets and Regular Grammars

Regular sets, Regular Expressions, Identity Rules, Finite Automata and Regular Expressions, pumping lemma of regular sets, Closure Properties of Regular Sets (proofs not required), Chomsky hierarchy of Languages.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the relationship between Finite automata and Regular languages.
2. Know the pumping lemma of regular sets.
3. Construct Finite Automata for RE's and Vice Versa.
4. Use pumping lemma for show that a language is not regular.

Unit III - Context Free Grammars and Languages

Context free grammar, Regular Grammar-Right linear grammar and left linear grammar, Equivalence between regular linear grammar and FA, inter-conversion between RE and RG. Definition of CFG, derivation trees, and sentential forms, Right Most and Left Most derivation of Strings, Ambiguity in Context Free Grammars. Simplification of Context Free Grammars, Chomsky Normal Form, Greibach Normal Form, Pumping Lemma for Context Free Languages. Decision properties of CFL (proofs omitted).

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand Regular Grammars and Context Free Grammars.

2. Apply minimization of Context Free Grammars.
3. Write Regular Grammar for Regular Language and able to differentiate between left linear and right linear grammars.
4. Know the cause of ambiguity in CFG and minimize the CFG.
5. Use pumping lemma to prove that the given language is CFL or not.

Unit IV - Push down Automata

Push Down Automata: Definition of the Pushdown Automaton, A Graphical Notation for PDA's, Instantaneous Descriptions of a PDA, The Languages of a PDA, Acceptance by Final State, Acceptance by Empty Stack, Equivalence of PDA's and CFG's, Properties of Context Free Languages.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the acceptance of Push Down Automata.
2. Apply equivalence of CFL and PDA.

Unit V - Turing Machine, Decidability and REL

Turing Machine: Turing Machine Model, Representation of TM, Design of TM, Types of Turing machines (proofs not required).

Decidability and Recursively Enumerable Languages: Decidability of problems, Universal Turing Machine, Undecidability of Post Correspondence Problem, Rice's theorem.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the basics of Turing Machine.
2. Illustrate concepts of Computability Theory.
3. Generalize Turing Machines into universal TMs.

Text Books:

1. "Theory of Computer Science and Automata languages and computation" -Mishra and Chandrashekaran, 3rd edition, PHI, 2011.
2. "Introduction to Automata Theory Languages and Computation". John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Pearson 3rd Edition, 2006.

Reference Books:

1. "Introduction to Computer Theory", Daniel I.A. Cohen, John Wiley, 2013.
2. "Introduction to Theory of Computation" - Sipser 2nd edition Thomson, 2018.
3. "Introduction to Automata Theory, Formal Languages and Computation", Shyamalendu kandar, Pearson, 2013.

Course Outcomes:

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

1. Understand formal machines, language and computations.
2. Design finite state machines for acceptance of strings.
3. Apply Regular Expressions in real time applications.
4. Design Context Free Grammars for formal languages.
5. Develop push down automata, Turing machine for accepting strings.
6. Distinguish between decidability and Undecidability.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Software Engineering

(Computer Science & Engineering)

II B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05403	**PC**	3	0	0	3	30	70	100

Objectives

- To understand the concepts of software engineering, requirement models, design models, SCM, different kinds of risks, project estimations and software testing techniques.
- To choose suitable software process model for a given problem scenario.
- To choose software requirement model in various scenarios.
- To apply architectural and component-level designs in various software applications.
- To use software testing techniques in order to debug developed software product.

Unit I

Introduction – Evolving role of software – Nature of Software in webapps– Software a crisis on the Horizon – Software Myths

Software models– Software process – Software process models – The linear sequential model – The prototyping model – The RAD model – Evolutionary models – Specialized Process Models – Process- product.

Agile Development: Agility, Agility and the cost of change, Agile process, Extreme Programming, Other Agile Process Models.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Learn definition, importance of software engineering and role of software engineering in development of webapps.
2. Discuss software myths.
3. Classify software process models.

Unit II

Software Process and project metrics – Measures, Metrics, and Indicators - Metrics in the Process and Project Domains - Software Measurement - Reconciling Different Metrics Approaches – Metrics for software quality – Managing validation.

Software project planning – Observations on estimating- Project planning objectives Resources – Software project estimation – Empirical estimation models-Automated estimation tools.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Learn the basics of Measures, Metrics, and Indicators and their approaches.
2. Discuss the importance of project planning in software development life cycle.
3. Use Automated estimation tools in order to find estimation time to complete a project.

Unit III

Risk analysis and Risk management – Software risks – Risk identification – Risk projection – Risk refinement – safety risks and hazard – RMMM plans.

Project scheduling and tracking – Defining task set-Defining task network – scheduling - earned value analysis-Error tracking-project plan.

Software quality assurance – Quality concepts – The quality movement-software quality assurance- Reviews-Reliability.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand different kinds of risks that a software engineer comes across while developing a project or product(s).
2. Predict project scheduling and tracking of errors
3. Explain various technical reviews in order to get quality software.

Unit IV

Software configuration management – Identification of objects in the software configuration - configuration audit-SCM standards.

Analysis concepts and principles – Requirement analysis-software prototyping-Specification Review

Analysis modeling – Data modeling-functional modeling-Behavioral modeling – Data dictionary.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Identify the changes in the software development and controlling them by programming team with SCM standards.
2. Explain requirements gathering and analysis phase of Software Development Life cycle.
3. Distinguish different types of analysis models.
4. Draw UML diagrams for the scenario given.

Unit V

Design concepts and principles – Effective modular design – design heuristics – Design model – Documentation.

Software design – Software architecture – Data designing – Architectural styles – Transform mapping –Transaction mapping – Refining architectural design.

User interface design – Component level design.

Software testing techniques – White box and black box testing – Testing for specialized environment, architectures and applications.

Software testing strategies – Unit testing – Integrating testing – validation technique – System testing – debugging.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand basics of Design concepts of Software Development Life cycle.
2. Draw blue prints by using different architectural styles.
3. Classify various software testing techniques.
4. Use testing techniques in software project development.
5. Develop User interface for any given Webapplications.

Text Books:

1. Roger S. Pressman, Software Engineering - A Practitioner's Approach, 6th Edition, MGH, 2005.
2. Ian Sommerville, Software Engineering, 9th Edition, Pearson Publishers, 2010

Reference Books:

1. Fundamentals of Software Engineering, Rajib Mall, Third Edition, 2009, PHI.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008.
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.

Course Outcomes:

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

1. Comprehend software development life cycle.
2. Prepare SRS document for a project.
3. Apply software design and development techniques.
4. Identify verification and validation methods in a software engineering project.
5. Implement testing methods at each phase of SDLC.
6. Analyze and Apply project management techniques for a case study.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Computer Organization

(Computer Science & Engineering)

II B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05404	**PCC**	3	0	0	3	30	70	100

Objectives

- The primary objective of this course is to introduce students to the foundations of computer organization.
- To illustrate the students about the implementation of arithmetical operations, fetching and execution of instructions at machine level.
- Enable the students to understand the different ways of communicating with I/O devices and standard I/O interfaces.
- Understand the concepts of Parallel processing.

Unit I - Structure of Computers and Computer Arithmetic

Structure of Computers: Computer types, Functional units, Basic operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Data representation: Data types, Fixed and Floating point representations.

Computer Arithmetic: Addition and Subtraction, Multiplication and Division algorithms, Floating-point Arithmetic Operations, Decimal arithmetic operations.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Identify Basic components of the computer and its functionality.
2. Analyze some of the design issues in terms of speed, technology, cost, performance.
3. Perform different types of computer arithmetic operations.

Unit II - Basic Computer Organization and Design

Instruction codes, Computer Registers, Computer Instructions and Instruction cycle. Timing and Control, Memory-Reference Instructions, Input-Output and interrupt. Central processing unit: Stack organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC), CISC Vs RISC.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Analyze the execution of instruction cycle.
2. Understand the operations of CPU.
3. Differentiate the various computer types, hardware Vs software, RISC Vs CISC.

Unit III - Register Transfer and Micro-operations

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logic shift unit. **Micro-Programmed Control:** Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understands register transfer, bus transfer and memory transfer.
2. Represent arithmetic, logic and shift micro operations using RTL.
3. Understand concepts of Hardwired control and micro programmed control.

Unit IV - Memory System and Input Output

Memory Hierarchy, Semiconductor Memories, RAM(Random Access Memory), Read Only Memory (ROM), Types of ROM, Cache Memory, Performance considerations, Virtual memory, Paging, Secondary Storage, RAID.

Input Output: I/O interface, Programmed IO, Memory Mapped IO, Interrupt Driven IO, DMA.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Categorize various memory mechanisms.
2. Apply different Cache memory mapping techniques.
3. Understand and compare various data transfer techniques

Unit V - pipeline, vector processing and multiprocessors

Pipeline and vector processing: Parallel processing, Pipelining, Arithmetic pipeline, Instruction pipeline, RISC pipeline vector processing, Array processors.

Multiprocessors: Characteristics of multiprocessors, Interconnection structures, Inter Processor Arbitration, Inter processor Communication and Synchronization, Cache Coherence.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Trace the execution of instructions and programs on pipelined processor implementations.
2. Explain basic instruction level parallelism using pipelining and the major hazards that may occur.
3. Understand the multiprocessor system and interconnection networks used in it.

Text Books:

1. M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India.
2. John P. Hayes (1998), Computer Architecture and Organization, 3rd edition, Tata McGrawHill.

Reference Books:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), Computer Organization, 5th edition, McGraw Hill, New Delhi, India.
2. William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersy.
3. Andrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education Inc.

Course Outcomes:

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

1. Describe the fundamental organization of a computer system.
2. Understand addressing modes, instruction formats and program control statements.
3. Recognize register transfer language notations for data transfer.
4. Distinguish the organization of various parts of a system memoryhierarchy.
5. Describe the fundamental concepts of pipeline and vector processing.
6. Identify the basic elements of multiprocessor architecture

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Design and Analysis of Algorithms

(Computer Science and Engineering)

II B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credit s	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05405	PCC	3	0	0	3	30	70	100

Objectives

- To know the importance of the complexity of a given algorithm.
- To study various algorithm design techniques.
- To utilize data structures and/or algorithmic design techniques in solving new problems.
- To illustrate clever and efficient ways to solve a given problem.
- To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
- To study some techniques for solving hard problems.

Unit I – Introduction

Introduction: What is an Algorithm, Algorithm specification, Performance analysis, growth of functions, Elementary Data Structures: Stacks, queues, trees, heaps, sets and disjoint sets union, graphs, hashing.

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Understand the elementary data structures.
2. Understand the importance of analyzing the complexity of an algorithm.
3. Apply traversal and search techniques for binary trees and various graphs.

Unit II – Divide and Conquer, Greedy Method

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Strassen's matrix multiplication.

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Understand the various algorithm design techniques.
2. Apply the divide and conquer technique to solve the new problems.
3. Apply the greedy method to solve the optimization problems.
4. Analyze the complexity of a given algorithm.

Unit III – Dynamic Programming, Backtracking

Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The Traveling sales person problem.
Back Tracking: General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Apply dynamic programming technique to solve the optimizationproblems.

2. Apply Back tracking technique for solving constraint satisfaction problems.

Unit IV –Branch and Bound, Lower Bound Theory

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency considerations.

Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, Inverting a lower triangular matrix, Computing the transitive closure.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Understand the importance of lower bound theory concept.
2. Apply Branch and Bound design technique to solve combinatorial optimization problems.

Unit V –NP-Hard and NP Complete Problems

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems.

Learning Outcomes:

At the end of unit**,** students will be able to

1. Classify the problems into NP hard and NP complete.
2. Understand the NP complete problem and cook's theorem.

Text Books:

1. "Fundamentals of Computer Algorithms", Ellis Horowitz, S. Sartaj Sahani and Rajasekhran, 2nd edition, 2012, University Press.
2. "Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave, Second Edition, 2009, Pearson Education.

Reference Books:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, "Introduction to Algorithms", second edition, PHI Pvt. Ltd./ Pearson Education, 2001.
2. R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, "Introduction to Design and Analysis of Algorithms A strategic approach", Mc Graw Hill.
3. Allen Weiss, "Data structures and Algorithm Analysis in C++", Second edition, Pearson education, 2005.

Course Outcomes:

At the end of the course student should be able to

1. Able to understand basics of tree, graphs, NP complete problem and cook's theorem.
2. Able to Apply Divide-and-Conquer design approach to solve the problems like binarysearch, finding maximum and minimum.
3. Apply Greedy method and Dynamic Programming Techniques to solve theoptimization problems.
4. Able to apply Back tracking technique for solving constraint satisfaction problems.
5. Apply Branch and Bound design technique to solve combinatorial optimization problems
6. Analyze the time and space complexity of a given algorithm.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Python Programming Lab

(Computer Science & Engineering)

II B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA05406	PC	0	0	3	1.5	30	70	100

Objectives

1. To understand the ease of programming using python.
2. To develop the graphics using graphics package.
3. To develop interface of an application.
4. To apply object-oriented concepts in programming.

List of Experiments:

1. a. Write a python script to display a simple message.
   b. Write a python script to perform basic arithmetic operations on two values which are accepted from the user.
2. a. Write a python script to calculate the factorial of a given number.
   b. Write a python script to calculate sum of individual digits of a given number.
   c. Write a python script to display the prime number series up to the given N Value.
3. a. Write a python script to find the largest number among three numbers and displaythem in ascending order using if-else construct.
   b. Write a python script to create a simple text file, write the contents into the created file and display the same on to the console screen.
4. Write a python script to remove all the occurrences of a given character from a text file, copy the resultant text into another text file. Find the total occurrences of the eliminated characters and display the count along with the contents of the text file on to the console.
5. a. Write a python script to display Fibonacci sequence of numbers using while loop, for loop and do-while loop constructs.
   b. Write a python script to demonstrate string methods.
6. a. Write a python script to create a list and add n number of user-defined values to the list and display the same on to the console screen.
7. b. Write a python script to perform the following operations on Lists:
   a. Matrix Addition.
   b. Matrix Multiplication.
8. a. Write a python script to search a key element in the given list of elements.
   b. Write a python script to arrange the given list of elements in ascending or descending order.
9. a. Write a python script to find GCD of two numbers using recursive and non recursive functions.
10. Write a python script to convert the following using functions:
    a. Fahrenheit to Celsius temperature.
    b. Celsius to Fahrenheit temperature.
11. a. Write a python script to draw a square using setposition method in absolute positioning.
    b. Write a python script to draw a triangle using left, right and Forward methods in relative positioning.
    c. Write a python script using penup and pendown methods to draw "W" character using turtle graphics.

d.Write a python script to create your own polygon shape and create an interesting design with it.

