SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.Tech-Information Technology

CURRICULUM and SYLLABI

[For students admitted in 2019-2020]

B.E / B.Tech Regulation 2019

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester I under Regulations 2019 (CBCS)
Branch: Information Technology

S.No	Course Code	Course Title	L	T	P	C	Category
Theory							
1	U19MAT102A	Linear Algebra and Calculus	3	1	0	4	BS
2	U19ENG101C	Communication skills in English- I	2	0	0	2	HS
3	U19PHY103C	Engineering Physics	3	0	0	3	BS
4	U19BEE106A	Basic Electrical and Electronics Engineering	3	0	0	3	ES
5	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES
Practical							
6	U19PHL110	Engineering Physics Laboratory	0	0	3	1.5	BS
7	U19BEEL113A	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1	ES
8	U19PPL111	Python Programming Laboratory	0	0	2	1	ES
9	U19GE101	Basic Aptitude – I	0	0	2	0	EEC
Total Credits						**18.5**	
Optional Language Elective*							
10	U19OLE1101	French	0	0	2	1	HS
11	U19OLE1102	German					
12	U19OLE1103	Japanese					

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester II under Regulations 2019 (CBCS)
Branch: Information Technology

S.No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Category
Theory							
1	U19MAT202D	Applied Probability and Statistics	3	1	0	4	BSC
2	U19ENG201C	Communication Skills in English – II	2	0	2	3	HSMC
3	U19CHE204B	Applied Chemistry	3	0	0	3	BSC
4	U19EGR206A	Engineering Graphics	2	0	2	3	ESC
5	U19IT201	Programming in C	3	0	0	3	PCC
6	U19IT202	Information Technology Essentials	2	0	0	2	ESC
Practical							
7	U19IT203	Programming in C Laboratory	0	0	3	1.5	PCC
8	U19CHL209	Engineering Chemistry Laboratory	0	0	3	1.5	ESC
9	U19GE201	Basic Aptitude – II	0	0	2	0	EEC
					Total Credits	**21**	
Optional Language Elective*							
10	U19OLE1201	French	0	0	2	1	HS
11	U19OLE1202	German					
12	U19OLE1203	Japanese					

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved By

Chairperson, Science and Humanities BoS	Chairperson, Information Technology BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr.M.Renuga	Dr.J.Akilandeswari	Dr.R.Shivakumar	Dr.S.R.R.Senthil Kumar

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13.12.2019 B.E/B.Tech Regulations-2019

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT301D	Discrete And Combinatorial Mathematics	3	1	0	4
2	U19IT301	Data Structures	3	0	0	3
3	U19IT302	Digital Logic Design	3	0	0	3
4	U19IT303	Computer Architecture	3	0	0	3
5	U19IT304	Object Oriented Programming in C++	3	0	0	3
6	U19GE303	Mandatory Course- Essence of Indian Traditional Knowledge	2	0	0	0
Practical						
7	U19IT305	Data Structures using C++ Laboratory	0	0	4	2
8	U19IT306	Digital Logic Design Laboratory	0	0	2	1
9	U19ENG301	Communications Skill Laboratory	0	0	2	1
10	U19GE301	Soft Skills and Aptitude - I	0	0	2	1
					Total Credits	**21**

Approved By

Chairperson, Information Technology BoS
Dr.J.Akilandeswari

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT401C	Operations Research	3	1	0	4
2	U19IT401	Operating Systems	3	0	2	4
3	U19IT402	Principles of Communication	3	0	0	3
4	U19IT403	Design and Analysis of Algorithms	3	0	2	4
5	U19IT404	Java Programming	3	0	0	3
6	U19GE402	**Mandatory Course:** Environment and Climate Science	2	0	0	-
Practical						
7	U19IT405	Java Programming Laboratory	0	0	2	1
8	U19IT406	Microprocessors Laboratory	1	0	2	2
9	U19GE401	Soft Skills and Aptitude - II	0	0	2	1
					Total Credits	**22**

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester V Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19IT501	Computer Networks	3	0	0	3	45
2	U19IT502	Database Management Systems	3	0	0	3	45
3	U19IT503	Theory of Computation	3	1	0	4	60
4	U19IT504	Software Engineering	3	0	0	3	45
5	noc21-cs63	**Elective-** NPTEL Introduction to internet of things	3	0	0	3	45
Practical							
6	U19IT505	Database Management Laboratory	0	0	4	2	60
7	U19IT506	Mobile Application Development Laboratory	0	0	4	2	60
8	U19IT507	Internet Of Things Laboratory	0	0	2	1	30
9	U19GE501	Soft Skills and Aptitude – III	0	0	2	1	30
					Total Credits	**22**	

Approved By

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester VI Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19IT601	Full Stack Development	3	0	0	3	45
2	U19IT602	Machine Learning	3	0	0	3	45
3	U19IT925	**Elective –** Agile Software Development	3	0	0	3	45
	U19IT927	**Elective –** Data Science					
4	U19IT911	**Elective –** Cloud Computing	3	0	0	3	45
	U19IT912	**Elective –** Total Quality Management					
Open Elective							
5	U19BM1001	Hospital Management	3	0	0	3	45
	U19CE1001	Building Services and Safety Regulations					
	U19CE1003	Energy Efficiency and Green Building					
	U19EE1002	Energy Conservation and Management					
	U19EE1004	Renewable Energy Systems					
	U19FT1001	Fundamentals of Fashion Design					
	U19MC1003	Smart Automation					
Practical							
6	U19IT603	Full stack Development Laboratory	0	0	4	2	60
7	U19IT604	Software Design and Testing Laboratory	0	0	4	2	60
8	U19IT605	Machine Learning Laboratory	0	0	2	1	30
9	U19GE601	Soft Skills and Aptitude - IV	0	0	2	1	30
					Total Credits	**21**	

Approved By

Chairperson, Information Technology BoS Dr.J.Akilandeswari

Member Secretary, Academic Council Dr.R.Shivakumar

Chairperson, Academic Council & Principal Dr.S.R.R.Senthil Kumar

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester VII under Regulations 2019
Branch: Information Technology

S.No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19GE701	Professional Ethics and Human Values	3	0	0	3	45
2	U19IT701	Cryptography and Network Security	3	0	0	3	45
3	U19IT918	**Professional Elective –** Intellectual Property Rights	3	0	0	3	45
4	U19IT905	**Professional Elective –** Information Security	3	0	0	3	45
	U19IT912	**Professional Elective –** Total Quality Management					
5	U19GE702	**Professional Elective** - Professional readiness for Innovation, Employability and Entrepreneurship	0	0	6	3	90
6	U19CE1004	**Open Elective –** Disaster Management	3	0	0	3	45
	U19EC1001	Biomedical Instrumentation and Measurements					
	U19EE1001	Electric Mobility					
	U19EE1002	Energy Conservation and Management					
	U19EE1004	Renewable Energy Systems					
	U19EE1005	Electrification in Building Construction					
	U19FT1001	Fundamentals of Fashion Design					
	U19FT1002	Garment Manufacturing Technology					
	U19MC1003	Smart Automation					
	U19MC1004	Fundamentals of Robotics					
Practical							
7	U19IT702	Cloud computing Laboratory	0	0	4	2	60
8	U19IT703	Mini Project	0	0	4	2	60
					Total	**22**	

Approved By

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester VIII Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Practical							
1	U19IT801	Project Work	0	0	24	12	360
					Total Credits	**12**	

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Chairperson, Academic Council & Principal
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HOD/Information Technology, Eighth Semester B.Tech IT Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester I under Regulations 2019 (CBCS)
Branch: Information Technology