12. a. Write a GUI Script for creating text label in a window.

    b. Write a Python Script to create a command button. When the button is clicked the event should be handled and the message on the window should change from "Hello" to "Good Bye".

13. a. Write a python script to demonstrate the Exception Handling.

    b. Write a Python script to demonstrate the Mouse and Key Event handling.

    c. Write a python script to demonstrate menu driven applications.

14. By forming a group of 3 to 4 members develop a mini project.

Reference Books:

1. Charles Dierbach, Introduction to Computer Science using Python: A Computational Problem- Solving Focus, Wiley India Edition, 2016.
2. Mark Lutz, Programming Python, O'Reilly Publications, Fourth Edition, 2011.
3. Think Python: How to Think Like a Computer Scientist, 2nd edition Allen B. Downey *(O'Reilly, 2015).*

Course Outcomes:

At the end of the lab, students will be able to:

1. Write a script-based programs using python.
2. Write python programs using concepts of functions to improve efficiency ofprogramming.
3. Design graphics using related packages.
4. Implement object-oriented concepts in programming.
5. Design user interface using GUI packages for applications.
6. Write programs to handle exceptions at runtime.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Software Engineering Lab

(Computer Science & Engineering)

II B. Tech II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA05407	**PC**	0	0	3	1.5	30	70	100

Objectives:

- To understand how to develop a software project plan and SRS document using tools.
- To design a software using UML tool.
- To test the software, website, security and system using tools.
- To analyze the quality and object-oriented metrics to ensure the quality of software.

List of Experiments:

1. Develop a Software Project Plan Using Microsoft Project (Planning involves estimation – work break down structure – how much money- how much effort – how many resources – how much time it will take to a specific software –based system or product).

2. Develop a SRS Document using Rational Requisite Pro Tool. (This Lab is for mastering the software requirements in this regard the documents like Vision Document- Use Case Document – SRS Documents must be submitted for the Problem given to you).

3. Designing a Software using UML – Tool used is Rational Rose- In this lab, the student is supposed to solve the problem using OO analysis and design Methodology.

4. Testing using tools Rational Robot, Rational Purify, Rational Quantify, Rational Pure Coverage etc., (Functional and Structural Testing techniques were discussed and necessary programs will be tested).

5. Writing programs for the following: Quality Metrics and OO Metrics, Finding the coupling and cohesion intensity in java code, Reverse Engineering Problems.

6. Web site Testing, Security Testing, System Testing Reading.

Reference Books:

1. Rational Online Documentation.
2. Booch, Jackobson and Rambaugh, UML Guide, Pearson Edu, 1999.
3. IEEE Standards for SRS Documents, IEEE Std. 830.
4. Fenton NE, Software Metrics: A Rigorous Approach, Chapman and Hall, 1991.

Course Outcomes:

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

1. Prepare software project plan.
2. Prepare Software Requirement Specification document.
3. Prepare design document and compute effort estimates for a software project.
4. Design UML diagram for a case study.
5. Design and Develop test cases for a software.
6. Perform website, security and system testing.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Life sciences for Engineers

(Common to all branches of Engineering)

II B. Tech II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA0MC04	HSMC	2	-	-	0	30	-	30

Objectives

- To learn to achieve the highest goal happily.
- To become a person with stable mind, pleasing personality and determination.
- To awaken wisdom in students.

UNIT I

Values and self – development – Social values and Individual attitudes. Work ethics, Indian vision of humanism - Moral and non – moral Valuation - Standards and principles - Value judgments - Importance of cultivation of values.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand moral values and standards.

UNIT II

Sense of duty, Devotion, Self – reliance. Confidence, Concentration, Truthfulness, Cleanliness - Honesty, Humanity. Power of faith, National Unity - Patriotism, Love for nature, Discipline

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand different attributes towards life.

UNIT III

Personality and Behaviour Development – Soul and Scientific attitude. Positive thinking. Integrity and Discipline - Punctuality, Love and Kindness - Avoid Fault Thinking - Free from anger, Dignity of labour

Learning Outcomes:

At the end of this unit, the student will be able to

3. Understand different kinds of attitudes

UNIT IV

Universal brotherhood and religious tolerance - True friendship - Happiness Vs suffering, love for truth - Aware of self - destructive habits - Association and Cooperation - Doing best for saving nature.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand different kinds of social moving cultures.

UNIT V

Character and Competence – Holy books Vs Blind faith - Self-management and Good Health - Science of Reincarnation - Equality, Nonviolence, Humility, Role of Women - All religions and same message - Mind your Mind, Self- control - Honesty, Studying effectively.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the essence of different religious books.

Text Books:

1. Chakroborty, SK. 'Values and Ethics for Organizations – Theory and Practise', - Oxford University Press, NewDelhi.

Reference Books:

1. Values and Virtues in Organizations: An introduction, Kim Cameron.

Course Outcomes:

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

1. Gain knowledge on self-development.
2. Learn the importance of Human Values.
3. Develop overall personality.
4. Develop their personality and achieve their highest goal of life.
5. Lead the nation and mankind to peace and prosperity.
6. Develop versatile personality.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Compiler Design

(Computer Science & Engineering)

III B. Tech - I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05501	**PCC**	3	0	0	3	30	70	100

Objectives

- To understand the basics of constructing compilers by applying mathematics and engineering principles.
- To construct a system for parsing the sentences in a context free grammar.
- To illustrate the various optimization techniques for designing compilers.
- To explore the process of Intermediate code Generation.
- To illustrate the methods of implementing a Code Generator for compilers.

Unit I – Introduction to Compilers and Lexical Analysis

Overview of Compilation: Introduction, Structure of compiler.

Lexical Analysis: The role of the lexical analyzer, input buffering, specification of tokens, recognition of tokens, the lexical analyzer generator (LEX/FLEX).

Learning Outcomes:

At the end of this unit, the student will be able to

1. Know the various types of language translators.
2. Explain the functions of each phase of the compiler.
3. Illustrate the usage of LEX tool.

Unit II – Top-Down Parsers

Syntax Analysis (Part-1): Introduction, context free grammars, top-down parsing: Brute force parsing, recursive descent parsing, predictive parsing and error recovery in predictive parsing.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Know the importance of parsing techniques.
2. Understand the construction of top-down parsers.

Unit III – Bottom Up Parsers

Syntax Analysis (Part-2): Shift reduce parsing, operator precedence parsing. Introduction to LR Parsing, Canonical LR and Look ahead LR, error recovery in LR parsers, parser generator (YACC).

Learning Outcomes:

At the end of this unit, the student will be able to

1. Know the construction of LR parsers.
2. Differentiate top down and bottom-up parser.
3. Illustrate the error recovery in LR parsers.

Unit IV – Syntax Directed Translation & Intermediate Code Generation

Syntax-Directed Translation: Syntax-Directed Definitions, evaluation orders for SDD's, application of SDT, SDT schemes, implementing L-attribute SDD's.

Intermediate Code Generation: Variants of syntax trees, three address code, Quadruples, Triples, Type expressions, Type equivalence, Type checking, Translation of expressions, control flow statements, switch statement, procedures, back patching.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the process of syntax directed translation.
2. Write the intermediate code using three address codes.

Unit V – Code Optimization and Generation

Machine Independent Optimization: The principal sources of optimization, basic blocks, flow graphs, loop optimization, DAG representation of basic block, local optimization, peephole optimization.

Code Generation: Issues in the design of a code generator, a simple code generator, register allocation and assignment.

Learning Outcomes: At the end of this unit, the student will be able to

1. Reduce the code using machine independent optimization techniques.
2. Explain the various code generation algorithms.
3. Design a compiler for new languages.

Text Books:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques and Tools, Second Edition, Pearson Education, 2009.
2. Compiler Design, K. Muneeswaran., Oxford University Press, 2012

Reference Books:

1. Compiler Construction, K.V.N Sunitha, Pearson, 2013
2. Engineering a Compiler, Second Edition, Keith D. Cooper & Linda Torczon., Morgan Kaufmann, Elsevier, 2011.
3. Compilers Principles and Practice, Parag H. Dave, Himanshu B. Dave., Pearson

e-Resuorces:

1. https://nptel.ac.in/courses/106/105/106105190/
2. https://ndl.iitkgp.ac.in/

Course Outcomes:

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

1. Demonstrate the types of translators and phases of compiler.
2. Build tokens and parsers using LEX and YAAC tools
3. Construct the parsers for a Context Free Grammar
4. Develop the intermediate code for the back end of the compiler.
5. Make use of optimization techniques for dataflow analysis.
6. Build the code generator to generate the target code.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Computer Networks

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05502	**PCC**	3	0	0	3	30	70	100

Objectives

- To explore the fundamental concepts of computer networking, protocols, architectures, and applications.
- To acquire knowledge in design, implement and analyze performance of layers in networking.
- To explore the fundamental concepts of network security.

Unit I – Introduction to Computer Networks

Introduction: Uses of Computer Networks, Network Hardware, Network Software, Reference Models.

Physical Layer: Theoretical basis for Data Communications, Transmission media, Circuit Switching and Packet Switching.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explore fundamentals of Network Hardware and Software.
2. Compare and Contrast TCP/IP Reference Model with OSI Model.
3. Illustrate various transmissions medium and its communication technologies.

Unit II – Data Link Layer

Data Link Layer: Design issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols.

Medium Access Control Layer: Channel Allocation Problem, Multiple Access Protocols, Ethernet, Wireless LAN.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Illustrate design issues of Data Link Layer.
2. Explore various types of elementary and sliding window protocols.
3. Explore Multiple Access protocol and switching.

Unit III – Communication Layer

Network Layer: Design issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internetworking, and Network Layer in the internet.

Transport Layer: Transport Services, Elements of Transport Protocols, Congestion Control, UDP, TCP, Performance issues.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the design issues, algorithms and QoS of network layer.
2. Illustrate transport services in the transport layer.
3. Illustrate Delay-Tolerant Networking.

Unit IV – Application Layer

Application Layer: DNS, Remote Logging, File Transfer, Electronic-Mail, WWW, HTTP, Network Management Systems, SNMP.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Illustrate various types of Applications in Application Layer.
2. Explore various Application technologies like DNS, Remote Logging, File Transfer, E-mail.
3. Describe the fundamentals of Network Management Systems.

Unit V – Introduction to Network Security

Cryptography: Introduction, Substitution ciphers, Transposition ciphers. Symmetric-key Algorithms: AES, DES. Public-Key Algorithms: RSA.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the fundamentals and principles of Cryptography.
2. Demonstrate Symmetric-key Algorithms.
3. Demonstrate Public-Key Algorithms.

Text Books:

1. "Computer Networks", Andrew S. Tanenbaum and David J. Wetharall, Prentice Hall, fifth Edition, 2011.
2. "Data Communications and Networking", Behrouz A. Forouzon, Sophia Chung Fegan, McGraw Hill Higher Education fifth Edition, 2012.

Reference Books:

1. "Computer Networks: A Systems Approach", Larry Peterson and Bruce Davie, 5th Ed, The Morgan Kaufmann Series, Elsevier, 2011.
2. "Computer Networking: A Top-Down Approach Featuring the Internet", J.F. Kurose and K.W.Ross, 6th Ed., Pearson Education, 2012.
3. "Data and Computer Communications", William Stallings, Pearson Education, 10th Ed, 2013.

E-Resources:

1. https://onlinecourses.swayam2.ac.in/cec21_cs19/preview
2. National Digital Library of India, https://ndl.iitkgp.ac.in

Course Outcomes:

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

1. Demonstrate the different building blocks of Communication network and its architecture.
2. Choose different types of networks and calculate the performance of network.
3. Identify and examine design issues of Data Link Layer.
4. Compare and contrast various types of Routing Algorithms and Congestion Control Algorithms.
5. Demonstrate fundamentals of transport services, protocols, and congestion control Algorithms and its performance.
6. Make use of fundamental applications of Application Layer and its Security mechanisms.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Operating Systems

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05503	**PCC**	3	0	0	3	30	70	100

Objectives

- To introduce the operating system concepts, designs and provide skills required to implement the services.
- To describe the trade-offs between conflicting objectives in large-scale system design.
- To develop the knowledge for application of the various design issues and services.

Unit I – Introduction to Operating System

Introduction: Operating System Operations, Resource Management, Security and Protection, Virtualization, Distributed Systems, Computing Environments.

Operating-System Structures: Operating-System Services, User and Operating-System Interface, System Calls, System Services.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Determine the functionality of operating systems
2. Illustrate the process of virtualization, computing environments.
3. Illustrate the role of services, interfaces and system calls.

Unit II – PROCESS MANAGEMENT

Processes: Process Concept, Scheduling, Operations. Inter process Communication: Shared-Memory Systems, Message-Passing Systems, Examples, Communication in Client–Server Systems. CPU Scheduling**:** Scheduling Criteria, Scheduling Algorithms, Threads.

Process Synchronization: The critical-section problem, Petersons Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Demonstrate the process features like scheduling, creation and termination.
2. Explore IPC in Shared-Memory Systems and Message-Passing Systems.
3. Demonstrate Client-Server Communication Systems.

Unit III – MEMORY MANAGEMENT

Contiguous Memory Allocation, Swapping, Paging, Page Replacement algorithms, Thrashing, Memory Compression.

Deadlocks: System Model, Deadlock Characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Investigate various techniques of allocating memory to processes.
2. Illustrate concepts of demand-paging, page-replacement algorithms.
3. Illustrate different methods for preventing or avoiding deadlocks.

Unit IV – STORAGE MANAGEMENT & FILE SYSTEM

Mass-Storage Structure: Overview of Mass-Storage Structure, Disk Scheduling, Storage Attachment, RAID Structure.

I/O Systems: I/O Hardware**,** Application I/O Interface, Kernel I/O Subsystem, Transforming I/O

Requests to Hardware Operations.

File-System: File Concept, Access Methods, Directory Structure, Protection, Memory-Mapped Files, File system structure and Implementation.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Evaluate disk scheduling algorithms.
2. Explore file-system protection.
3. Illustrate local file systems, directory structures and remote file systems.

Unit V – Security and Protection

Protection: Goals, Principles and domain, Access Matrix, Implementation of Access Matrix and Access control, Revocation of Access Rights.

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Illustrate goals and principles of protection in modern operating system.
2. Demonstrate security threats and attacks.
3. Demonstrate various virtual machine technologies.

Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley, Tenth Edition, 2018.
2. Operating Systems: Design And Implementation, Andrew S. Tanenbaum, Albert S. Woodhull, Pearson, 3rd Edition, 2015.

Reference Books:

1. Operating Systems, A Spiral Approach, Ramez Elmasri, A.Gil Carrick, David Levine, McGrawHill Higher Education, 2010.
2. Operating Systems, Three Easy Pieces, Remzi H. Arpaci-Dusseau, Andrea C. Arpaci-Dusseau, Arpaci-Dusseau Books, 2015.
3. Operating Systems: and design Principles,5th Edition,William Stallings,PHI.

e-Resources:

1. https://onlinecourses.nptel.ac.in/noc21_cs72/preview
2. National Digital Library of India, https://ndl.iitkgp.ac.in

Course Outcomes:

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

1. Illustrate various types of system calls and find the stages of various process states.
2. Implement thread scheduling and process scheduling techniques.
3. Distinguish among IPC synchronization Techniques.
4. Implement page replacement algorithms, memory management techniques and deadlock issues.
5. Make use of the file systems for applying different allocation and access techniques.
6. Illustrate system protection and Security.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Web Development Technologies

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05504	**PCC**	3	0	0	3	30	70	100

Objectives

- To explore the fundamental concepts of web, internet protocols, client-server model, and applications.
- To acquire knowledge in design and implement web applications.
- To demonstrates the uses of scripting languages.
- To explore the fundamental concepts of AngularJS, React JS and Node.js.

Unit I – Introduction to Web and Internet

Introduction: Introduction to Networks, Internet, Web Protocols, Web Organization and Addressing.

Web Browsers and Web Servers: Apache HTTP Server, Apache Tomcat Server, XAMPP Server, Installations of above Servers, Web System Architecture, URL, Domain Name, Client-Side and Server-Side Scripting Technologies.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explore fundamentals of Internet and Web.
2. Illustrate Client-Server Model.
3. Demonstrate the installation of Web Servers.
4. Explain the Scripting Technologies.

Unit II – Web Designing

HTML5: Basics of HTML5 Elements, Tags, Tables, List, Form Elements, Frames and Media Elements.

CSS3: Properties, Selectors, Types of CSS. Introduction to Bootstrap & its Components.

XML: Basics of XML, Document Type Definition (DTD), XML Schema, XML-DOM, XSLT.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Create HTML forms, tables, Lists.
2. Apply various styles using CSS.
3. Create DTD, XML, XSLT based web applications.

Unit III – JavaScript

Basics: Introduction to JavaScript, Data Types and Variables, Operators, Expressions, Statements, Objects, Arrays, Functions, Regular Expressions, Windows Object, Scripting Documents, Handling Event.

Advanced JavaScript: Introduction to JSON – JSON Structure, The jQuery Library, Introduction to AJAX, AngularJS, Understanding Angular, Angular Components.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the basic concepts of JavaScript.
2. Demonstrate web page using jQuery and AJAX.
3. Explain the concepts of AngularJS components.

Unit IV – PHP & DATABASE CONNECTIVITY

Introduction to PHP: Introduction, Download, Install and Configure of PHP, Anatomy of A PHP.

Overview of PHP Data Types and Concepts: Variables and Data Types, Operators, Expressions and Control Statements, Strings, Arrays and Functions, Regular Expressions.

PHP advanced concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating Users

MySQL Basics: Introduction to MySQL, Querying Single and Multiple MySQL databases with PHP – PHP data objects.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Learn how to configure PHP.
2. Demonstrate the need of Regular Expressions.
3. Explain PHP advanced concepts like Cookies, HTTP Headers, Sessions.
4. Learn the basic concepts of Database Connectivity using MySQL.

Unit V – Application Development Using Node.js

Overview of Node.js: Introduction to Node.js, Installing Node.js, Using Events, Listeners, Timers, and Callbacks in Node.js, Handling Data I/O in Node.js. Introduction to Mongodb, Accessing Mongodb from Node.js, Advanced MongoDB Concepts, Express Framework.

Learning Outcomes: At the end of this unit, the student will be able to

1. Explain the fundamentals of Node.js.
2. Explain the importance of mongodb and mangoose.
3. Demonstrate various advance concepts of Node.js.
4. Demonstrate Express Framework.

Text Books:

1. Chris Bates, Web Programming: Building Internet Applications, 3rd Edition.
2. Brad Dayley, Brendan Dayley, and Caleb Dayley, Node.js, MongoDB and Angular Web Development: The definitive guide to using the MEAN stack to build web applications, 2nd Edition, Pearson Education, 2018.

Reference Books:

1. Paul Deitel, Harvey Deitel, Abbey Deitel, Internet & World Wide Web - How to Program, 5th edition, Pearson Education, 2012.
2. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, A press Publications (Dream tech.).
3. David Flanagan, "JavaScript: The Definitive Guide, Sixth Edition", O'Reilly Media, 2011.

e-Resource:

1. "Introduction to modern application development": https://nptel.ac.in/course.html

Course Outcomes:

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

1. Implement dynamic web pages effectively by using HTML, CSS and JavaScript.
2. Develop XML, DTD, XML Schema, XSLT based web applications.
3. Develop an application using JQuery, JSON, AJAX.
4. Develop real time application by using PHP and MySQL.
5. Implement Cookies, HTTP Headers, Sessions in PHP.
6. Develop application using Node.js, Angular JS/React JS and MongoDB.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – I

Artificial Intelligence

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05505	**PEC**	3	0	0	3	30	70	100

Objectives

- To learn the distinction between optimal reasoning Vs. human like reasoning.
- To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, and Machine Learning.

Unit I – Introduction

Problem Solving by Search-I: Introduction to AI, Intelligent Agents.

Problem Solving by Search –II: Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies, informed (Heuristic) Search Strategies, Beyond Classical Search: Hill-climbing search, simulated annealing search, Local Search in Continuous Spaces, Searching with Non-Deterministic Actions.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Recognize the importance of Artificial Intelligence.
2. Identify how intelligent agent is related to its environment.
3. Know various uninformed and informed search strategies.

Unit II – Problem Solving by Search-II and Propositional Logic

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

Learning Outcomes:

At the end of the unit, students will be able to

1. Demonstrate the importance the constraint satisfaction problems.
2. Explain effective usage of propositional logic in knowledge representation.
3. Learn how resolution works.

Unit III – Logic and Knowledge Representation

First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution

Learning Outcomes:

At the end of the unit, students will be able to

1. Know the difference between propositional logic and predicate logic.
2. Illustrate both forward and backward chaining.
3. Explain the inference mechanism in FOL.

Unit IV – Planning

Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, and Analysis of Planning approaches.
Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains.

Learning Outcomes:
At the end of the unit, students will be able to

1. Explain the importance of graphs in real world problems.
2. Illustrate the BLOCKS-WORLD problem.
3. Know various types of planning with respect to time.

Unit V – Uncertain knowledge and Learning

Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use,
Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions and Approximate Inference in Bayesian Networks.
Learning: Forms of Learning, Supervised Learning, Learning Decision Trees. Knowledge in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

Learning Outcomes:
At the end of the unit, students will be able to:

1. Knowing the importance of Bayes' theorem and its applications
2. Illustrate about Bayesian Belief Networks
3. Explain different types of learning

Text Books:

1. Stuart J.Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", 3rd Edition, Pearson Education, 2019.
2. Artificial Intelligence, 3rd Edn, E. Rich and K.Knight (TMH)

Reference Books:

1. Artificial Intelligence, 3rd Edn., Patrick Henny Winston, Pearson Education.
2. Artificial Intelligence, Shivani Goel, Pearson Education.
3. Artificial Intelligence and Expert systems – Patterson, Pearson Education.

Course Outcomes:

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

1. Formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Make use of the skill for representing knowledge using the appropriate technique for a given problem.
4. Identify and Implement AI techniques to solve problems of game playing, and Machine Learning.
5. Solve problems involving uncertain information using probabilistic techniques.
6. Demonstrate propositional and predicate logic to represent knowledge.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – I

Internetworking with TCP/IP

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05506	PEC	3	0	0	3	30	70	100

Objectives

- Understand Internet Protocol Addressing Schemes.
- Understand Network Design and Implementation essentials.
- Understand the Design and Implementation of TCP/IP Networks.
- Understand on Network Management issues.
- Learn to Design and Implement Network Applications.

Unit I – INTRODUCTION

Internetworking concepts and architecture model – classful Internet address – CIDR – Subnetting and Supernetting – AARP – RARP- IP- IP Routing – ICMP – IPV6.

Learning Outcomes:

After completing this Unit, students will be able to

1. Design networks with ipV4 classful addressing, realize issues, design with CIDR, IPV6 fields and benefits.
2. Differentiate and implement subnetting and supernetting.
3. Understand the need of ARP and RARP, components and interactions in ARP and RARP.
4. Work with ICMP packet fields and Functions, test and troubleshoot sequences for ICMP.

Unit II – TCP

Services – header – connection establishment and termination – interactive data flow – bulk data flow – timeout and retransmission – persist timer – keep alive timer – futures and performance.

Learning Outcomes:

After completing this Unit, students will be able to

1. Describe various functions of TCP.
2. Understand the TCP implementation using different techniques.

Unit III – IP IMPLEMENTATION

IP global software organization – routing table – routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).

Learning Outcomes:

After completing this Unit, students will be able to

1. Understand the datagrams from the network interface software as well as outgoing datagrams with uniform input queue and uniform routing.
2. Understand and work with routing tables and routing algorithms.
3. Understand and handle fragmentation works, reassemble works and Handling loss and duplicates.
4. Learn detailed knowledge of error processing with ICMP and IGMP

Unit IV - TCP IMPLEMENTATION-I

Data structure and input processing – transmission control blocks – segment format – comparison – finite state machine implementation – Output processing – mutual exclusion – computing the TCP Data length.

Learning Outcomes:

After completing this Unit, students will be able to

1. Understand TCP input processing, output processing and its associated data structures.
2. Learn detailed knowledge of data unit formats and FSM implementation.

Unit V – TCP IMPLEMENTATION-II

Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission – congestion avoidance and control – urgent data processing and push function.

Learning Outcomes:

After completing this Unit, students will be able to

1. Describe the timer mechanism, flow control, congestion control of data.
2. Learning knowledge on event, timer, and message processing.

Text Books:

1. Douglas E Comer," Internetworking with TCP/IP Principles, Protocols and Architecture", Vol1, VIth Edition, Addison-Wesley Professional,2013.
2. W. Richard Stevans "TCP/IP Illustrated" Pearson Education Vol 1. 2012.

Reference Books:

1. Forouzan, "TCP/IP Protocol Suite" Fourth Edition, Tate MC Graw Hill, 2010.
2. W. Richard Stevens "TCP/IP Illustrated" Volume 2, Pearson Education 2003.
3. A. S. Tanenbaum – "Computer Networks (4th Ed.)" – Pearson Education/PHI

Course Outcomes:

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

1. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation
2. Describe the functions of TCP.
3. Make use of different routing protocols and the mechanism of IP Protocols.
4. Differentiate between subnetting and supernetting.
5. Implement the TCP Model using different techniques.
6. Describe the timer mechanism, flow control, congestion control of data.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – I

Software Requirements & Estimation

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05507	**PEC**	3	0	0	3	30	70	100

Objectives

- Understand the good practices for requirements engineering.
- Understand Requirements elicitation, elicitation techniques.
- Acquire the knowledge on analysis models, Software quality attributes.
- Understand software estimation, size estimation.
- Understand Effort, Schedule and Cost Estimation.

Unit I – Software Requirements

What and Why: Essential Software requirement, good practices for requirements engineering, Improving requirements processes, Software requirements and risk management.

Software Requirements Engineering: Requirement's elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Identify the essential software requirements of a project.
2. Understand the good practices for requirements gathering.
3. Illustrate requirements elicitation techniques.
4. Understand the requirements elicitation techniques.

Unit II – Software Requirements Management & Modeling

Software Requirements Management: Requirements management Principles and practices, Requirements attributes, Requirements Traceability Matrix, Links in requirements chain.

Software Requirements Modeling: Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Implement good practices of requirements management.
2. Understand the change management Process.
3. Analyze the components of requirements chain.
4. Implement the requirements using use case modeling diagrams.

Unit III – Software Estimation

Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation.

Size Estimation: Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explore the software estimation methods.
2. Analyze the factors that influence the estimation.
3. Illustrate the size estimation of a software project.

Unit IV – Effort, Schedule and Cost Estimation

What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Illustrate various types of effort and cost estimation models.
2. Analyze the cost estimation using algorithmic models.
3. Understand the COCOMO II model to estimate the cost, effort and schedule to develop new software.

Unit V – Tools for Requirements Management and Estimation Requirements Management

Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation.

Software Estimation Tools: Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explore the benefits of requirements management tools.
2. Demonstrate various types of Symmetric-key Algorithms.
3. Analyze the process automation for requirements management.
4. Illustrate tools for software estimation.

Text Books:

1. Swapna Kishore, Rajesh Naik, Software Requirements and Estimation, 1st Edition, Tata Mc Graw Hill, 2001.
2. "Data Communications and Networking", Behrouz A. Forouzon, Sophia Chung Fegan, McGraw Hill Higher Education fifth Edition, 2012.

Reference Books:

1. Karl E. Weigers, Software Requirements, 2nd Edition, Microsoft Press, 2003.
2. Estimating Software Costs, Second edition, Capers Jones, TMH, 2007.
3. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.

Course Outcomes:

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

1. Identify the minimum requirements for the development of application.
2. Organize the requirements of elicitation techniques and prototyping.
3. Gain knowledge about requirement management, their principles and practices.
4. Implement use case modeling and data diagrams for a given Scenario.
5. Demonstrate Estimation of the software in terms of size, cost, effort and schedule.
6. Make use of the tools for Analyzing the requirements management process automation.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Mandatory Course

Indian Constitution

(Common to all branches)

III B. Tech-I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194GA0MC02	NCMC	2	0	0	0	30		30

Objectives

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- Address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- Address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT I - History & Philosophy of the Indian Constitution

History of making of the Indian Constitution: History, Drafting Committee (Composition & Working) Philosophy of the Indian Constitution: Preamble, Salient Features.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the history of Indian Constitution.
2. Understand the Philosophy of Indian Constitution.