S.No	Course Code	Course Title	L	T	P	C	Category
Theory							
1	U19MAT102A	Linear Algebra and Calculus	3	1	0	4	BS
2	U19ENG101C	Communication skills in English- I	2	0	0	2	HS
3	U19PHY103C	Engineering Physics	3	0	0	3	BS
4	U19BEE106A	Basic Electrical and Electronics Engineering	3	0	0	3	ES
5	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES
Practical							
6	U19PHL110	Engineering Physics Laboratory	0	0	3	1.5	BS
7	U19BEEL113A	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1	ES
8	U19PPL111	Python Programming Laboratory	0	0	2	1	ES
9	U19GE101	Basic Aptitude – I	0	0	2	0	EEC
Total Credits						**18.5**	
Optional Language Elective*							
10	U19OLE1101	French	0	0	2	1	HS
11	U19OLE1102	German					
12	U19OLE1103	Japanese					

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Approved By

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Dr.M.Renuga	**Dr.J.Akilandeswari**	**Dr.R.Shivakumar**	**Dr.S.R.R.Senthil Kumar**

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HOD/ Information Technology, First Semester BE IT Students and Staff, COE

U19ENG101C - COMMUNICATION SKILLS IN ENGLISH – I
COMMON TO IT

L	T	P	C
2	0	0	2

Course Outcome: At the end of course, the students will be able to

1. Use grammatical components effectively in both written and spoken communication
2. Develop speaking skills for self-introduction, delivering speeches and technical presentation.
3. Speak effectively in real time and business situations
4. Write email, formal letters and descriptions of graphics
5. Develop skills for writing reports and proposals, and for general purpose and technical writing.

UNIT I

- Parts of speech
- Self-introduction – personal information, name, home background, study details, area of interest, hobbies, strengths and weaknesses, projects and paper presentations, likes and dislikes in food, travel, clothes, special features of home town.
- Instructions, Email – fixing an appointment, cancelling appointments, conference details, hotel accommodation, order for equipment, training programme details, paper submission for seminars and conferences
- Paragraph writing – Describing – defining – providing examples or evidences

UNIT II

- Tenses, active and passive voice
- Welcome address, Vote of Thanks, Special Address on specific topic.
- Letter Writing – Business communication, quotations, placing orders, complaints, replies to queries from business customers, inviting dignitaries, accepting and declining invitations

UNIT III

- Prefixes and Suffixes
- Mini presentation in small groups of two or three on Office Arrangements, Facilities, Office Functions, Sales, Purchases, Training Recruitment, Advertising, Applying for financial assistance, applying for a job, team work, discussion, presentation.
- Cover letter and resume writing

UNIT IV

- Modal verbs and probability, concord
- Situational Role Play - between examiner and candidate, teacher and student, customer and sales manager, hotel manager and organiser, team leader and team member, bank manager and candidate, interviewer and applicant, car driver and client, industrialist and candidate, receptionist and appointment seeker, new employee and manager, employee and employee, p.a. and manager, schedule for training
- Proposal: establishing a lab, introducing a subject in the curriculum, training programme for students

UNIT V

- If conditionals
- Situational Role Play - Asking for directions, seeking help with office equipment, clarifying an error in the bill, job details, buying a product, selling a product, designing a website, cancelling and fixing appointments, hotel accommodation, training facilities, dress code, conference facilities.
- Technical report writing - feasibility report, accident report, survey report

TOTAL: 40 Hours

Speaking test will be conducted for 20 marks externally and evaluated along with Communication Skills in English – I in the End Semester Valuation.

TEXT BOOK

- Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016

EXTENSIVE READING

- The Story of Amazon.com- Sara Gilbert, published by Jaico
- The Story of Google – Sara Gilbert, published by Jaico

REFERENCE

1. Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.
2. A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.

U19MAT102A - LINEAR ALGEBRA AND CALCULUS
Common to CIVIL, MECH, EEE, CSE, IT and MCT

L	T	P	C
3	1	0	4

Course Outcomes: At the end of the course, the students will be able to

- find the rank of the matrix and solve linear system of equations by direct and indirect methods
- apply the concepts of vector spaces and linear transformations in real world applications
- apply the concepts of eigen values and eigen vectors of a real matrix and their properties in diagonalization and the reduction of a real symmetric matrix from quadratic form to canonical form
- find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables
- apply appropriate techniques of multiple integrals to find the area and volume.

UNIT I - LINEAR SYSTEM OF EQUATIONS **12**

Rank of a matrix – Solution of linear system of equations by matrix method, Gauss elimination, Gauss-Jordan, Gauss-Jacobi and Gauss-Seidel methods.

UNIT II - VECTOR SPACES **12**

Vector Space – Linear independence and dependence of vectors – Basis – Dimension – Linear transformations (maps) – Matrix associated with a linear map – Range and kernel of a linear map – Rank-nullity theorem (without proof).

UNIT III - EIGEN VALUES AND EIGEN VECTORS **12**

Eigen values and eigen vectors of real matrices – Properties of eigen values and eigen vectors – Cayley-Hamilton theorem – Diagonalization of real symmetric matrices – Reduction of quadratic form to canonical form.

UNIT IV - MULTIVARIABLE CALCULUS **12**

Functions of several variables – Partial differentiation – Total derivative – Jacobians – Taylor's theorem for function of two variables – Maxima and minima of function of two variables without constraints – Constrained maxima and minima by Lagrange's method of undetermined multipliers.

UNIT V - MULTIPLE INTEGRALS **12**

Double integrals – Change of order of integration – Change of variables from Cartesian to polar coordinates – Area as double integrals in Cartesian coordinates – Triple integrals – Volume as triple integrals in Cartesian coordinates.

Theory: 45 hours; Tutorial: 15 hours

TOTAL: 60 Hours

TEXT BOOKS

1. T. Veerarajan, "Linear Algebra and Partial Differential Equations", McGraw Hill Publishers, 1st Edition, 2018.
2. T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1st Edition, 2019.

REFERENCE BOOKS

1. S. Lipschutz and M. L. Lipson, "Linear Algebra", McGraw Hill Publishers, 6th Edition, 2018.
2. E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017.
3. C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1st Edition, 2018.
4. B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.
5. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2018.

U19PHY103C - ENGINEERING PHYSICS
(For B.Tech Information Technology)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the course, the students will be able to,

1. Discuss the dual nature of matter and radiation and the application of wave nature of particles.
2. Describe the basic components of lasers.
3. Analyse the relation between arrangement of atoms and material properties.
4. Differentiate the electrical and thermal conductivity of metals.
5. Elucidate the classification and theory of semiconducting materials.

UNIT I - QUANTUM PHYSICS **9**

Origin of quantum mechanics – Limitations of classical theory - Dual nature of matter and radiation.

Particle nature of radiation - Compton effect - Explanation based on quantum theory - Expression for Compton shift (no derivation).

Wave nature of matter - de Broglie waves - Schrödinger's time independent and time dependent wave equations - Physical significance of wave function - Energy and wave function of an electron trapped in one dimensional box.

Application of wave nature of particles - Electron microscope - Comparison of optical and electron microscope - Scanning electron microscope - Limitations of electron microscope.

UNIT II - LASERS **9**

Basic terms - Energy level - normal population - induced absorption (pumping) - population inversion - meta stable state - spontaneous emission - stimulated emission.

Basic *components* of a laser - Active medium - pumping technique - optical resonator **Einstein's theory** - stimulated absorption - spontaneous emission and stimulated emission.

Types of lasers - Solid lasers (Nd:YAG) - Gas lasers (CO_2 laser) - semiconductor laser (homojunction and hetero junction laser).

Holography - Construction and reconstruction of hologram.

UNIT III - CRYSTAL PHYSICS **9**

Importance of crystals - Types of crystals - Basic definitions in crystallography (Lattice –space lattice - unit cell - lattice parameters – basis - crystallographic formula) - Seven crystal systems and fourteen Bravais lattices – Lattice planes and Miller indices – Interplanar distance - d spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number and Atomic Packing factor for SC, BCC, FCC and HCP Structures - Polymorphism and allotropy.

Crystal imperfections - Point, line and surface defects – burger vector.

UNIT IV - CONDUCTING MATERIALS **9**

Usage of conducting materials - basic definitions (electrical resistance - conductance - resistivity - conductivity).

Classical free electron theory of metals - Postulates of classical free electron theory - microscopic form of Ohm's law - Electrical conductivity - definition and expression for electrical conductivity - Thermal conductivity - definition and expression for thermal conductivity - Wiedemann - Franz law and Lorentz number - Success and failure of classical free electron theory.

Quantum free electron theory - Drawbacks of quantum free electron theory - origin of energy bands - band theory of solids (qualitative treatment only) - Fermi energy and Fermi distribution function - Effect of temperature on Fermi function - Density of energy states - carrier concentration in metals.

UNIT V - SEMICONDUCTING MATERIALS **9**

Properties of semiconductors - Classification of semiconductors - Intrinsic and extrinsic semiconductors - Elemental and compound semiconductors.

Intrinsic semiconductor - Two types of charge carriers - Energy band diagram of intrinsic semiconductors (at T= 0 K and T > 0 K) - Expression for number of electrons in conduction band - Expression for number of holes in valence band - Law of mass action and intrinsic carrier concentration - Fermi level - Variation of Fermi level with temperature - electrical conductivity - band gap determination.

Extrinsic semiconductors - Draw backs of intrinsic semiconductors – Types of extrinsic semiconductors – 'n'-type and 'p'-type semiconductors – Energy band diagram of 'n' type and 'p' type semiconductors (at T= 0 K and T > 0 K) – Carrier concentration of extrinsic semiconductors (Qualitative Treatment only) – Hall effect – Determination of Hall coefficient – Applications.

TOTAL: 45 Hours

TEXT BOOKS

- M.N.Avadhanulu, 'Engineering Physics' S.Chand & Company Ltd, New Delhi (2015)
- B. K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning India Pvt. Ltd., Delhi, 2019

REFERENCES

- Engineering Physics, Sonaversity, Sona College of Technology, Salem (Revised Edition 2018).
- Rajendran, V, and Marikani A, 'Materials science' TMH Publications, (2004) New Delhi.
- Palanisamy P.K, 'Materials science', SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)
- K. Bhattacharya, Poonam Tandon "Engineering Physics" Oxford University Press 2017.

U19BEE106A - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L	T	P	C
3	0	0	3

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

- Analyse the various DC circuits and find the circuit parameters.
- Describe the principles of AC fundamentals.
- Discuss the construction and working principle of DC machines and Transformer.
- Explain the basics of semiconductor devices and its applications.
- Discuss the various applications of operational amplifier and working principle of UPS.

UNIT I - DC FUNDAMENTALS 9

Electrical components and parameters – Resistance, Conductance – Ohm's law, limitations of Ohm's law – – Kirchhoff's law – Power – Energy – resistors in series and parallel – comparison of series and parallel circuits – Star-Delta transformation – simple problems.

UNIT II - AC FUNDAMENTALS 9

AC waveforms – standard terminologies – RMS and average value of Sinusoidal, Triangular and Square waveforms – form factor, peak factor – Resistance, Inductance, Capacitance in AC circuits – Impedance – RL, RC, RLC series circuits – series resonance – simple problems.

UNIT III - ELECTRICAL MACHINES 9

DC Generator: construction of DC Machine – working principle of DC Generator – EMF equation – Types of DC Generator.

DC Motor: Working principle of DC Motor – Types of DC Motor.

Transformer: Working principle of Transformer – EMF equation – Transformation ratio.

UNIT IV - SEMICONDUCTOR DEVICES 9

BJT: Operations of NPN and PNP Transistors – Characteristics of Transistors in CE, CB and CC configuration.

Introduction to power semiconductors - SCR, MOSFET – V-I characteristics and applications.

UNIT V - OPERATIONAL AMPLIFIERS AND POWER SUPPLY 9

Operational Amplifier: Ideal characteristics of Op-Amp – Inverting amplifier, Non-Inverting amplifier – voltage follower – summing amplifier.

Rectifiers: working principle of half wave rectifier, full wave rectifier, bridge rectifier.

UPS: components of UPS – working principle of UPS.

TOTAL: 45 Hours

TEXT BOOKS

1. B.L. Theraja, "Fundamentals of Electrical Engineering & Electronics", S. Chand & Co Ltd, 2015.
2. Muthusubramanian R, Salivahanan S, "Basic Electrical and Electronics Engineering", 3rd Edition 2007,Tata McGraw-Hill publishing company limited.

REFERENCES

1. Mehta V.K, Rohit Mehta, "Principles of Electrical Engineering & Electronics", S.Chand& Co. Ltd., 2011.
2. S.K. Bhattacharya, "Electrical Machines", Tata MC Graw Hill Publishing company ltd., III edition, 2009.
3. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", II revised edition 2010, PHI publications.
4. D. Roy Choudhury and Shail Jain, "Linear Integrated Circuits", First edition, New age international, 2011.
5. S. Padma, "Basic Electrical and Electronics Engineering", Sonaversity, Revised edition 2016.

U19PPR105 - PROBLEM SOLVING USING PYTHON PROGRAMMING

L	T	P	C
3	0	0	3

Course Outcomes: At the end of course, the students will be able to

1. Develop algorithmic solutions to simple computational problems
2. Write simple Python programs
3. Write programs with the various control statements and handling strings in Python
4. Develop Python programs using functions and files
5. Analyze a problem and use appropriate data structures to solve it.

UNIT I - ALGORITHMIC PROBLEM SOLVING 9

Need for computer languages, Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT II - BASICS OF PYTHON PROGRAMMING 9

Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, input function, print function, Formatting numbers and strings, implicit/explicit type conversion.

UNIT III - CONTROL STATEMENTS AND STRINGS 9

Conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration-while, for, infinite loop, break, continue, pass, else. Strings-String slices, immutability, string methods and operations.

UNIT IV - FUNCTIONS AND FILES 9

Functions - Introduction, inbuilt functions, user defined functions, passing parameters - positional arguments, default arguments, keyword arguments, return values, local scope, global scope and recursion. Files -Text files, reading and writing files.

UNIT V - DATA STRUCTURES: LISTS, SETS, TUPLES, DICTIONARIES 9

Lists-creating lists, list operations, list methods, mutability list functions, searching and sorting, Sets-creating sets, set operations. Tuples-Tuple assignment, Operations on Tuples, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Nested Dictionaries.

TOTAL: 45 Hours

TEXT BOOK

- Reema Thareja, "Problem Solving and Programming with Python", Oxford University Press, 2018.
- Allen B. Downey, "Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 (http://greenteapress.com/wp/think- python/)

REFERENCES

- Ashok Namdev Kamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python" , Mc-Graw Hill Education, 2018.
- Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.
- Timothy A. Budd," Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015.
- Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
- Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition, 2013.

U19PHL110 - ENGINEERING PHYSICS LABORATORY
(For B.Tech. Information Technology)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the course, the students will be able to,

1. Demonstrate an experimental setup to form interference fringes and use it to determine the thickness of the thin wire.
2. Study the change in properties of ultrasonic waves in a liquid medium and determine the characteristics of the liquid.
3. Demonstrate by means of an appropriate experiment the poor thermal conductivity of a given bad conductor
4. Apply the principle of spectrometry to determine the properties of a given prism.
5. Demonstrate the applications of a diode laser to determine the wave length, particle size in the given powder (Lycopodium) and the characteristics of a given optical fibre.
6. Investigate the non – uniform bending behavior of a given material.
7. Demonstrate the experimental set up to execute torsional oscillations and determine the rigidity modulus of the given wire
8. Determine the specific resistance of the given wire using Carey – Fosters bridge.
9. Demonstrate the experimental setup for stream line flow of low viscus liquid and determine the coefficient of viscosity of the given liquid by Poiseuille's method.
10. Apply the principle of spectrometry to determine the properties of a given prism.
11. Investigate the uniform bending behavior of a given material.
12. Determine the band gap of a semiconductor diode.

LIST OF EXPERIMENTS

1. Determination of the thickness of a thin wire by forming interference fringes using air wedge apparatus.
2. Determination of velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
3. Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.
4. Determination of dispersive power of the prism for various pairs of colors in the mercury spectrum using a spectrometer.
5. Determination of laser wavelength, particle size (lycopodium powder), acceptance angle and numerical aperture of an optical fibre using diode laser.