UNIT II - Contours of Constitutional Rights and Duties

Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the contours of Constitutional rights and duties.

UNIT III - Organs of Governance

Parliament, Composition, Qualifications and Disqualifications, Powers and Functions- Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand different organs of governance.

UNIT IV - Local Administration

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative CEO of Municipal Corporation.

Panchayati Raj: Introduction, PRI: ZillaPanchayat, Elected officials and their roles, CEO.**ZillaPanchayat**: Position and role, Block Level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand different levels of local administration.

UNIT V - Election Commission

Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the role and duties of election commission

Text Books:

1. The Constitution of India, 1950 (Bare Act), Government0 Publication.

Reference Books:

1. Dr.S.N. Busi and Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition,2015.
2. M.P. Jain, Indian Constitution Law, 7th Edition, Lexis Nexis,2014.

Course Outcomes:

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

1. Get the clarity and idea about function of Indian constitution.
2. Understand the Rights of equality, the Right of freedom and the Right to constitutional remedies.
3. Grab the knowledge of union government & their powers and function.
4. Understand state and central policies, fundamental duties.
5. Understand powers and functions of Municipalities, Panchayats and Co-operative Societies.
6. Understand Electoral Process, special provisions.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Computer Networks and OS Lab

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05510	**PCC**	0	0	3	1.5	30	70	100

Objectives

- To familiarize with packet tracer simulator.
- To explore on scheduling algorithms, synchronization Problems and file and Memory management Mechanisms.

List of Experiments:

1. Installation and Configure CISCO Packet Tracer Simulator.
2. Implementation of IP Addressing in simple network.
3. Static Routing Configuration.
4. Configuring Routing Information Protocol (RIP).
5. Configuring Open Shortest Path First (OSPF) Protocol.
6. Implement DHCP & DNS.
7. Demonstration of Telnet & SSH.
8. Implement e-mail using SMTP / POP3.
9. Write a program to stimulate following CPU scheduling Algorithms.
   a) FCFS b) SJF c) Round Robin d) Priority.
10. Write a program to stimulate Producer-Consumer Problem using Semaphores.
11. Write a program to stimulate Dining-philosophers problem.
12. Write a Program to stimulate MVT and MFT.
13. Write a Program to stimulate the following contiguous memory allocation techniques.
    a) Worst Fit b) Best Fit c) First Fit
14. Write a Program to stimulate the following page replacements algorithms.
    a) FIFO b) LRU c) OPTIMAL
15. Write a Program to stimulate the following File Organization Techniques.
    a) Single Level Directory b) Second Level Directory
16. Write a Program to stimulate the following file allocation strategies.
    a) Sequential b) Indexed c) Linked
17. Write a Program to stimulate the following Bankers algorithm.
    a) Dead Lock Avoidance b) Dead Lock Prevention
18. Write a Program to stimulate the following Disk scheduling Algorithms.
    a) FCFS b) SCAN c) C-SCAN

Reference Books:

1. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition, PHI.
2. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI.
3. Compilers: Principles, Techniques, and Tools (Second Edition) Alfred Aho, Monica Lam, Ravi Sethi, and Jeffrey Ullman. Addison-Wesley

Course Outcomes:

At the end of the lab, students will be able to

1. Implement the IPC between Processes and Synchronization mechanism.
2. Stimulate the algorithms of CPU Scheduling, Disk Scheduling, Page replacements and Bankers.
3. Stimulate the File and Memory Allocation techniques.
4. Demonstrate implementation of Packet Tracer.
5. Implement the routing protocols.
6. Create IP address for both static and dynamic protocols.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Web Development Technologies Laboratory

(Computer Science & Engineering)

III B. Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05511	**PCC**	0	0	3	1.5	30	70	100

Objectives

- To develop client-server application using modern technologies.
- To build single-page web applications using AngularJS.
- Create dynamic web pages using Java Script and AJAX.
- To enhance the knowledge to Node.js, ReactJS and mongodb.

List of Experiments

1. Write a procedure to download and Installation of Apache HTTP Server, Apache Tomcat Server and XAMPP Server.
2. To create an HTML page by using basic HTML Tags, Table Tags, List Tags, Image Tags, anchor Tags.
3. To create a simple student Bio - data form using html5. It should contain the following First Name, Last Name (text box), address (multiline text box), Gender (radio button Male, Female, Transgender), Email Id, Phone No., Known Technologies (checkboxes – C, Java, Angular JS, ReactJS, Node.js etc.), Extracurricular activities (text box), Nationality (combo box), Submit and Reset button.
4. Design an HTML page by using frames such that page is divided into 3 frames 20% on top to show contents of College Name and Department Name, 30% in left to show list of faculty names, remaining on right to show faculty profiles/details (Note: if you click particular faculty, it will display only that faculty details).
5. Design the webpage by applying the different styles using inline, internal & external style sheets.
6. Write an XML file which will display the Book information which includes the following: a) Title of the book b) Author Name c) ISBN number d) Publisher name e) Edition f) Price.
7. Create a Schema to describe a library. Library has one or more - books, members and staffs. (a) Each book has BookID (Attribute), Title, one or more Authors, Publisher Year of Publication, ISBN and Price. (b) Each Member has MemeberID (Attribute), Name, Address, Phone number (c) Each Staff has StaffID (Attribute), Name, Address, Phone number. Each Author has AuthorID (Attribute), Name, Address, Phone number. (d) Each Publisher has PublisherID (Attribute), Name, Address, Phone number. Use the above DTD in a sample XML document.
8. 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.
9. Implement the web application using PHP, the user is first served a login page which takes user's name and password. After submitting the details, the server checks these values against the data from a database and takes the following decisions. If name and password match, serves a welcome page with user's full name. If name matches and password doesn't match, then serves "password mismatch" page If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password).
10. Write a PHP program to Insert, update and delete using student database.
11. a). Implement the web application using PHP, A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.
    b). Implement the web application using PHP, which takes a name as input and on

submit it shows a hello <name> page where<name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).

12. Write a Program to hide paragraph using jQuery.
13. Create a web page using Bootstrap.
14. Create a Single page Application (SPA) where navigation between the pages is performed without refreshing the whole page using AngularJS.
15. Create an HTML page to perform CRUD operations using ReactJS, Node.js and mongodb.

Reference Books:

1. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, And AJAX, Black Book, KOGENT LEARNING SOLUTIONS INC.
2. Web Technologies, Uttam K. Roy, 1st edition 7th impression, 2012, Oxford Higher Education

Course Outcomes:

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

1. Install Apache HTTP Server, Apache Tomcat Server and XAMPP Server to run web applications in local host.
2. Create dynamic web pages by using HTML, CSS and JavaScript.
3. Develop XML, XSLT based web applications
4. Implement client and server-side scripting using PHP.
5. Create an HTML page to perform CRUD operations using PHP.
6. Develop an application using Angular JS, Node.js and MongoDB.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Data Warehousing & Data Mining

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05601	**PCC**	3	0	0	3	30	70	100

Objectives

- Familiarize with mathematical foundations of data mining tools.
- Introduce classical models and algorithms in data warehouses and data mining.
- Investigate the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- Explore data mining techniques in various applications like social, scientific and environmental context.

Unit I – Introduction to Data Warehousing

Basic Concepts: Data Warehousing Components: Building a Data Warehouse, Database Architectures for Parallel Processing, Multidimensional Data Model, Data Warehouse Schemas for Decision Support, Concept Hierarchies: Characteristics of OLAP Systems, Typical OLAP Operations, OLAP and OLTP.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Identify the component of Data warehouse.
2. Create the architecture of Data warehouse.
3. Apply different types of OLAP operations.

Unit II – Introduction to Data Mining

Knowledge Discovery Process: Data Mining Techniques, Issues, applications, Data Objects and attribute types, Statistical description of data.
Data Preprocessing, Data Visualization, similarity and dissimilarity measures.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Summarize the data processing steps.
2. Apply data cleaning process.

Unit III – Association Rule Mining

Mining Frequent Patterns, Associations and Correlations: Mining Methods ,Pattern Evaluation Method , Pattern Mining in Multilevel, Multi Dimensional Space: Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand Association Rules.
2. Apply different Mining Methods.
3. Review Classification using Frequent Patterns.

Unit IV – Classification

Decision Tree Induction, Bayesian Classification, Rule Based Classification, Classification by Back Propagation, Support Vector Machines, Lazy Learners, Model Evaluation and Selection, Techniques to improve Classification Accuracy.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Creating Decision Tree
2. Evaluate Classification techniques

Unit V – Clustering Techniques

Cluster analysis, Partitioning Methods: Hierarchical Methods, Density Based Methods, Grid Based Methods, Outlier analysis, outlier detection methods.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Implement various clustering algorithms on the given data.
2. Able to know about Outlier detection.

Text Books:

1. Jiawei Han and Micheline Kamber, —Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.
2. Pang Ning Tan, Michael Steinbach, Vipin Kumar - - Introduction to Data Mining, Pearson Publishers, 2016.

Reference Books:

1. Alex Berson and Stephen J.Smith, —Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, —Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H.Witten and Eibe Frank, —Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.

e-Resource:

1. National Digital Library of India, https://ndl.iitkgp.ac.in

Course Outcomes:

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

1. Illustrate a Data warehouse system and business analysis
2. Implement pre-processing and visualization techniques for knowledge analysis.
3. Use frequent pattern and association rule mining techniques to calculate support and confidence of business data.
4. Identify classification techniques for a given data.
5. Choose clustering techniques for grouping analysis.
6. Demonstrate the basic principles and algorithms used in practical data mining using WEKA Tool.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Android Application Development

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05602	**PCC**	3	0	0	3	30	70	100

Objectives

- Understand fundamentals of android operating systems.
- Illustrate the various components, layouts and views in creating android applications
- Understand advance concepts of android programming.
- Understand the fundamentals of Kotlin programming in android.

Unit I – Introduction to Android

Introduction: Android Studio Installation and Configuration of SDK and JDK**,** Basic Building blocks – Activities, Services, Broadcast Receivers & Content providers, UI Components -Views & notifications, Components for communication -Intents & Intent Filters, Android API levels.

Basics of Android: AndroidManifest.xml, Uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Drawable Resources, Activities and Activity lifecycle, First sample Application

Learning Outcomes:

At the end of this unit, the student will be able to

1. Illustrate the importance of Building blocks of android.
2. Explore fundamentals of UI components.
3. Demonstrate the installations of Android Studio.
4. Explore design and implementation of the app according to Activity life cycle.

Unit II – UI Design

Basic UI Design: Form widgets, Text Fields, Layouts – (dip, dp, sip, sp) versus px, Shared Preferences, Preferences from xml, Menus, Intents, Fragments, Time and Date, Images and media, Composite, Alert Dialogs & Toast Messages, Popup.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Design using Form widgets and Menus.
2. Demonstrate various Layouts in UI Design.
3. Create an app using various intents and Fragments.
4. Illustrate the Alert Dialogs & Toast, popup.

Unit III – Database Connectivity and Adapters

Overview of Content Providers: SQLite Programming, SQLiteOpenHelper, SQLiteDatabse, Cursor, Reading and updating.

Linkify: Web URLs, Email address, text, map address, phone numbers, MatchFilter & TransformFilter.

Adapters and Widgets: Introduction to Adapters and its types ListView - ListActivity, Custom listview, GridView using adapters, Gallery using adapters

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain the concept of SQLite Database and its operations.
2. Implement cursors for content provider through SQLite.
3. Demonstrate the various Adapters.
4. Demonstrate the significance of Widgets with various views.

Unit IV – Services & Broadcast Receivers

Notifications: Broadcast Receivers, Services and notifications, Alarms.
Custom Components: Custom Tabs, Custom animated popup panels, other components.
Services: Overview of services in Android, implementing a Service, Service lifecycle, Inter Process Communication (AIDL Services).

Learning Outcomes:
At the end of this unit, the student will be able to

1. Demonstrate the Broadcast Receivers Services and notifications.
2. Demonstrate the various custom components.
3. Explain need of Services in android.
4. Implement the services using service life cycle.

Unit V – Application Development Using Kotlin

Introduction Kotlin, IntelliJ, Features, Structure of Kotlin Programming. Convert Main Activity to kotlin Code. Operators, Data types, Variables, Conditionals, Lists and arrays, Null safety. Functions, Classes & Objects, Extensions.
First App: Your first app, Anatomy of an Android app, Layouts and resources in Android Activities, Make an app interactive, Gradle: Building an Android app in kotlin.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Explain the fundamentals of Kotlin Programming.
2. Explain the connectivity of IntelliJ-j with kotlin.
3. Illustrate the sunctions, classes and Extensions in kotlin.
4. Create an android app using the Kotlin programming language and Gradle building.

Text Books:

1. Android programming by B.M Halwani, Pearson Education, 2013.
2. Kotlin in Aciton by Dmitry Jemerov and Svetlana Isakova, Manning Publications, 2017.

Reference Books:

1. Android application Development for Java Programmers, James C Sheusi, Cengage Learning
2. Learn Kotlin for Android development, Peter spath, Leipzig- Apress, -2019.
3. Kotlin for Android Developers by Antonio Leiva, 2017.

e-Resources:

1. "Android for Developers" https://developer.android.com/
2. "Android app using Kotlin" https://onlinecourses.swayam2.ac.in/

Course Outcomes:

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

1. Demonstrate data sharing with different applications for sending and intercepting messages through broadcasting.
2. Develop an android application using services and publishing.
3. Illustrate the advancement in android application development.
4. Demonstrate the tools like IntelliJ and android studio for android software development.
5. Design the application with database connectivity using modern tools.
6. Develop an application using kotlin programming.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective-II
AI Tools, Techniques AND Applications

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05603	**PEC**	3	0	0	3	30	70	100

Objectives

- Expose fundamental concepts in AI.
- Demonstrate the capability to create simple AI applications using Natural Language.
- Processing, Speech Recognition, Computer Vision, Pattern recognition.
- Present various modeling and formulation techniques to solve problems using AItechniques.
- Introduce state-of-art AI tools and techniques to solve various problems faced byEngineers in design and analysis.

Unit I: FUNDAMENTALS OF AI

AI: Definition, Applications, Search Strategies: BFS, DFS.
Knowledge representation and reasoning: Knowledge based Agent, Wumpus World Environment, Logics.
Machine Learning: Supervised Learning, Linear Regression, Logistic Regression, Unsupervised Learning, K -means clustering, Anomaly Detection, and Reinforcement Learning.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Know various informed and uninformed search strategies.
2. Get the importance of propositional and predicate logic.
3. Understand the different types learning mechanisms.