6. Determination of the Young's modulus of the given material by non-uniform bending method.
7. Determination of rigidity modulus of the material of wire using torsion pendulum
8. Determination of specific resistance of a given wire using Carey Foster's bridge.
9. Determination of coefficient of viscosity of liquid by Poiseuille's method.
10. Determination of wavelength of prominent colors in mercury spectrum using a spectrometer.
11. Determination of the Young's modulus of the given material by uniform bending method.
12. Determination of band gap of the given semiconductor diode.

TOTAL: 45 Hours

U19BEEL113A - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

L	T	P	C
0	0	2	1

Course Outcomes: At the end of course, the students will be able to

- Apply the basic circuit laws for calculating various parameters of DC and AC circuits
- Design the circuit for various applications using electronic devices.
- Analysis the performance characteristics of electronic devices such as SCR, MOSFET, BJT and op-amp.

List of experiments

1. Verification of Ohm's Law.
2. Verification of Kirchhoff's Law.
3. Measurement of power and power factor for RLC circuit.
4. Frequency response of RLC resonance circuit.
5. V-I characteristics of BJT in CB configuration.
6. V-I characteristics of BJT in CE configuration.
7. V-I characteristics of BJT in CC configuration.
8. V-I characteristics of MOSFET.
9. V-I characteristics of SCR.
10. Characteristics of operational amplifier as inverting and non-inverting amplifiers.
11. Measurement of ripple factor for half wave and full wave rectifier circuits.

Total: 30 Hours

U19PPL111 - PYTHON PROGRAMMING LABORATORY

L	T	P	C
0	0	2	1

Course Outcomes: At the end of course, the students will be able to

1. Implement the algorithms using basic control structures in Python
2. Develop Python programs to use functions, strings and data structures to solve different types of problems
3. Implement persistent storing information through file operations

LIST OF EXPERIMENTS

1. Draw flowchart using any open source software.
2. Implement programs with simple language features.
3. Implement various branching statements in python.
4. Implement various looping statements in python.
5. Develop python programs to perform various string operations like concatenation, slicing, indexing.
6. Implement user defined functions using python.
7. Implement recursion using python.
8. Develop python programs to perform operations on list and tuples
9. Implement dictionary and set in python
10. Implement python program to perform file operations.

TOTAL: 30 Hours

U19GE101 - BASIC APTITUDE – I
(Common to All Departments)

L	T	P	C
0	0	2	0

Course Outcomes: At the end of course, the students will be able to

1. Solve fundamental problems in specific areas of quantitative aptitude
2. Solve basic problems in stated areas of logical reasoning
3. Demonstrate rudimentary verbal aptitude skills in English with regard to specific topics

1. Quantitative Aptitude and Logical Reasoning

Solving simple problems with reference to the following topics:

a. Numbers – HCF & LCM
b. Decimal fractions
c. Square roots & cube roots
d. Surds & Indices
e. Logarithms
f. Percentage
g. Averages
h. Coding and Decoding & Visual language

2. Verbal Aptitude

Demonstrating plain English language skills with reference to the following topics:

a. Synonyms
b. Antonyms
c. Verbal analogy
d. Editing passages
e. Sentence filler words

TOTAL: 30 hours

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester II under Regulations 2019 (CBCS)
Branch: Information Technology

S.No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Category
Theory							
1	U19MAT202D	Applied Probability and Statistics	3	1	0	4	BSC
2	U19ENG201C	Communication Skills in English – II	2	0	2	3	HSMC
3	U19CHE204B	Applied Chemistry	3	0	0	3	BSC
4	U19EGR206A	Engineering Graphics	2	0	2	3	ESC
5	U19IT201	Programming in C	3	0	0	3	PCC
6	U19IT202	Information Technology Essentials	2	0	0	2	ESC
Practical							
7	U19IT203	Programming in C Laboratory	0	0	3	1.5	PCC
8	U19CHL209	Engineering Chemistry Laboratory	0	0	3	1.5	ESC
9	U19GE201	Basic Aptitude – II	0	0	2	0	EEC
					Total Credits	**21**	
Optional Language Elective*							
10	U19OLE1201	French	0	0	2	1	HS
11	U19OLE1202	German					
12	U19OLE1203	Japanese					

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved By

Chairperson, Science and Humanities BoS	Chairperson, Information Technology BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr.M.Renuga	Dr.J.Akilandeswari	Dr.R.Shivakumar	Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/ Information Technology, Second Semester BE IT Students and Staff, COE

13.12.2019 B.E/B.Tech Regulations-2019

U19MAT202D – APPLIED PROBABILITY AND STATISTICS

L	T	P	C
3	1	0	4

Course Outcome: At the end of the course, the students will be able to

1. apply the concepts of measure of central tendency, dispersion, correlation to the given data and analyze the results.
2. apply the concepts of random variables and their properties to generate the moments.
3. fit the suitable distribution and its properties to the real world problems and interpret the results.
4. apply the concepts of joint probability distribution and its properties to find the covariance.
5. test the hypothesis of the population using sample information.

UNIT I - BASIC STATISTICS **12**

Measures of central tendency (simple arithmetic mean, median, mode) – Quartile's – Measures of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation, coefficient of variation) – Simple correlation – Curve fitting (straight line and parabola).

UNIT II - RANDOM VARIABLES **12**

Discrete and continuous random variables – Probability mass function, probability density function, moments, moment generating function and their properties.

UNIT III - STANDARD DISTRIBUTIONS **12**

Binomial, Poisson, geometric, uniform, exponential and normal distributions and their properties.

UNIT IV - TWO DIMENSIONAL RANDOM VARIABLES **12**

Joint distributions, marginal and conditional distributions – Covariance – Correlation – Central limit theorem.

UNIT V - TESTING OF SIGNIFICANCE **12**

Sampling distributions - Testing of hypothesis for mean, standard deviation, variance, proportion and differences using normal and t distributions - χ^2- test for independence of attributes and goodness of fit and F distribution.

TOTAL: 60 Hours

TEXT BOOKS

1. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, 11th Edition, Reprint, 2019.
2. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.

REFERENCES

1. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
2. S. Ross, "A first course in probability", Pearson Publishers, 9th Edition, 2019.
3. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
4. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, 3rd Edition, Wiley Publishers, 2008.

U19ENG201C - COMMUNICATION SKILLS IN ENGLISH - II

L	T	P	C
2	0	2	3

Course Outcome: At the end of the course, the students will be able to

1. frame sentences correctly, both in written and spoken forms of language with accuracy and fluency.
2. develop and demonstrate listening skills for academic and professional purposes.
3. draw conclusions on explicit and implicit oral information.
4. develop effective reading skills and reinforce language skills required for using grammar and building vocabulary.
5. read for gathering and understanding information, following directions and giving responses.

UNIT – I

- Cause and effect expressions, adjectives, comparative adjectives
- Listening to conversations, welcome speeches, lectures and description of equipment
- Listening to different kinds of interviews (face-to-face, radio, TV and telephone interviews)
- Understanding notices, messages, timetables, advertisements, graphs, etc.
- Reading passages for specific information transfer

UNIT – II

- Prepositions and dependent prepositions
- Understanding short conversations or monologues,
- Taking down phone messages, orders, notes etc
- Listening for gist, identifying topic, context or function
- Reading documents for business and general contexts and interpreting graphical representations

UNIT – III

- Collocations
- Listening comprehension, entering information in tabular form
- Error correction, editing mistakes in grammar, vocabulary, spelling, etc.
- Reading passage with multiple choice questions, reading for gist and reading for specific information, skimming for comprehending the general idea and meaning and contents of the whole text

UNIT – IV

- Articles, adverbs
- Intensive listening exercises and completing the steps of a process.
- Listening exercises to categorise data in tables.
- Short reading passage: gap-filling exercise related to grammar, testing the understanding of prepositions, articles, auxiliary verbs, modal verbs, pronouns, relative pronouns and adverbs, short reading passage with multiple choice questions.

UNIT – V

- Pronouns
- Listening to extended speech for detail and inference
- Listening and developing hints
- Gap-filling exercise testing the knowledge of vocabulary, collocations, dependent prepositions
- Short reading passages for sentence matching exercises, picking out specific information in a short text

TOTAL: 45 Hours

The listening test will be conducted for 20 marks and reading for 20 marks internally and evaluated along with Communication Skills in English –II in the End Semester Valuation.

TEXTBOOK

1. Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016

EXTENSIVE READING

1. Who Moved my Cheese? – Spencer Johnson-G. P. Putnam's Sons
2. Discover the Diamond in You – Arindham Chaudhari – Vikas Publishing House Pvt. Ltd.

REFERENCES

1. Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.
2. A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.

U19CHE204B - APPLIED CHEMISTRY

L	T	P	C
3	0	0	3

Course Outcome: At the end of the course, the students will be able to

1. outline the principles and applications of electrochemistry to engineering and technology.
2. analyze the types of corrosion and describe the methods of corrosion control.
3. discuss the principle, applications of surface chemistry and catalysis in engineering and technology.
4. describe the basics of nano chemistry, synthesis, properties and applications of nano materials in engineering and technology.
5. analyze the types of polymers, methods of polymerization and methods of fabrication.

UNIT I - ELECTROCHEMISTRY **9**

Conductivity of Electrolytes – Kohlrausch's Law of Independent Migration of Ions and Its Applications – Conductometric Titration (Acid-Base – HCl vs NaOH) – Electrode Potential – Nernst Equation – Derivation and Problems Based on Single Electrode Potential Calculation – Electrochemical Series – Significance – Reference Electrodes - Standard Hydrogen Electrode, Saturated Calomel electrode – Ion selective electrode - glass electrode - determination of pH for unknown solution – Electrochemical Cell – Emf of an Electrochemical Cell – Redox Reactions - Potentiometric Titrations (Redox – Fe^{2+} Vs Dichromate).

UNIT II - CORROSION AND ITS CONTROL **9**

Dry or Chemical Corrosion - Pilling-Bedworth Rule – Wet or Electrochemical Corrosion – Mechanism of Electrochemical Corrosion – Galvanic Corrosion – Differential aeration Corrosion - Factors Influencing Corrosion – Corrosion Control - Cathodic Protection - Sacrificial Anodic Protection Method and Impressed Current Cathodic Protection – Protective Coatings – Metallic Coatings – Galvanizing process – Tinning process - Organic Coatings – Paints - Constituents and Functions.

UNIT III SURFACE CHEMISTRY AND CATALYSIS **9**

Adsorption – types - Physical and chemical adsorption – adsorption of gases on solids - Adsorption isotherms - Freundlich and Langmuir isotherms - Adsorption of solutes from solution – Applications of adsorption - Role of adsorption in catalytic reactions – Adsorption in pollution abatement (granular activated carbon and powdered activated

carbon) – Catalysis - Types - Characteristics of catalysts - Autocatalysis - Definition and examples – catalytic promoters – catalytic poisons.

UNIT IV NANOCHEMISTRY 9

Basics - Distinction between molecules, nanoparticles and bulk materials – Size-dependent properties – Nanoparticles: nano cluster, nano rod, nanotube (CNT) and nanowire – Synthesis: Precipitation – Thermolysis – Hydrothermal – Solvothermal – Electrodeposition - Chemical vapour deposition - Sol-gel technique – Properties and applications of nano materials.

UNIT V POLYMERS AND COMPOSITES 9

Nomenclature of Polymers – Functionality – Types of Polymerization-Addition-Condensation and Copolymerization – Classification of Polymers – Free Radical mechanism of Addition Polymerization – Properties of Polymers - Glass transition temperature – Tacticity - Methods of Polymerization – Bulk, solution, emulsion and suspension – Thermoplastic and Thermosetting Resins – Plastics – Moulding Constituents of Plastic – Moulding of Plastics into Articles-Injection - Compression and Blow Moulding – Composites - Constituents of Composites – Types of FRP Composites**.**

TOTAL : 45 Hours

TEXT BOOKS

1. P. C. Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi, 2010 (15th Edition).
2. G. Shanthi *et al.,* "Applied Chemistry", Sonaversity, Sona College of Technology, Salem, 2019.

REFERENCES

1. H. K. Chopra, A. Parmer, "Chemistry for Engineers", Narosa Publishing House, New Delhi, 110 002, 2016.
2. Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd., Chennai, 2009.
3. B. Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2008.
4. Ozin G. A. and Arsenault A. C., "Nanochemistry: A Chemical Approach to Nanomaterials", RSC Publishing, 2005.

U19EGR206A – ENGINEERING GRAPHICS

L	T	P	C
2	0	2	3

Course Outcomes: At the end of the course, the students will be able to

1. predict the construction of various curves in civil elevation, plan and machine components.
2. analyze the principles of projection of various planes by different angle to project points, lines and planes.
3. draw the principles of projection of simple solid by the axis is inclined to one reference plane by change of position method.
4. understand the interior details of complex components, machineries by sectioning the solid body. study the development of surfaces for prisms and pyramids.
5. draw the projection of three dimensional objects representation of machine structure and explain standards of orthographic views by different methods.

CONCEPTS AND CONVENTIONS (Not for Examination) 03

Importance of graphics in engineering applications, Use of drafting instrument, BIS conventions and specifications - Size, layout and folding of drawing sheets, Lettering and dimensioning.

COMPUTER AIDED DRAFTING (Not for Examination) 03

Importance 2d Drafting, sketching, modifying, transforming and dimensioning.

UNIT I – PLANE CURVES (Manual drafting) 06

Curves used in engineering practices Conics – Construction of ellipse – Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

UNIT II – PROJECTION OF POINTS, LINES AND PLANE SURFACES (CAD software) 12

Projection of points – Projection of straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to one reference planes.

UNIT III – PROJECTION OF SOLIDS (CAD software) 12

Creation of 3D CAD models of pyramids, prisms and solids of revolutions-Sectional views **- (Not for Examination)**

Projection of simple solids like prisms – pyramids – cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV – SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES (CAD software) 12

Sectioning of simple solids like prisms – pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other, (Obtaining true shape of section is not required). Development of lateral surfaces of simple and truncated solids – Prisms – pyramids –cylinders and cones.

UNIT V – Conversion of Isometric Views to Orthographic Views (Manual drafting) 12

Representation of three dimensional objects – General Principles of Orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout of views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

TOTAL: 60 Hours

TEXT BOOKS

1. P. Suresh et al., "Engineering Graphics and Drawing", Sonaversity, Sona College of Technology, Salem, Revised edition, 2012.
2. K.V. Natarajan Engineering Graphics by, Chennai, 17th edition 2003.

REFERENCES

1. Dhananjay A. JoIhe, Engineering Drawing with an introduction to AutoCAD, Tata McGraw Hill Publishing Company Limited, 2008.
2. Basant Agarwal and Agarwal C.M., Engineering Drawing, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. K. R. Gopalakrishnana, Engineering Drawing (Vol. I & II), Subhas Publications, 1998.
4. Bertoline & Wiebe fundamentals of graphics communication III edition McGrawhill 2002.

U19IT201 – PROGRAMMING IN C

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the course, the students will be able to

1. write simple C programs
2. apply the concepts such as arrays, decision making and looping statements to solve real-time problems
3. develop C programs using functions and pointers
4. write a C programs to define own data types using the concept of structures and union
5. write a C program to store the information persistently using file concepts

UNIT I - C PROGRAMMING BASICS **9**

Structure of a C program – Compiling and Debugging a C program - C Character set, Identifiers and Keywords, Data Types, Declarations, Expressions, Statements and Symbolic constants, Operators – Arithmetic Operators – Unary operators – Relational and Logical Operators – Assignment operators – Conditional operators. Managing Input and Output operations, pre-processor directives and storage classes.