Unit II: NLP AND BOT TECHNOLOGIES

Natural Language Processing: Natural language Understanding, Sentiment Analysis, Segmentation and recognition, Speech Recognition, Text-to-Speech, NLP in the cloud, NL Interface.

Chatbots: Chatbot definition, Build a Chatbot, How has chatbot transformed user experience, Designing elements, best practices for chatbot development.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Understand the fundamentals of NLP.
2. Implement chatbot for the applications.

Unit III – IMAGE PROCESSING &APPLICATIONS

What is Image processing? Image Noise, Removal of Noise from Images, Color Enhancement, Fourier transforms, Feature detection and matching, Segmentation**,** Object detection, Face recognition, Recognition Databases and test sets. Application: Optical Character Recognition.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Understand the concept of image processing.
2. Understand the preprocessing techniques.
3. Demonstrate segmentation, face reorganization and object detection.
4. Implement Optical Character Recognition.

Unit IV – DEEP LEARNING

Introduction, Neural Networks, Deep Learning, Different types of Deep Neural Networks, forward propagation, Cost function, back propagation. APIs using Softwares Tensorflow and Keras.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Demonstrate the fundamentals of Neural networks.
2. Understand the implementation of CNN and RNN.
3. Design APIs using Softwares like Tensorflow and Keras.

Unit V – SMART APPLICATIONS

Smart Agriculture, Smart Transportation &Autonomous Vehicles, Smart Homes, Smart cities.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Design Smart Agriculture applications using deep learning.
2. Design Smart Transportation &Autonomous Vehicles applications using deep learning,
3. Design Smart Homes and Smart cities applications using deep learning.

Text Books:

1. Tom Markiewicz & Josh Zheng, Getting started with Artificial Intelligence, Published byO'Reilly Media, 2017.
2. Stuart J. Russell and Peter Norvig, Artificial Intelligence A Modern Approach.

Reference Books:

1. AurélienGéron, Hands on Machine Learning with Scikit-Learn and TensorFlow.
2. Concepts, Tools, and Techniques to Build Intelligent Systems, Published by O'Reilly, Media, 2017.
3. A classical approach to Artificial Intelligence, Munesh Chandra Trivedi, KhannaPublications.

Course Outcomes:

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

1. Illustrate concepts and applications of Artificial Intelligence.
2. Use a chatbot for natural language scenario.
3. Identify the features of digital images for object detection.
4. Implement the deep learning techniques using tensor flow and keras tools.
5. Compute Cost function for a deep neural network.
6. Demonstrate smart applications for automobiles, agriculture, homes, transport and cities.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective-II

Mobile Computing

(Computer Science & Engineering)

III B. Tech-II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194G1A05604	PEC	3	0	0	3	30	70	100

Objectives

- Understand basic concepts of Mobile Computing, Mobile Tele communications, and Mobile Network Infrastructure.
- Understand the issues and solutions of MAC layer, Network Layer, and Transport Layer of Mobile Networks.
- Understand data delivery models and database issues in mobile environment.
- Understand Ad-hoc Networks and its related concepts.
- Understand Protocols and Platforms used in Mobile environments.

Unit I – INTRODUCTION

Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. Radio Interfaces, Protocols, Localization, Calling, Handover, Security.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Familiar the basic concepts principles of mobile computing, Mobile Computing Architecture, and determine the applications and limitations of Mobile devices.
2. Get a working understanding of the applications, characteristics and limitations of mobile hardware devices including their user-interface modalities.

Unit II – (Wireless) Medium Access Control (MAC)

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/ (IEEE 802.11).

Learning Outcomes:

At the end of this unit, the student will be able to

1. Determine the functionality of wireless MAC for a mobile network.
2. Explain about various multiple access methods.
3. Understand fundamentals of wireless Networks.

Unit III – Mobile Network Layer

IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation, Route Optimization, DHCP.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain IP, Mobile IP and DHCP that provide the ability of a host to stay connected regardless of their location.
2. Describe Tunneling and Encapsulation.

Unit IV – Mobile Transport Layer

Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Learning Outcomes:
At the end of this unit, the student will be able to

1. Illustrate the fundamentals of TCP protocols.
2. Apply the mechanism to send packet streams from various applications simultaneously over a network.

Unit V – Data Dissemination and Synchronization

Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

Learning Outcomes: At the end of this unit, the student will be able to

1. Describe the timer mechanism, flow control, congestion control of data.
2. Learning knowledge on event, timer, and message processing.

Text Books:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press,2007, ISBN: 0195686772.

Reference Books:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing.

Course Outcomes:

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

1. Debate on any new technical issue related to this new paradigm and come up with a solution(s).
2. Make use of TCP/IP extensions for mobile networking.
3. Illustrate ad hoc network applications by using algorithms and protocols.
4. Develop any existing or new protocol related to mobile environment.
5. Illustrate security, energy efficiency, mobility, scalability, and their unique characteristics in mobile networks.
6. Illustrate the development of new mobile application.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective-II

Design Patterns

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05605	**PEC**	3	0	0	3	30	70	100

Objectives

- Understand design patterns and their underlying objects-oriented concepts.
- Learn the day-to-day problems faced by object-oriented designers and how design patterns solve them.
- Provide an interface for creating families of related objects without specifying their concrete classes.
- To know the consequences of combining patterns on the overall quality of a system.

UNIT I - Introduction to Design Patterns

Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Develop design patterns in Small Talk MVC.
2. Select and use a Design Pattern.
3. Solve problems using design patterns.

Unit II – Designing Document Editor: A Case Study

Design problems, Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns**.**

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the context in which the pattern can be applied.
2. Apply eight different patterns to Lexi's design.
3. Specify the kinds of objects to create new objects using prototype.

Unit III – Structural Patterns

Structural Patterns-1: Adapter, Bridge, Composite.

Structural Patterns-2: Decorator, Facade, Flyweight, Proxy, Discuss of Structural Patterns.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand structural patterns.
2. Explain adapter, bridge and composite structural patterns.
3. Create decorator, facade, flyweight and proxy structural patterns.

Unit IV – Behavioral Patterns

Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator. Behavioral Patterns-2: Mediator, Memento, Observer**.**

Learning Outcomes:

At the end of this unit, the student will be able to

1. Define behavioral patterns.
2. Demonstrate object scope behavioural patterns.
3. Justify description for different types of behavioural patterns.

Unit V – Behavioral Patterns-2

Behavioral Patterns-2(cont'd): State, Strategy, Template Method, Visitor and Discussion of Behavioral Patterns. The Pattern Community An Invitation, A Parting Thought.

Learning Outcomes: At the end of this unit, the student will be able to

1. Identify behavioral patterns.
2. Justify different types of behavioral patterns.
3. Determine community for patterns.

Text Books:

1. "Design Patterns: Elements of Reusable object-Oriented Software",Erich Gamma, John Vlissides PearsonEducation,1995.
2. Head First Design Patterns"Eric Freeman, Elisabeth Robson, 2nd edition O'Reilly Publications 2020.

Reference Books:

1. "Pattern's in JAVA" Mark Grand, Vol-I, WileyDreamTech.
2. "Pattern's in JAVA" Mark Grand, Vol-II By, WileyDreamTech.
3. "JAVA Enterprise Design Patterns", Mark Grand, Vol-III, WileyDreamTech.

Course Outcomes:

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

1. Know object-oriented principles of design patterns.
2. Describe the process of object creation using creational design patterns.
3. Describe interaction of objects or classes and responsibility distribution using behavioral patterns.
4. Describe behavioral patterns using encapsulation, history of pattern community.
5. Design a document Editor using classified design patterns.
6. Demonstrate composition of classes or objects using structural design patterns.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective-III

Natural Language Processing

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05606	**PEC**	3	0	0	3	30	70	100

Course Objectives:

This course is designed to:

- Explain and apply fundamental algorithms and techniques in the area of Natural Language Processing (NLP).
- Discuss approaches to syntax and semantics in NLP.
- Examine current methods for statistical approaches to machine translation.
- Explore Machine Learning techniques used in NLP.

Unit I – Introduction to Natural language

The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Organization of Natural language Understanding Systems.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Classify various NLP Applications.
2. Apply the logic by using Python Programming.
3. List the AI Languages.
4. Outline the Linguistic Background.

Unit II – Grammars and Parsing

Grammars and Parsing- Top-Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Bayes Rule, Shannon game, Entropy and Cross Entropy.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Demonstrate the Top- Down and Bottom-Up Parsing techniques.
2. Apply Bayes Rule, Shannon game, Entropy and Cross Entropy.
3. Develop game playing strategies using Shannon game.

Unit III – Grammars for Natural Language

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Human Preferences in Parsing.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Classify Grammars for Natural Language.
2. Explain Hold Mechanisms in ATNs.
3. Explain Human Preferences in Parsing.

Unit IV – Semantic Interpretation

Semantic & Logical form, Word senses & ambiguity, the basic logical form language, encoding ambiguity in the logical Form, Verbs & States in logical form, Speech acts & embedded sentences, Defining semantics structure model theory.

Language Modeling Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models,

Learning Outcomes:

At the end of this unit, the student will be able to

1. Distinguish Language model Evaluation.
2. List the types of Language Models.

Unit V – Machine Translation

Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, Brief History, Possible Approaches, And Current Status.

Multilingual Information Retrieval

Introduction, Document Preprocessing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources.

Multilingual Automatic Summarization

Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Datasets

Learning Outcomes:

At the end of this unit, the student will be able to

1. Apply Machine Translation techniques.
2. Elaborate Multilingual Information Retrieval and Multilingual Automatic Summarization.

Text Books:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications: From Theory To Practice-Daniel M.Bikel and Imed Zitouni, Pearson Publications.

Reference Books:

1. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
2. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2008.
3. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language
4. Processing, MIT Press, 1999.

Course Outcomes:

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

1. Outline Natural Language Processing and its applications.
2. Demonstrate parsing techniques for a formal grammar.
3. Implement Bayes' rule and Shannon game for finding parsing features
4. Explain the fundamentals of CFG and parsers and mechanisms in ATN's.
5. Use Semantic Interpretation and Language Modeling for finding probability of words in a sentence
6. Interpret Machine Translation and multilingual Information Retrieval systems and Automatic Summarization.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective-III

Mobile Adhoc Networks

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05607	**PEC**	3	0	0	3	30	70	100

Objectives

- To introduce the characteristic features of Adhoc wireless networks and their applications to the students.
- To enable the student to understand the functioning of different access and routing protocols that can be used for Adhoc networks.
- Learn the concepts of Security issues for designing a routing protocol for ad Hoc Networks.
- To enable the student to understand the need for security and the challenges and also the role of cross layer design in enhancing the network performance.

Unit I – INTRODUCTION

Introduction to ad-hoc networks – definition, characteristics features, applications. Characteristics of wireless channel, ad-hoc mobility models: indoor and outdoor models.

Learning outcomes:

At the end of this unit, the student will be able to

1. Understand various preliminaries to ad Hoc networks.
2. Identify the various ad-hoc mobility models.

Unit II – MEDIUM ACCESS PROTOCOLS

Design issues, goals and classification. Contention based protocols – with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.

Learning outcomes:

At the end of this unit, the student will be able to

1. Understand the concept of protocols for MAC.
2. Understand interfaces of ad Hoc networks.

Unit III – NETWORK PROTOCOLS

Routing Protocols: Design issues, goals and classification. Proactive Vs reactive routing, unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, energy aware routing algorithm, hierarchical routing, QoS aware routing.

Learning outcomes

At the end of this unit, the student will be able to

1. Able to differentiate routing protocols.
2. Evaluate the QoS related performance measurements of Ad hoc networks

Unit IV – END – END DELIVERY AND SECURITY

Transport Layer: Issues in designing – Transport layer classification, Adhoc transport protocols. **Security issues in Adhoc networks**: issues and challenges, network security

attacks, secure routing protocols.

Learning outcomes:

At the end of this unit, the student will be able to

1. Understand transport and security protocols for ad Hoc networks.
2. Understand the various Security Challenges in Ad-hoc networks.

Unit V – CROSS LAYER DESIGN

Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, cross layer cautionary perspective. Integration of Adhoc with Mobile IP networks.

Learning outcomes:

At the end of this unit, the student will be able to

1. Evaluate efficient use of network resources and achieving high adaptability.
2. Analyze the Integration of Adhoc with Mobile IP networks.

Text Books:

1. Siva Ram Murthy and B. S. Manoj, Ad hoc Wireless Networks Architecture and Protocols, 2nd edition, Pearson Edition, 2007.
2. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000.

Reference Books:

1. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobile ad-hoc networking, Wiley-IEEE press, 2004.
2. Mohammad Ilyas, The handbook of ad-hoc wireless networks, CRC press, 2002.
3. T. Camp, J. Boleng, and V. Davies "A Survey of Mobility Models for Ad-hoc Network"

Course Outcomes:

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

1. Illustrate the unique issues of Mobile Adhoc networks.
2. Describe current technology trends for implementing and deployment of Mobile Adhoc Networks
3. Articulate the challenges in designing MAC and transport protocols for Mobile Adhoc networks.
4. Explain the challenges in designing routing protocols for Mobile Adhoc networks.
5. Identify security issues for Mobile Adhoc Networks.
6. Examine the concept of cross layer design and upper layer issues in Mobile Adhoc networks.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective-III

Software Project Management

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05608	**PEC**	3	0	0	3	30	70	100

Objectives

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

Unit I – Conventional Software Management

The waterfall model, conventional software management performance, Evolution of Software Economics, Improving Software Economics, Automation, Achieving required quality, Peer inspections.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Describe the evolution of software economics.
2. Analyze various models to automate the software development process.

Unit II – The Old Way and The New

The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. Life Cycle Phases, Artifacts of The Process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Categorize different life cycle phases.
2. Analyze engineering and production stages.
3. Describe various artifact sets.

Unit III – Model Based Software Architectures

A Management perspective and technical perspective, Work Flows of the Process, Checkpoints of the Process: Major mile stones, Minor Milestones, Periodic status assessments.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Describe various workflows.
2. Summarize the check points of the process.
3. Illustrate periodic status assessments of the project.

Unit IV – Iterative Process Planning

Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. Project Organizations and Responsibilities.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Know the Work breakdown structure of any project.