UNIT II - CONTROL STATEMENTS, ARRAYS AND STRINGS **9**

Unconditional statements, conditional statements, branching and looping statements - Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

UNIT III - FUNCTIONS AND POINTERS **9**

Function – Library functions and user-defined functions – Function prototypes and function definitions – Call by value – Call by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays- Example Problems – Pointers and Functions

UNIT IV - STRUCTURES AND UNIONS **9**

Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure – Passing structures to functions – Array of structures – Pointers to structures – Union - Programs using structures and Unions – Dynamic Memory Allocation: malloc and calloc

UNIT V – FILE MANIPULATIONS **9**

File Manipulations- File operations – Open, Read, Write and Close, Binary files and text files, Input and outout file redirection – Stdin and Stdout and Command line arguments.

TOTAL: 45 Hours

TEXTBOOKS

1. Deitel P and Deitel H, "C How to Program", Pearson Education, New Delhi, 2016.
2. Venugopal KR and Sudeep R Prasad, "Mastering C", McGraw Hill, Second edition, 2017.

REFERENCES

1. Byron S Gottfried, "Programming with C", Schaums Outlines, Second Edition, Tata McGraw-Hill, 2017.
2. Yashavant P. Kanetkar, "Let Us C", 15th Edition, BPB Publications, 2016.
3. Balagurusamy E, "Programming in ANSI C", sixth edition, Tata Mcgraw-Hill, 2012.
4. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2006.

U19IT202 – INFORMATION TECHNOLOGY ESSENTIALS

L	T	P	C
2	0	0	2

Course Outcomes: At the end of the course, the students will be able to

1. create a web pages using HTML and CSS
2. explain the basics of networking and its working principles in real world
3. explain the working principles of mobile communication
4. perform installation and configuration of operating system, and drivers
5. explain the basics of Machine Learning, Cloud Computing and IoT

UNIT I - WEB ESSENTIALS **6**

Creating a Website - Working principle of a Website - Browser fundamentals - Authoring tools - Types of servers: Application Server - Web Server - Database Server.

UNIT II - NETWORKING ESSENTIALS **6**

Fundamental computer network concepts - Types of computer networks - - Network layers - TCP/IP model - Wireless Local Area Network - Ethernet - WiFi - Network Routing - Switching - Network components.

UNIT III - MOBILE COMMUNICATION ESSENTIALS **6**

Cell phone working fundamentals - Cell phone frequencies & channels - Digital cell phone components - Generations of cellular networks - Cell phone network technologies / architecture - Voice calls & SMS

UNIT IV - INSTALLATION AND CONFIGURATION OF PC **6**

Configuration of BIOS - Installing Operating System (Open Source and Proprietary) – Driver installation – Network Configuration – Disk Configuration

UNIT V - RECENT TRENDS IN IT **6**

Introduction to Machine Learning - Application of Machine Learning – Introduction to Cloud Computing – Types of Cloud services – IoT and its applications

TOTAL: 30 Hours

TEXTBOOKS

1. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, “Mastering HTML, CSS and Java Script”, BPB Publications, 2017.
2. James F. Kurose, ―Computer Networking: A Top-Down Approach‖, Sixth Edition, Pearson, 2017.

REFERENCES

1. Gottapu Sasibhushana Rao, "Mobile Cellular Communication", Pearson, 2012.
2. Nathan Clark,” Linux: installation, configuration and command line basics”, Independent Publisher,2018.
3. R. Kelly Rainer, Casey G. Cegielski, Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.

U19IT203 – PROGRAMMING IN C LABORATORY

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the course, the students will be able to

1. develop programs in C using basic constructs.
2. develop applications in C using strings, pointers, functions, structures
3. develop applications in C using file processing

List of Experiments

1 Programs using Input, Output and assignment statements
2. Programs using Branching statements
3. Programs using Looping statements
4. Programs using Functions
5. Programs using one dimensional and two dimensional arrays
6. Programs using Structures and Unions.
7. Programs using Strings
8. Programs using Pointers (both data pointers and function pointers)
9. Programs using Recursion
10. Programs using Command line arguments
11. Programs using Files concepts
12. Programs using Dynamic Memory Allocation

TOTAL: 45 Hours

U19CHL209 – ENGINEERING CHEMISTRY LABORATORY

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the course, the students will be able to

1. analyse the given water sample to determine the amount of hardness and different types of alkalinity and determine their amount in the given water sample.
2. determine the molecular weight of various polymers, analyse the quality of brass by estimating copper and estimate the amount of calcium oxide in the given cement sample. Calculate the amount of chromium present in the given sample of water.
3. estimate the amount of DO in water and evaluate the amount of iron content in the given sample using spectrophotometry.

List of Experiments

1. Estimation of hardness of water sample by EDTA method.
2. Estimation of alkalinity of water sample by indicator method.
3. Estimation of chloride ion present in the sample water by argentometric method.
4. Estimation of copper in brass by EDTA method.
5. Estimation of HCl acid by pH metry.
6. Determination of iron content in water by spectrophotometric method.
7. Estimation of HCl by conductometry. (HCl vs NaOH)
8. Estimation of mixture of acids by conductometry. (HCl + CH_3COOH vs NaOH)
9. Estimation of ferrous ion by potentiometric titration.
10. Determination of molecular weight of a polymer by viscosity measurements.
11. Determination of dissolved oxygen of water by Winkler's method.
12. Estimation of chromium in waste water.
13. Estimation of corrosion rate by weight loss measurements.

14. Determination of calcium oxide in cement.

TOTAL : 45 Hours

U19GE201 - BASIC APTITUDE - II

L	T	P	C
0	0	2	0

Course Outcomes: At the end of the course, the students will be able to

CO1: solve more elaborate problems than those in BA-I in specific areas of quantitative aptitude.

CO2: solve problems of greater intricacy than those in BA-I in stated areas of logical reasoning.

CO3: demonstrate higher than BA-I level verbal aptitude skills in English with regard to specific topics.

List of Experiments

1. QUANTITATIVE APTITUDE AND LOGICAL REASONING

Solving quantitative aptitude and logical reasoning problems with reference to the following topics:

a. Ratio and proportion
b. Partnership
c. Chain rule
d. Ages
e. Profit, loss and discount
f. Geometry
g. Area and volume
h. Data arrangement

2. VERBAL APTITUDE

Demonstrating verbal aptitude skills in English with reference to the following topics:

a. Jumbled sentences
b. Reconstructions of sentences (PQRS)
c. Sentence fillers two words
d. Idioms and phrases
e. Spotting errors
f. Writing captions for given pictures

TOTAL : 24 Hours

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT301D	Discrete And Combinatorial Mathematics	3	1	0	4
2	U19IT301	Data Structures	3	0	0	3
3	U19IT302	Digital Logic Design	3	0	0	3
4	U19IT303	Computer Architecture	3	0	0	3
5	U19IT304	Object Oriented Programming in C++	3	0	0	3
6	U19GE303	Mandatory Course- Essence of Indian Traditional Knowledge	2	0	0	0
Practical						
7	U19IT305	Data Structures using C++ Laboratory	0	0	4	2
8	U19IT306	Digital Logic Design Laboratory	0	0	2	1
9	U19ENG301	Communications Skill Laboratory	0	0	2	1
10	U19GE301	Soft Skills and Aptitude - I	0	0	2	1
					Total Credits	**21**

Approved By

Chairperson, Information Technology BoS
Dr.J.Akilandeswari

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Information Technology, Third Semester B.Tech IT Students and Staff, COE

U19MAT301D DISCRETE AND COMBINATORIAL MATHEMATICS 3 1 0 4

COURSE OUTCOMES

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

1. Check the validity of the arguments in the field of data base and artificial intelligence using the rules of logic
2. Apply the concept of logical theory to validate the correctness of software specifications.
3. Apply the combinatorics techniques to count, enumerate, or represent possible solutions in the process of solving application problems in the field of communication networks and string searching algorithm.
4. Analyze and simplify the digital (logic) circuits using the concept of lattices.
5. Produce an output for each input in computer programming and Turing machine.