2. Understand the responsibilities of Organizations.
3. Describe the evolution of organization.

Unit V – Process Automation

Automation Building blocks, The Project Environment, Project Control and Process Instrumentation, Project Estimation and Management: COCOMO model, Critical Path Analysis, PERT technique, Monte Carlo approach.

Learning Outcomes: At the end of this unit, the student will be able to

1. Identify seven core metrics.
2. Analyze the cost estimation using PERT and CPM techniques.

Text Books:

1. Software Project Management, Walker Royce, Pearson Education, 2005.
2. Software Project Management, Bob Hughes, 4th edition, Mike Cotterell, TMH.

Reference Books:

1. Software Project Management, Joel Henry, Pearson Education.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005.
3. Effective Software Project Management, Robert K.Wysocki, Wiley,2006

Course Outcomes:

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

1. Develop the model from the conventional software product to the modern.
2. Illustrate the need of software life cycle process.
3. Exemplify artifacts of the software process.
4. Develop the model-based software architecture of the project.
5. Acquire the knowledge of iterative planning process for cost and schedule estimation.
6. Describe the tools for project automation.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Mandatory Course

Essence of Indian Traditional Knowledge

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194GA0MC03	**NCMC**	2	0	0	0	30	0	30

Objective:

- To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

UNIT I - Introduction to Traditional knowledge

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Know about the importance of traditional knowledge.

UNIT II - Protection of Traditional knowledge

The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the need for protection of traditional knowledge.

UNIT III - Legal frame work and TK

A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act);
B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand various legal acts related to traditional knowledge.

UNIT IV - Traditional knowledge and Intellectual Property

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the intellectual property rights related to traditional knowledge.

UNIT V - Traditional knowledge in Different sectors

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs,

Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Know about traditional knowledge in different sectors.

Text Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.

Reference Books:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
2. "Knowledge Traditions and Practices of India" Kapil Kapoor1, Michel Danino2

Course Outcomes:

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

1. Know about the roots of Indian Traditional Knowledge and legal acts related to it.
2. Understand the concept of Traditional knowledge and its importance
3. Know the need and importance of protecting traditional knowledge.
4. Know the various enactments related to the protection of traditional knowledge.
5. Understand the concepts of Intellectual property to protect the traditional knowledge.
6. Understand the traditional knowledge in different sectors.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Data Warehousing & Data Mining Laboratory

(Computer Science & Engineering)

III B. Tech-II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194G1A05613	PCC	0	0	3	1.5	30	70	100

Objective:

- Learn how to build a data warehouse and query it (using open-source tools like Pentaho Data Integration Tool, Pentaho Business Analytics).
- Learn to perform data mining tasks using a data mining toolkit (such as open-source WEKA).
- Understand the data sets and data preprocessing.
- Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression.
- Exercise the data mining techniques with varied input values for different parameters.
- To obtain Practical Experience Working with all real data sets.
- Emphasize hands-on experience working with all real data sets.

List of Experiments

1. Build Data Warehouse and Explore WEKA
2. Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets
3. Demonstrate performing classification on data sets
4. Demonstrate performing clustering on data sets
5. Demonstrate performing Regression on data sets
6. Task 1: Credit Risk Assessment. Sample Programs using German Credit Data
7. Task 2: Sample Programs using Hospital Management System

Project

Simple Project on Data Preprocessing.

Additional Experiments

1. Create an Employee Table with the help of Data Mining Tool WEKA.
2. Create a Weather Table with the help of Data Mining Tool WEKA.
3. Apply Pre-Processing techniques to the training data set of Weather Table
4. Apply Pre-Processing techniques to the training data set of Employee Table
5. Normalize Weather Table data using Knowledge Flow.
6. Normalize Employee Table data using Knowledge Flow.

Reference Books:

1. Alex Berson and Stephen J.Smith, —Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, —Insight into Data Mining Theory and Practice

Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H.Witten and Eibe Frank, —Data mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.

Course Outcomes:

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

1. Build data warehouse and explore WEKA.
2. Perform data Pre-Processing tasks.
3. Demonstrate performing association rule mining on data sets
4. Perform classification on data sets.
5. Perform clustering on data sets.
6. Perform Regression on data sets.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Android Application Development Laboratory

(Computer Science & Engineering)

III B. Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05614	**PCC**	0	0	3	3	30	70	100

Objectives

- To develop android application using modern technologies.
- To implement the various components, layouts and views in creating android applications.
- Design the App with database connectivity using modern tools.

List of Experiments

1. Installation of Android studio, Kotlin- IntelliJ
2. Create an application for various choosing concepts
   a. checkbox b. Radio button c. Radio group d. Spinner
3. Creating the application by using the Activity and Fragment Life cycle.
4. Design the Application using Intents.
5. Create an application by using fragments.
6. Design an application for List View.
7. Create an application to play the audio and video clips.
8. Design the Application for Designing Image gallery.
9. Design the application for Menus and Action Bars.
10. Create an application for Login form with SQLite Database Connectivity.
11. Create an application for web view.
12. Design an application with Date and Time Pickers.
13. Create an application on services (Background Task).
14. Design the Layouts for an activity using Kotlin.
15. Design Calculator app using Kotlin programming.

Reference Books:

1. "Dawn Griffiths, David Griffiths" Head First Android Development: A Brain-Friendly Guide, O'Reilly Media.
2. "Dawn Griffiths, David Griffiths" Head First Kotlin: A Brain-Friendly Guide, O'Reilly Media.

Course Outcomes:

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

1. Download, Install and Configure Eclipse, SDK/Android Studio and InetlliJ Platform for creating Android Applications.
2. Develop basic Android Applications using Activity class and fragment life cycle.
3. Develop the Android Application by using Text Edit control.
4. Develop the Android Application to choose options such as upload image, play the Audio and Video clips.
5. Develop the Android Application for Menus and Action Bar and display Drop-Down List Action Bar.
6. Develop Android applications using Kotlin programming.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(Computer Science & Engineering)

Socially Relevant Project
1. Solid waste conversion into energy (Gasification) 2. Plastic waste into fuel. 3. Bio-gas digester. 4. Development of mechanisms for farmers. 5. Smart irrigation for saving water. 6. Mechanized water segregation. 7. Applications of solar technologies for rural purpose. 8. Power generation from wind turbine. 9. Applications of drones for agriculture. 10. Solar drying.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Machine Learning

(Computer Science & Engineering)

IV B.Tech - I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05701	**PCC**	3	0	0	3	30	70	100

Course Objectives: This course is designed to:

- Understand the basic theory underlying machine learning.
- Formulate machine learning problems corresponding to different applications.
- Illustrate a range of machine learning algorithms along with their strengths and weaknesses.
- Apply machine learning algorithms to solve problems of moderate complexity.
- Understand how Machine Learning imbibes the philosophy of Human learning.

Unit I – Introduction

Learning Problems, Perspectives and Issues, Concept Learning, Version Spaces and Candidate Eliminations, Inductive bias, Decision Tree learning, Representation, Algorithm , Heuristic Space Search.

Learning Outcomes:

At the end of the unit, students will be able to

1. Explore how to build computer programs that improve their performance at some task through experience.
2. Interpret Decision tree learning as practical methods for inductive inference.

Unit II – Neural Networks

Neural Network Representation, Problems, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Advanced Topics.

Learning Outcomes:

At the end of the unit, students will be able to

1. Appraise artificial neural networks as one of the most effective learning methods currently known to interpret complex real-world sensor data.
2. Illustrates the use of the genetic algorithm approach, and examine the nature of its hypothesis space search.

Unit III – Bayesian Learning

Bayes Theorem, Concept Learning, Maximum Likelihood, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, Bayesian Belief Network, EM Algorithm.

Learning Outcomes:

At the end of the unit, students will be able to

1. Illustrate the principles of Probability for classification as an important area of Machine Learning Algorithms.
2. Analyze sample complexity and computational complexity for several learning Problems

Unit IV – Instance based Learning

K- Nearest Neighbor Learning, Locally weighted Regression, Radial Bases Functions, Case Based Learning.

Learning Outcomes: At the end of the unit, students will be able to:

1. Infer that the Instance based algorithms can be used to overcome memory complexity and over fitting problems.

Unit V – Advanced Learning

Learning Sets of Rules, Sequential Covering Algorithm, Learning Rule Set , Sets of First Order Rules, Induction on Inverted Deduction, Inverting Resolution, Introduction to

ReinforcementLearning.

Learning Outcomes:

At the end of the unit, students will be able to

1. Infer that the combined methods outperform both purely inductive and purely analytical learning methods.
2. Recognize the importance of Reinforcement Learning in the industry.

Text Books:

1. T.M. Mitchell, "Machine Learning", McGraw-Hill, 1997.
2. 2. Ethern Alpaydin, "Introduction to Machine Learning", MIT Press, 2004

Reference Books:

1. Stephen Marsland, "Machine Learning -An Algorithmic Perspective", Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Andreas C. Müller and Sarah Guido "Introduction to Machine Learning with Python: A Guide for Data Scientists", Oreilly.
3. Shai Shalev-Shwartz , Shai Ben-David, "Understanding Machine Learning: From Theory to Algorithms" , Cambridge University Press.

e-Resources:

1. Andrew Ng, "Machine Learning Yearning" https://www.deeplearning.ai/machine-learning- yearning/.
2. https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/index.html

Course Outcomes:

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

1. Describe the fundamental concepts of learning problems.
2. Explain the importance of learning set of rules and reinforcement learning
3. Illustrate basics of learning problems with hypothesis and version space
4. Explain the concepts of neural networks for learning linear and non linear activatic functions.
5. Demonstrate Bayesian learning to solve real world problems.
6. Use instance based learning to resolve memory complexity and over fitting problems.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – IV

Data Analytics

(Computer Science & Engineering)

IV BTech-I Sem								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05702	**PEC**	3	0	0	3	30	70	100

Objectives

- Big exposed to big data.
- Learn the different ways of data analysis.
- Be familiar with data streams.
- Learn the mining and clustering.
- Be familiar with the visualization.

Unit I – Introduction to Big Data

Introduction to Big Data Platform: Challenges of conventional systems, Web data, Evolution of Analytic scalability, analytic processes and tools, Modern data analytic tools, Statistical concepts.

Learning Outcomes:

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

1. State the challenges in conventional systems with data.
2. Differentiate between analysis and reporting.
3. Understand analytic processing tools.
4. Use statistical concepts in data analytics.

Unit II – Data Analysis

Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series, Neural networks: learning and generalization, competitive learning, principal component analysis , Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

Learning Outcomes:

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

1. Understand regression modeling and analysis of time series.
2. Understand neural networks and fuzzy logic models and search methods.

Unit III – Mining Data Streams

Introduction to Streams Concepts, Stream data model and architecture, Stream Computing, Sampling data in a stream, Filtering streams, Counting distinct elements in a stream, Estimating moments, Counting oneness in a window, Decaying window , Real-time Analytics Platform(RTAP) applications: sentiment analysis, stock market predictions.

Learning Outcomes:

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

1. Describe the concept of streams and its distinct elements.
2. Understand real time analytics platform applications.

Unit IV – Frequent Item sets and Clustering

Mining Frequent item sets, Market based model, Apriori Algorithm, Handling large data sets in Main memory, Limited Pass algorithm, Counting frequent item sets in a stream, Clustering Techniques: Hierarchical, K- Means, Clustering high dimensional data, Clustering for streams and Parallelism.

Learning Outcomes:

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

1. Identify the frequent item sets.
2. Perform clustering on high dimensional data using clustering methods.

Unit V – Frameworks and Visualization

MapReduce , Hadoop, Hive, MapR , Sharding , NoSQL Databases , S3, Hadoop Distributed file systems , Visualizations, Visual data analysis techniques.

Learning Outcomes:

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

1. Understand the file system of Hadoop.
2. Describe the data using visualization techniques.

Text Books:

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.

Reference Books:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analystics, John Wiley & sons, 2012.
2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O" Reilly, 2011.
3. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

Course Outcomes:

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

1. Apply the statistical analysis methods.
2. Compare and contrast various soft computing frameworks.
3. Design distributed file systems.
4. Apply Stream data model.
5. Use Visualization techniques
6. Understand the importance of various clustering techniques.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – IV
Wireless Sensor Networks

(Computer Science & Engineering)

IV B. Tech - I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05703	**PEC**	3	0	0	3	30	70	100

Objectives

- To study the concepts of sensor networks.
- To understand the WSN node Architecture and Network Architecture.
- To study the MAC protocols.
- To study the Routing protocols
- To design and develop wireless sensor node.
- To identify the security attacks in every layer.
- To study the research issues in different layers of sensor networks.

Unit I – INTRODUCTION

Introduction: Overview of Wireless Sensor Networks, Applications of Sensor Networks, Issues & Challenges, Basic Wireless Sensor Technology, Wireless Transmission Technology and Systems.
Sensor-node Architecture: Hardware components, Energy consumption of sensor nodes, Operating systems and execution environments in Wireless Sensor Networks.

Learning Outcomes:
At the end of this unit, the student will be able to:
1. Understand self-configured wireless networks.
2. Understand infrastructure-less wireless networks.

Unit II – MEDIUM ACCESS PROTOCOLS

Medium Access Control Protocols for Wireless Sensor Networks: Fundamentals of MAC Protocols, Types of MAC protocols, Low duty cycle protocols and wakeup concepts, Contention-based protocols, Schedule-based protocols, The IEEE 802.15.4 MAC protocol in Wireless Sensor Networks.

Learning Outcomes:
At the end of this unit, the student will be able to:
1. Understand the functionalities of the MAC protocols.
2. Analyze Low duty cycle & Wakeup concept.

Unit III – WIRELESS SENSOR NETWORK PROTOCOLS

Routing Protocols for Wireless Sensor Networks: Routing Challenges & Design Issues, Requirements, Routing Strategies in Wireless Sensor Networks: WSN Routing Techniques, Flooding and its variants, LEACH, Power-Efficient Gathering in Sensor Information Systems, Directed diffusion, Geographical routing.
Transport Control Protocols for Wireless Sensor Networks: TCP & UDP for WSNs, Transport Protocol Design Issues.

Learning Outcomes:
At the end of this unit, the student will be able to:
1. Evaluate the performance of LEACH protocols for power consumption,scalability and latency parameters.
2. Evaluate the performance of transport control protocols for congestion detection and avoidance, reliability and control packet overhead parameters.

Unit IV –MIDDLEWARE NETWORK MANAGEMENT AND OPERATING SYSTEM

Middleware principles, architecture, existing middleware: MiLAN & IrisNet, Network

Management Requirements, Traditional Network Management Models, Network Management Design Issues, Operating System Design Issues, Examples of Operating Systems.

Learning Outcomes:

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

1. Understand the Sensor management, sensor network middleware.
2. Understand various kinds of Operating Systems.

Unit V – SECURITY IN WIRELESS SENSOR NETWORKS

Constraints, Characteristics, security goals, attacks, layering-based security approach, secure routing algorithms, malicious node detection mechanisms.

Learning Outcomes:

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

1. Understand the Sensor Network Constraints, security goals and its attacks.
2. Understand various secure routing algorithms as well as malicious node detectection.

Text Books:

1. Kazem Sohraby, Daniel Minoli, Taieb Znati, Wireless Sensor Networks: Technology, Protocols, and Applications, Wiley-Interscience, 2007.
2. Parag Verma, Ankur Dumka, Anuj Bhardwaj, Security issues for Wireless Sensor Networks, CRC Press, 2022.

Reference Books:

1. Ankur Dumka, Sandip K. Chaurasiya, A Complete Guide to Wireless Sensor Networks from Inception to Current Trends, CRC Press, 2019.
2. Holger Karl, Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, John Wiley & Sons Ltd, 2005.
3. Waltenegus Dargie, Christian Poellabauer, Fundamentals of Wireless Sensor Networks Theory and Practice, A John Wiley and Sons, Ltd., Publication, 2010.

Course Outcomes:

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

1. Describe the principles of sensor networks and theirimpact on protocol design.
2. Discuss architecture and work with various kinds of Sensor nodes.
3. Explain Medium Access Control protocols for sensor networks.
4. Differentiate Routing and Transport Control protocols for sensor networks.
5. Interpret middleware network management and work with various kinds of operating systems environments.
6. Describe various security issues in node and network architecture.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – IV
Software Testing Methodologies

(Computer Science & Engineering)

IV B.Tech - I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194G1A05704	PEC	3	0	0	3	30	70	100

Objectives

- To study fundamental concepts in software testing and discuss various software testing issues and solutions in software unit, integration, regression and system tests.
- To learn how to plan a test project, design test cases and data, conduct testing, manage software problems and defects, generate a test report.
- To expose the advanced software tests concepts such as object-oriented software test methods, web-based and component-based software testing.
- To understand software test automation problems and solutions.
- To learn how to write software test documents and communicate with engineers in various forms.

Unit I – Software Testing

Introduction, Evolution, Myths & Facts, Goals, Psychology, definition, Model for testing, Effective Vs Exhaustive Software Testing. Software Testing Terminology and Methodology, Software Testing Life Cycle, Verification and Validation.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the fundamentals of testing.
2. Analyze Software Testing Life Cycle.
3. Illustrate Software Testing Methodology.

Unit II – Testing Techniques

Dynamic Testing: Black Box testing techniques, Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table-based testing, Cause-Effect Graphing based testing, Error guessing.
White-Box Testing: Need, Logic Coverage criteria, Basis Path testing, Graph matrices, Loop testing, data flow testing, mutation testing.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the process of various Black Box testing techniques.
2. Understand the process of various White Box testing techniques.
3. Differentiate between Black Box testing and White Box testing techniques.

Unit III – Static Testing

Validation activities: Unit testing, Integration Testing, Functional testing, system testing, acceptance testing.
Regression testing: Progressive Vs regressive testing, Regression: Test ability, Objectives, Testing types, Testing techniques.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the process of static testing.
2. Analyze various validation activities.
3. Differentiate between Progressive and Regressive testing.
4. Understand the Regression Testing Techniques.

Unit IV – Efficient Test Suite Management

Test Suite: Growing nature , Minimization and its benefits, prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite.

Software Quality Management: Software Quality metrics, SQA models, Debugging: process, techniques, correcting bugs.

Learning Outcomes:
At the end of this unit, the student will be able to
1. Understand test suite minimization.
2. Understand the test case prioritization techniques.
3. Understand the Software Quality Management.
4. Analyze the application of a cost of software quality system.

Unit V – Automation and Testing Tools

Need for automation, Testing tools: categorization, selection, Cost incurred. Guidelines for automated testing, overview of some commercial testing tools such as Win Runner, Load Runner, Jmeter and JUnit. Test Automation using Selenium tool.
Testing Object Oriented Software: Basics, Object oriented testing.
Testing Web based Systems: Challenges in testing for web-based software, quality aspects, web engineering, testing of web-based systems, Testing mobile systems

Learning Outcomes:
At the end of this unit, the student will be able to
1. Understand the process of automation.
2. Implement automated testing using Selenium tool.
3. Implement Object Oriented Software Testing.
4. Implement web based software testing.

Text Books:

1. Software Testing, Principles and Practices, Naresh Chauhan, Oxford.
2. Software Testing, Yogesh Singh, CAMBRIDGE.

Reference Books:

1. Foundations of Software testing, Aditya P Mathur, 2ed, Pearson.
2. Software testing techniques – Baris Beizer, Dreamtech, second edition.
3. Software Testing, Principles, techniques and Tools, M G Limaye, TMH.

Course Outcomes:

At the end of the course, student will be able to
1. Identify and understand various software testing problems, apply software testing knowledge and engineering methods and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
2. Design and conduct a software test process for a software project.
3. Analyze the needs of software test automation.
4. Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
5. Basic understanding and knowledge of contemporary issues in software testing, such as component-based, web based and object-oriented software testing problems.
6. Write test cases for given software to test it before delivery to the customer and write test scripts for both desktop and web-based applications.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – V
Artificial Neural Networks

(Computer Science & Engineering)

IV BTech- I Sem

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194G1A05705	PEC	3	0	0	3	30	70	100

Objectives

- To introduce the fundamental techniques and principles of Neural Networks.
- To study the different models in ANN and their applications.
- To familiarize deep learning concepts with Convolutional Neural Network case studies.

Unit I – Introduction to Neural Networks

Introduction, Humans and Computers, Organization of the Brain, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Potential Applications of ANN.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the how humans and computers are different in thinking.
2. Understand the organization of brain neuron models.
3. Understand ANN and its applications.

Unit II – Essentials of Artificial Neural Networks

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

Learning Outcomes:

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

1. Understand ANN , its operations and architecture.
2. Understand classifications of ANN.

Unit III – Single Layer Feed Forward Networks

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category;
Training Algorithms: Discrete and Continuous Perceptron Networks, Limitations of the Perceptron Model.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Study the importance of perceptron models and its limitations.

Unit IV – Multi-Layer Feed Forward Networks

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of BP Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the importance of back propagation in training.
2. State the learning difficulties and improvements in multi-layer feed forward networks.

Unit V – Associative Memories

Pattern Mathematics, Hebbian Learning, Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training
Algorithms: Storage and Recall Algorithm, BAM Energy Function.

Neural network applications: Process identification, control, fault diagnosis.

Learning Outcomes: At the end of this unit, the student will be able to

1. Understand the concepts of associative memory.
2. Discuss the associative memory algorithms.

Text Books:

1. Laurene Fausett, "Fundamentals of Neural Networks", Pearson Education, 2004.
2. Simon Haykin, "Neural Networks- A comprehensive foundation", Pearson Education, 2003.

Reference Books:

1. S.N.Sivanandam, S.Sumathi,S. N. Deepa "Introduction to Neural Networks using MATLAB 6.0", TATA Mc Graw Hill, 2006.
2. S. Rajasekharan and G. A. Vijayalakshmi pai, "Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications", PHI Publication, 2004.
3. Timothy J. Ross, " Fuzzy Logic With Engineering Applications", Tata McGraw-Hill Inc. 2000.

Course Outcomes:

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

1. Explain the basic concepts in Neural Networks and applications.
2. Identify the deep learning algorithms which are more appropriate for various types of learning tasks.
3. Discuss feed forward networks and their training issues.
4. Distinguish different types of ANN architectures.
5. Explain the deep learning concepts using Back Propagation Neural Network.
6. Implement neural network algorithms to solve real-world problems.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – V

Blockchain Fundamentals

(Computer Science & Engineering)

IV B.Tech - I Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194G1A05706	PEC	3	0	0	3	30	70	100

Objectives

- To provide conceptual understanding of the function of Block chain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.
- Impart strong technical understanding of Blockchain technologies.
- To cover the technological underpinnings of block chain operations as distributed data structures and decision-making systems, their functionality and different architecture types.
- To provide a critical evaluation of existing "smart contract" capabilities and platforms, and examine their future directions, opportunities, risks and challenges
- Develop familiarity of current technologies, tools, and implementation strategies.

Unit I – Introduction

Blockchain: Introduction, layers of blockchain, Working of Blockchain, Properties of blockchain solutions, blockchain transactions, distributed consensus mechanisms, Blockchain mechanisms, Scaling blockchain Working of Bitcoin: Money, Bitcoin, Bitcoin blockchain, bitcoin network, bitcoin scripts, Full Nodes and SVPs, Bitcoin wallets.

Learning Outcomes:

At the end of this unit, the student will be able to

1. The students would understand the structure of a block chain and why/when it is better than a simple distributed database.

Unit II – Ethereum

Ethereum: three parts of blockchain, Ether as currency and commodity, Building trustless systems, Smart contracts, Ethereum Virtual Machine, The Mist browser, Wallets as a Computing Metaphor, The Bank Teller Metaphor, Breaking with Banking History,Central Bank Network, Virtual Machines, EVM Applications, State Machines, Guts of the EVM, Blocks, Mining's Place in the State Transition Function, Renting Time on the EVM, Gas, Working with Gas, Accounts, Transactions, and Messages, Transactions and Messages, Estimating Gas Fees for Operations, Opcodes in the EVM.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Explain cryptographic building blocks and reason about their security
2. Exploit applications of Blockchain in real world sceneries.

Unit III- Hyperledger

Hyperledger: Overview, Fabric, composer, installing hyperledger fabric and composer, deploying, running the network, error troubleshooting. Smart Contracts and Tokens: EVM as Back End, Assets Backed by Anything, Crypto currency Is a Measure of Time, Function of Collectibles in Human Systems, Platforms for High-Value Digital Collectibles, Tokens as Category of Smart Contract, creating a Token, Deploying the Contract, Playing with Contracts.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Develop Blockchain based solutions and write smart contract using Hyperledger Fabric and Ethereum frameworks. Integrate ideas from various domains and implement them using Blockchain technology in different perspectives.

Unit IV- Mining Ether

Mining Ether: Why? Ether's Source, Defining Mining, Difficulty, Self-Regulation, and the Race for Profit, How Proof of Work Helps Regulate Block Time, DAG and Nonce, Faster Blocks, Stale Blocks, Difficulties, Ancestry of Blocks and Transactions, Ethereum and Bitcoin, Forking, Mining, Geth on Windows, Executing Commands in the EVM via the Geth Console, Launching Geth with Flags, Mining on the Testnet, GPU Mining Rigs, Mining on a Pool with Multiple GPUs.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Analyze the incentive structure in a blockchain based system and critically assess its functions, benefits and vulnerabilities.

Unit V- Blockchain Application Development

Building an Ethereum DApp: The DApp, Setting Upa Private Ethereum Network, Creating the Smart Contract, Deploying the Smart Contract, Client Application.

DApp deployment: Seven Ways to Think About Smart Contracts, Dapp Contract Data Models, EVM back-end and front-end communication, JSON-RPC, Web 3, JavaScript API, Using Meteor with the EVM, Executing Contracts in the Console, Recommendations for Prototyping, Third-Party Deployment Libraries, Creating Private Chains**.**

Learning Outcomes:

At the end of this unit, the student will be able to

1. Evaluate the setting where a block chain-based structure may be applied, its potential and its limitations and understand what constitutes a "smart" contract, what are its legal implications and what it can and cannot do, now and in the near future.

Text Books:

1. The Blockchain Developer, Elad Elrom, Apress, 2019.
2. Introducing Ethereum and Solidity, Apress, 2017.

Reference Books:

1. Beginning Blockchain A Beginner's Guide to Building Blockchain Solutions, Bikramaditya Singhal, Gautam Dhameja, Priyansu Sekhar Panda, Apress, 2018.
2. Mastering Ethereum, Andreas M. Antonopoulos Dr. Gavin Wood, O'Reilly First 2018.
3. Blockchain Enabled Applications, Vikram Dhillon David Metcalf Max Hooper, Apress 2017.

Course Outcomes:

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

1. Familiarize the functional/operational aspects of cryptocurrency.
2. Understand emerging abstract models for Blockchain Technology.
3. Demonstrate the block-chain services to develop a New Paradigm of L3: Apply Organizational activities
4. Applying Bit-Coin protocols and how to develop the digital currency in L3:Apply the websites
5. Identify major research challenges and technical gaps existing between theory and practice in cryptocurrency domain.
6. Learn the limitations of the block-chain mechanism and understand efficient organizational structure.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – V
Software Quality Assurance

(Computer Science & Engineering)

IV B.Tech - I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05707	**PEC**	3	0	0	3	30	70	100

Objectives

- Understand the basic tenets of software quality and quality factors.
- Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.
- Understand of how the SQA components can be integrated into the project life cycle.
- Be familiar with the software quality infrastructure.
- Be exposed to the management components of software quality.

Unit I – INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE

Need for Software quality, Quality challenges, Software Quality Assurance (SQA) – Definition and objectives, Software quality factors, McCall's quality model, SQA system and architecture, Software Project life cycle Components, Pre project quality components, Development and quality plans.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the need of software quality assurance.
2. Analyze SQA system.
3. Illustrate architecture of SQA.
4. Analyze the usage of SQA in Software Project life cycle.

Unit II – SQA COMPONENTS AND PROJECT LIFE CYCLE

Software Development methodologies, Quality assurance activities in the development process-Verification & Validation, Reviews, Software Testing, Software Testing implementations, Quality of software maintenance, Pre-Maintenance of software quality components, Quality assurance tools, CASE tools for software quality, Software maintenance quality, Project Management.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the process of Quality assurance in the software development.
2. Implement the software testing process.
3. Analyze the quality assurance tools.
4. Implement the SQA in the Project.

Unit III – SOFTWARE QUALITY INFRASTRUCTURE

Procedures and work instructions, Templates, Checklists, 3S development - Staff training and certification Corrective and preventive actions, Configuration management, Software change control, Configuration management audit, Documentation control, Storage and retrieval.

Learning Outcomes:

At the end of this unit, the student will be able to

1. To implement Procedures and work instructions in SQA.
2. To determine the training and updating methods for staff.
3. To implement corrective and preventive actions process to develop the solution.
4. To understand the issues of controlled document approval, storage and retrieval.