UNIT – I PROPOSITIONAL CALCULUS 12

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contra positive – Logical equivalences and implications – DeMorgan's laws – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments – Validity of arguments.

UNIT – II PREDICATE CALCULUS 12

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – Rules of universal specification and generalization – Validity of arguments.

UNIT – III COMBINATORICS 12

Counting principle – Sum and product rule – Pigeonhole principle – Permutations and combinations – Mathematical induction – Recurrence relation – Solution of recurrence relation using generating functions.

UNIT – IV RELATIONS AND LATTICES 12

Relations - Types of relations and their properties – Equivalence relations – Partial order relation – Equivalence Classes – Partition of a set – Matrix representation of a relation – Representation of relations by graphs – Poset – Hasse diagram – Lattices and their properties.

UNIT – V FUNCTIONS 12

Functions – Classification – Types of functions and examples – Composition of functions – Inverse functions – Characteristic function of a set - Permutation functions.

Theory: **45 Hours** Tutorial: **15 Hours** Total**: 60 Hours**

TEXT BOOKS:

1. K. H. Rosen, "Discrete Mathematics and its Applications", McGraw Hill Publishers, 8th Edition, 2019.
2. J. P. Trembly and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill Publishers, 35th Reprint, 2008.

REFERENCES:

1. T. Veerarajan, “Discrete Mathematics with Graph Theory and Combinatorics”, McGraw Hill Publishers, 19th Reprint, 2014.
2. R. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Pearson Publishers, 5th Edition, 2004.
3. https://nptel.ac.in/courses/106/106/106106094/

U19IT301 DATA STRUCTURES 3 0 0 3

COURSE OUTCOMES

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

1. Apply and implement linear data structure
2. Apply different nonlinear data structures.
3. Implement variants of different tree data structure.
4. Analyze simple algorithms and develop algorithms using hashing.
5. Develop and apply algorithms for real time applications using graph.

UNIT I LINEAR STRUCTURES 9

Abstract Data Types (ADT) - List ADT - Array-Based Implementation - Linked List Implementation - Doubly Linked Lists - Applications Of Lists - Stack ADT - Queue ADT - Circular Queue Implementation - Applications of Stacks And Queues

UNIT II TREE STRUCTURE 9

Preliminaries of Trees - Implementation of Tree ADT - Tree Traversals - Binary Tree ADT - Expression Trees - Binary Search Tree ADT - AVL Trees - Applications of Trees.

UNIT III TREE VARIANTS AND BINARY HEAP 9

Splay Trees - Splaying - B Trees - Priority Queue: Model - Simple Implementation - Binary Heap - Basic Heap Operations - Applications of Priority Queue.

UNIT IV ALGORITHM ANALYSIS & HASHING 9

Algorithm Analysis - Asymptotic Notations - Time complexity - Space complexity - Hashing -General idea - Hash Function - Separate Chaining - Open Addressing - Linear Probing - Quadratic Probing - Double Hashing - Rehashing - Extendible Hashing

UNIT V GRAPH 9

Definitions - Representation of Graphs - Traversals - Breadth First Search - Depth-first Search - Topological Sort – Shortest path Algorithms - Unweighted Shortest Paths - Dijkstra's Algorithm- Minimum Spanning Tree - Prim's and Kruskal's.

Total : 45 hours

TEXT BOOK

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C++", Fourth Edition, Pearson Education, 2014.

REFERENCES

1. D.S. Malik, "Data Structures Using C++", 2nd edition , Cengage, 2012.
2. Yedidyah Langsan, Moshe J. Augenstein And Aoron M. Tanenbaum," Data Structures using C and C++", Pearson, 2006
3. Sartaj Sahni, " Data Structures, Algorithm and Application in C++", 2nd edition, Universities Press, 2005.
4. Michael T.Goodrich, R.Tamassia and Mount "Data structures and Algorithms in C++", 2nd edition, Wiley , 2016.

U19IT302 DIGITAL LOGIC DESIGN 3 0 0 3

COURSE OUTCOMES

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

1. Simplify the Boolean expression using K-Map and tabulation techniques.
2. Use Boolean simplification techniques to design a combinational circuit.
3. Analysis and Design of a given combinational digital/logic circuits.
4. Analysis and Design of a given sequential digital/logic circuits.
5. Design for Hazard free combinational and sequential circuits.

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Review of Number systems – Complements - Digital Logic gates - Basic theorems and properties of Boolean algebra - Boolean functions – Canonical and Standard forms -Simplifications of Boolean functions using Karnaugh map – three variable, Four variable and Five variable – Product of sum simplification- Don't care conditions – Quine McCluskey(QM) method.

UNIT II COMBINATIONAL LOGIC 9

Combinational circuits – Analysis and design procedures - Code conversion – Binary to Gray, Gray to Binary – BCD to Excess - 3, Excess - 3 to BCD- Circuits for arithmetic operations –Half Adder – Full Adder - Binary Adder– Half subtractor – Full subtractor – Binary subtractor- BCD adder- Binary Multiplier – Magnitude comparator.

UNIT III MSI LOGIC CIRCUITS AND PROGRAMMABLE LOGIC 9

Decoders – combinational logic implementation using decoder – Encoders- Priority encoder-Multiplexers- Boolean function Implementation using multiplexer – Demultiplexer - Programmable logic Array – Implementation of Boolean functions with PLA - Programmable Array logic. Implementation of Boolean functions with PAL.

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential circuits – Flip flops – RS, JK, D, T - Analysis of clocked sequential circuits –State equations, State Table, State diagram - Analysis with D, JK and T Flip flops – State reduction and state assignment - Design procedures – Synthesis using D, JK and T – Sequence detector – Parallel counter design using flip-flops.

UNIT V HAZARDS AND FPGA LOGIC 9

Introduction- Hazards –Hazards in Combinational Circuits -Hazards in Sequential Circuits – FPGA – Basics – FPGA Vs CPLD – FPGA Architecture – Configurable Logic Block – Basic Architecture of Xilinx XC 4000 series- Design flow –Design entry – Logic Synthesis – Design implementation – Design verification – Types of FPGA based on Application .

TOTAL: 45 HOURS

TEXT BOOK

1. M.Morris Mano, Michel D. Ciletti, and John F.Walerly "Digital Design", 5th edition, Pearson Education, 2013.

REFERENCES

1. Larry L Kinney and Charles H.Roth Jr, "Fundamentals of Logic Design", 5th edition, Jaico Publishing House, 2015.
2. Ananda Natarajan, "Digital Design", PHI learning private Ltd, 2015.
3. Donald P.Leach, Albert Paul Malvino and Saha, "Digital Principles and Applications", 8th edition, TMH, 2014.
4. G.K.Kharate, "Digital Electronics", Oxford University press, 2012.
5. John F.Wakerly, "Digital Principles and practices", 4th edition, Pearson Education, 2013.

U19IT303 COMPUTER ARCHITECTURE 3 0 0 3

COURSE OUTCOMES:

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

1. Explain the processor design concepts in modern computer architecture.
2. Explain the operations and instruction sequences in a basic computer.
3. Apply the concepts of pipelining to solve performance related problems.
4. Explain the hierarchical memory system including cache memory and virtual memory.
5. Choose appropriate I/O devices for embedded system applications.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Software – Performance and metrics – Multiprocessors and Multicomputer – Memory Locations and Addresses– Instructions and instruction sequencing – Addressing modes – Fixed point and Floating point representations.

UNIT II BASIC PROCESSING UNIT 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control: Micro Instructions- Micro Instructions with next address field.

UNIT III PIPELINING 9

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets –Data path and control considerations – Superscalar operation– Performance considerations.

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAM – ROM – Speed Size and cost – Cache memories – performance consideration – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

UNIT V I/O ORGANIZATION AND EMBEDDED SYSTEMS 9

I/O devices - Accessing I/O devices –Interrupts – Direct Memory Access –Interface circuits – Standard I/O Interfaces (USB, Fire wire, SCSI Bus, SATA) – Examples of Embedded Systems - Microcontroller Chips for Embedded Applications – Introduction to SoC.