Unit IV – SOFTWARE QUALITY MANAGEMENT & METRICS

Project process control, Computerized tools, Software quality metrics – Objectives of quality measurement, Process metrics, Product metrics – Implementation – Limitations of software metrics, Cost of software quality – Classical quality cost model – Extended model – Application of Cost model.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Implement of software quality metrics.
2. Understand the classic model and extended model of cost of software quality.
3. Analyze the application of a cost of software quality system

Unit V – STANDARDS, CERTIFICATIONS & ASSESSMENTS

Quality management standards – ISO 9001 and ISO 9000-3, capability Maturity Models – CMM and CMMI assessment methodologies, Bootstrap methodology, SPICE Project, SQA project process standards – IEEE std 1012 & 1028,Organization of Quality Assurance – Department management responsibilities, Project management responsibilities, SQA units and other actors in SQA systems.

Learning Outcomes:

At the end of this unit, the student will be able to

1. Understand the scope of quality management standards.
2. Analyze CMM and CMMI assessment methodology.
3. Understand the SQA project process standards.
4. Analyze Project management responsibilities for quality assurance.

Text Books:

1. Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009.
2. Schulmeyer, G.G., McManus, J.I., Handbook of Software QualityAssurance. Prentice Hall 1999.

Reference Books:

1. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press.1997.
2. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press, 1997.
3. Software Engineering: A Precise Approach, Pankaj Jalote, Wiley India,2010.

Course Outcomes:

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

1. Describe the process of SQA.
2. Summarize the need of SQA & Architecture.
3. Discuss the importance of software infrastructure.
4. Demonstrate the usage of tools for software quality.
5. Calculate the cost of software quality using metrics.
6. Model the software by adapting the quality standards.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Machine Learning Laboratory

(Computer Science & Engineering)

IV B.Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05712	PCC	0	0	3	1.5	30	70	100

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.
- The programs can be implemented in Python.
- Data sets can be taken from standard repositories (https://archive.ics.uci.edu/ml/datasets.html) or (www. kaggle.com) or constructed by the students.

Lab Experiments:

1. Implement and demonstrate the 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 to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back Propagation 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 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 Python ML library classes.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Python ML library classes 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. 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.

Reference Books:

1. Stephen Marsland, "Machine Learning -An Algorithmic Perspective", Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Andreas C. Müller and Sarah Guido "Introduction to Machine Learning with Python: A Guide for Data Scientists", Oreilly.
3. Shai Shalev-Shwartz , Shai Ben-David, "Understanding Machine Learning: From Theory to Algorithms" , Cambridge University Press.

Course Outcomes:

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

1. Explain the implementation procedures for the machine learning algorithms.
2. Implement Classification algorithms.
3. Design Python programs for various Learning algorithms.
4. Apply appropriate data sets to the Machine Learning algorithms.
5. Identify and apply Machine Learning algorithms to solve real world problems.
6. Build Neural Network applications for the given data set.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

IoT Laboratory

(Computer Science & Engineering)

IV B.Tech-I Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05713	PCC	3	0	0	3	30	70	100

Objectives:

- Implement the IoT concepts for the given applications.
- Able to design and program the IoT based system.

Lab Experiments:

1. 1.Select any one development board (Eg., Arduino or Raspberry Pi) and control LED using the board.
2. Using the same board as in (1), read data from a sensor. Experiment with both analog and digital sensors.
3. Control any two actuators connected to the development board using Bluetooth.
4. Read data from sensor and send it to a requesting client. (using socket communication)
   Note: The client and server should be connected to same local area network.
5. Create any cloud platform account, explore IoT services and register a thing on the platform.
6. Push sensor data to cloud.
7. Control an actuator through cloud.
8. Access the data pushed from sensor to cloud and apply any data analytics or visualization services.
9. Create a mobile app to control an actuator.
10. Design an IoT based air pollution control system which monitors the air pollution by measuring carbon monoxide, ammonia, etc and gives alarm or sends message when the pollution level is more than permitted range
11. Design an IoT based system which measures the physical and chemical properties of the water and displays the measured values.
12. Identify a problem in your local area or college which can be solved by integrating the things you learned and create a prototype to solve it (Mini Project).
13. Design a business model canvas for a digital display

Reference Books:

1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012.
2. Alexander Osterwalder, and Yves Pigneur – Business Model Generation – Wiley, 2011.

Course Outcomes:

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

1. Know the hardware components of IoT network.
2. Choose the sensors and actuators for an IoT application.
3. Select protocols for a specific IoT application.
4. Utilize the cloud platform and APIs for IoT application.
5. Experiment with embedded boards for creating IoT prototypes.
6. Design Smart application like smart cities, smart home etc.

Project Stage-I (**194G1A05714**)
Industrial Training/Internship/Research Projects in National Laboratories/Academic Institutions (**194G1A05715**)

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – VI

Deep Learning

(Computer Science & Engineering)

IV B.Tech-II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194G1A05801	PEC	3	0	0	3	30	70	100

Objectives

- To acquire the knowledge on Deep Learning Concepts
- To learn various types of unsupervised deep learning models.
- To gain knowledge on regularization techniques for deep learning.
- To learn optimization strategies for large scale applications
- To Acquire knowledge on applications of computer vision and Natural Language Processing.

Unit I – INTRODUCTIONTO DEEP LEARNING

Deep Feed forward networks, Gradient-Based learning, Hidden Units, Architecture Design, Back-Propagation, Differentiation Algorithms, ReLu Heuristics for avoiding bad local minima. Heuristics for faster training. Nestors accelerated gradient descent. Regularization. Dropout.

Learning outcomes:

At the end of this unit, the student will be able to

1. Familiarize with feed forward networks.
2. Differentiate between sigmoid and ReLu functions.

UNIT II - DEEP UNSUPERVISED LEARNING

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Magnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN).

Learning outcomes:

At the end of this unit, the student will be able to

1. Know different types of neural networks.
2. Understand the features of unsupervised learning networks.

UNIT III: REGULARIZATION FOR DEEP LEARNING

Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised learning, multi-task learning, Early Stopping, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Tangent Classifier.

Learning outcomes:

At the end of this unit, the student will be able to

1. Understand the concept of data augmentation.
2. Know over fitting problem in decision trees.
3. Distinguish the terms like bagging, boosting and ensembling.

UNIT IV: OPTIMIZATION TO TRAIN DEEP MODELS

Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies, Meta-Algorithms.

Learning outcomes:

At the end of this unit, the student will be able to

1. Know about optimization of neural network.
2. Understand different optimization techniques.

UNIT-V: APPLICATIONS

Large-Scale Deep Learning, Image segmentation, Object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models, Neural Summarization, Opinion Mining using Recurrent Neural Networks.

Learning outcomes:

At the end of this unit, the student will be able to

1. Classify image segmentation.
2. Understand about LSTM Models.

Text Books:

1. Ian Good fellow and Yoshua Bengio and Aaron Courville, "Deep Learning", An MIT Press Book, 2015.
2. Bengio, Yoshua. "Learning deep architectures for AI." Foundations and trends in Machine Learning 2.1 (2009).

Reference Books:

1. Simon Haying, "Neural Networks and Learning Machines" 3rd Edition, Pearson Prentice Hall.
2. "Neural Networks and Deep Learning : A Text Book", Charu C. Aggarwal, Springer Edition, September 2018.
3. "Deep Learning in Python / Pytorch " , Francois Chollet, Manning Publications.

Course Outcomes:

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

1. Understand the concepts of Neural Networks and Deep learning.
2. Choose the appropriate learning Networks in modeling.
3. Use an efficient regularization algorithm for Deep Learning Models.
4. Apply optimization strategies for large scale applications.
5. Develop deep learning applications to Computer vision and NLP.
6. Understand about object detection and image classification.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – VI

Computer Forensics Cyber Security

(Computer Science & Engineering)

IV B.Tech-II Semester **SRIT R19**

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
194G1A05802	PEC	3	0	0	3	30	70	100

Objectives

- Understand essential building blocks and basic concepts of cyber security
- Explore Web security and Network security
- Explain the measures for securing the networks and cloud
- Understand privacy principles and policies
- Describe the legal issues and ethics in computer security

Unit I–INTRODUCTION JNTU R15

Introduction to Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, Access Control, and Cryptography, Authentication, Access Control, Cryptography.
Programs and Programming: Unintentional (Non-malicious) Programming Oversights, Malicious Code—Malware, Counter measures.

Learning Outcomes:

After completing this Unit, students will be able to

1. Explain Vulnerabilities, threats and Counter measures for computer security.
2. Interpret the design of the malicious code.

Unit II - NETWORK SECURITY

Network Concepts, Threats to Network Communications, Wireless Network Security, Denial of Service, Distributed Denial-of-Service Strategic Defences: Security Counter measures, Cryptography in Network Security, Firewalls, Intrusion Detection and Prevention Systems, Network Management.

Learning Outcomes:

After completing this Unit, students will be able to

1. Identify the network security threats and attacks.
2. Design the Counter measures to defend the network security attacks.

Unit III– PRIVACY

Privacy Concepts, Privacy Principles and Policies, Authentication and Privacy, Data Mining, Privacy on the Web, Email Security, Privacy Impacts of Emerging Technologies, Where the Field Is Headed. Management and Incidents: Security Planning, Business Continuity Planning, Handling Incidents, Risk Analysis, Dealing with Disaster.

Learning Outcomes:

After completing this Unit, students will be able to

1. Interpret the need for Privacy and its impacts of Emerging Technologies.
3. Explain how to handle incidents and deal with Disaster.

Unit IV- COMPUTER FORENSICS

Definition and Cardinal Rules, Data Acquisition and Authentication Process, Windows Systems-FAT12, FAT16, FAT32 and NTFS, UNIX file Systems, mac file systems, computer artifacts, Internet Artifacts, OS Artifacts and their forensic applications.

Learning Outcomes:

After completing this Unit, students will be able to

1. Understand data acquisition and authentication process.
2. Understand the artifacts of computer, internet and OS with their forensic applications.

Unit V – Forensic Tools

Introduction to Forensic Tools, Usage of Slack space, tools for Disk Imaging, Data Recovery, Vulnerability Assessment Tools, Encase and FTK tools.

Learning Outcomes:

After completing this Unit, students will be able to

1. Use forensic tools.

Text Books:

1. C. Altheide & H. Carvey Digital Forensics with Open Source Tools, Syngress, 2011. ISBN:9781597495868.
2. Schneier,Bruce.AppliedCryptography,SecondEdition,JohnWiley&Sons,1996

Reference Books:

1. Rhodes-Ousley, Mark. Information Security: The Complete Reference, Second Edition, Information Security Management: Concepts and Practice, McGraw-Hill,2013.
2. Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Infosec Managers. Boston, MA: Course Technology,2011.
3. Online Course management System: https://esu.desire2learn.com/

Course Outcomes:

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

1. Understand the basic concepts of cyber security.
2. Illustrate the broadest of technical, social & political aspects of Cyber Security and security management methods to maintain security protection.
3. Assess the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure.
4. Identify the nature of secure software development and operating systems.
5. Demonstrate the role security management in cyber security defense.
6. Adapt the legal and social issues at play in developing solutions.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Professional Elective – VI
Agile Methodologies

(Computer Science & Engineering)

IV B.Tech-II Semester								SRIT R19
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
194G1A05803	**PEC**	3	0	0	3	30	70	100

Objectives

- To understand the agile concept and its importance in software development.
- Understand how an iterative, incremental development process leads to faster delivery of more useful software.
- To acquire complete knowledge on Xtreme programming.
- To know complete modeling of agile process on XP environment.

Unit I –Fundamentals of Agile

Agile Software Development: Traditional Model vs. Agile Model, Classification of Agile Methods, Agile Manifesto and Principles, Agile project management, Design and development practices in Agile projects.

Learning outcomes:

At the end of the unit, students will be able to

1. Classify different agile methods for software development.
2. Describe the origins and motivations of the Agile Manifesto.
3. Construct different agile models.

Unit II –Agile Frameworks

Lean Production, SCRUM, Crystal, Feature Driven Development, Adaptive Software Development, Extreme Programming: Method Overview ,Lifecycle ,Work Products, Roles and Practices.

Learning outcomes:

At the end of the unit, students will be able to

1. Analyze what scrum methodology is.
2. Justify extreme programming.
3. Distinguish agile modelling and planning XP projects.

Unit III –Agility and Knowledge Management

Agile Information Systems – Agile Decision Making –– Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment, Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing.

Learning outcomes:

At the end of the unit, students will be able to

1. Define Knowledge management cycle.
2. Demonstrate incremental software development.
3. Explain the importance of agile methodologies.

Unit IV –Agility and Requirements Engineering

Impact of Agile Processes in RE, Current Agile Practices ,Variance, Overview of RE Using Agile Managing Unstable Requirements, Requirements Elicitation, Agile Requirements . Abstraction Model: Requirements Management & Prioritization in Agile Environment, Agile Requirements Modeling and Generation , Concurrency in Agile Requirements Generation.

Learning outcomes:

At the end of the unit, students will be able to

1. Identify tools to help with agile development.
2. Define the requirements for agile modeling.

Unit V –Agility and Quality Assurance

Developing Incremental Requirements, Agile Approach to Quality Assurance, Customer

Tests, Test- Driven Development, Incremental Design and Architecture, Spike Solutions, Performance Optimization.

Learning outcomes:

At the end of the unit, students will be able to

1. Outline the practices that keep the code clean and allow the entire team to contribute to development .
2. Implement testing activities within an Agile project using various strategies.
3. Able to design the architecture as incremental approach.

Text Books:

1. David J. Anderson and Eli Schragenheim, —Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.
2. James Shore and Shane Warden, "The Art of Agile Development", O'REILLY, 2007.

Reference Books:

1. Robert C. Martin, "Agile Software Development, Principles, Patterns, and Practices" , PHI, 2002.
2. Bhuvan Unhelkar, "The Art of Agile Practice: A Composite Approach for Projects and Organizations", CRC Press.
3. Craig Larman, —Agile and Iterative Development: A Managers Guide, Addison-Wesley, 2004

Course Outcomes:

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

1. Use agile methods in various development environments.
2. Design and model agile methods in SCRUM.
3. Create own agile method by customizing to a particular situation.
4. Develop techniques and tools for improving team collaboration and software.
5. Apply regaining control techniques.
6. Quality, Show how agile approaches can be scaled up to the enterprise level.

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