TOTAL: 45 HOURS

TEXT BOOK

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian "Computer Organization and Embedded Systems", 6th edition, McGraw Hill Education, 2017.

REFERENCES

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 10th edition, Pearson Education, 2015.
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software interface", 5th edition, Elsevier, 2013.
3. B. Govindarajalu, "Computer Architecture and Organization: Design Principles and Applications", 2nd edition, McGraw Hill Education, 2010.

U19IT304 OBJECT ORIENTED PROGRAMMING IN C++ 3 0 0 3

COURSE OUTCOMES

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

- Explain fundamental programming concepts such as variables, conditional statements, looping constructs, and methods (procedures), inline function, friend function.
- Describe how the class mechanism supports encapsulation and information hiding
- Apply the concept of constructors, destructors and operator overloading.
- Apply templates and inheritance mechanism in applications.
- Write C++ programs for applications using files and exceptions.

UNIT I OBJECT ORIENTED CONCEPTS 9

Introduction to Object Oriented Programming and C++: Object oriented concepts and its characteristics: abstraction, encapsulation, inheritance, and polymorphism. History of C++ - Structure of C++-Applications of C++- Tokens- Keywords- Identifiers-Basic data types- Derived data types- Symbolic constants- Dynamic initialization -Reference variables- Scope resolution operator-Type modifiers- Type casting.

C++ Operators and control statements- Input and output statements- Function Prototyping-Function components- Passing parameters - call by reference, return by reference- Inline function- Default arguments - Overloaded function- Introduction to friend function.

UNIT II CLASSES AND OBJECTS, CONSTRUCTORS AND DESTRUCTORS 9

Classes and Objects: Class specification- Member function definition- Nested member function- Access qualifiers- Static data members and member functions - Instance creation- Array of objects- Dynamic objects-Static Objects- Objects as arguments- Returning objects.

Constructors and Destructors: Constructors – Parameterized constructors- Overloaded Constructors-Constructors with default arguments-Copy constructors- Dynamic constructors-Dynamic initialization using constructors- Destructors.

UNIT III OPERATOR OVERLOADING AND TEMPLATES 9

Operator Overloading: Operator function – Overloading unary and binary operator-Overloading binary operator using friend function - Type Conversion.

Generic Programming with Templates: Introduction, class templates – class templates with multiple parameters - Function templates, Function templates with multiple parameters- overloading of function templates, Member function Templates, Non-Type Template Arguments- Inheritance of class template.

UNIT IV INHERITANCE AND VIRTUAL FUNCTIONS 9

Inheritance: Defining Derived classes- Single Inheritance- Protected Data with private inheritance- Multiple Inheritance- Multi level inheritance- Hierarchical Inheritance- Hybrid Inheritance-Multipath inheritance-Virtual Base Classes- Abstract classes -Constructors in derived class- Member Classes

Virtual Function: Definition – Runtime Polymorphism – Array of pointers to base class – virtual functions - Pure virtual functions – Virtual Destructors.

UNIT V STREAMS AND EXCEPTION HANDLING 9

Streams: Streams in C++- Stream classes- Formatted and unformatted data- Manipulators- User defined manipulators- File streams-File pointer and manipulation-File open and close- Sequential and random access-Name Space.

Exception Handling: Principle of exception handling-Exception handling mechanism, multiple catch, nested try, rethrowing the exception – specifying exceptions.

Total: 45 hours

TEXT BOOK

1. Robert Lafore, "Object-Oriented Programming in C++" Pearson Education, 4 Edition, 2008.
2. K R Venugopal, Rajkumar Buyya "Mastering C++" Tata McGraw Hill, New Delhi, Second edition 2015.

REFERENCES

1. H. M. Deitel, P. J. Deitel, " C++ How to Program", Fifth Edition, Deitel & Associates, Inc.
2. Nicholas A. Solter, Scott J. Kleper, "Professional C++", 3rd Edition, Wiley Publishing,
3. Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition Reprint 2004.
4. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Fourth Edition, Pearson Education, 2005.
5. B. Stroustrup, "The C++ Programming language", 3rd edition, Pearson Education, 2004.
6. E. Balaguruswamy, "Object-Oriented Programming with C++" Tata McGraw Hill, New Delhi, Sixth edition 2015.

U19IT305 DATA STRUCTURES USING C++ LABORATORY 0 0 4 2

COURSE OUTCOMES

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

1. Implement the basic concept of C++ such as Polymorphism, Inheritance, Friend and virtual Function
2. Implement operations of linear and tree data structures.
3. Implement hashing and graph data structure.

LIST OF EXPERIMENTS

1. Design C++ classes with static members, methods with default argument
2. Practice of dynamic memory allocation using constructor, destructor, copy constructor.
3. Practice of C++ concepts such as polymorphism, inheritance, friend and virtual function.
4. Implement streams and exception handling concept.
5. Implementation of singly linked lists and doubly linked lists.
6. Implement stack and queue data structure using linked list
7. Implement binary search tree and B tree.
8. Implement hashing techniques.
9. Implement depth first traversal and breadth first traversal using STL.
10. Implementation of Prim's and Kruskal's algorithm using STL.

TOTAL: 60 HOURS

U19IT306 DIGITAL LOGIC DESIGN LABORATORY 0 0 2 1

COURSE OUTCOMES

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

1. Use Boolean simplification techniques to design and construct simple Boolean theorems and functions.
2. Design and implement combinational and sequential circuits.
3. Design the different functional units in a digital computer system.

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions.
3. Design and implementation of Binary to Gray and Gray to Binary code converters.
4. Design and implementation of Half adder / Half subtractor, Full adder / Full subtractor using basic gates.
5. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices.
6. Design and implementation of parity generator / checker using basic gates and MSI devices.
7. Design and implementation of magnitude comparator.
8. Design and implementation of Decoders and encoders.
9. Design and implementation of Multiplexers/Demultiplexers.
10. Design and implementation of Shift registers.
11. Design and implementation of Synchronous counters.
12. Design and implementation of Asynchronous counters.

TOTAL: 30 HOURS

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
Sona College of Technology.
Salem-636 005.

SEMESTER – III

MANDATORY COURSE

U19GE303 - ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

(Common for IT, ECE and BME)

L	T	P	C
2	0	0	0

Course Outcomes

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

1. understand, connect up and explain basics of Indian traditional knowledge in modern scientific perspective.
2. show an ability to comment critically on curriculum proposals that aim to promote science citizenship/scientific literacy
3. communicate using common medical and psychological terminology, including the skill to discuss commonly used medications, supplements, and surgical procedures
4. use effective oral and written language skills to communicate scientific data and ideas
5. describe the fundamentals of yoga and its importance

Unit I 6

- Introduction to Vedas
- Traditional methodology of Veda – Sat Angas
- Types of Vedas and their application
- Sub Veda – Ayurveda - their modern day application

Unit II 6

- Basics of Applied Vedic Science
- Modern day application of Vedas and procedure
- Ancient Indian Scientific thoughts
- Introduction to the Vedic language "Sanskrit"

UNIT – III- Modern science 6

- Introduction – modern science
- Objectives – modern science
- Architecture in ancient India

UNIT – IV Technology 6

- India's contribution to science and technology (from ancient to modern)
- Nobel laureates of Indian origin and their contribution
- India in space
- Latest achievement from Jan – 2017

20.05.2020 **B.E. / B.Tech. Regulations 2019**

UNIT – V- Yoga and Holistic Health Care 6

- Fundamentals of yoga and holistic health
- Human biology
- Diet and nutrition
- Life management
- Contemporary yogic models – case study

References

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016.
4. Roshan Dalal The Vedas: An Introduction to Hinduism's Sacred Texts, Penguin Books 2014. ISBN 13: 9780143066385
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049

Total: 30 HOURS

20/5/20
Dr. M. Raja
Course Coordinator / Sciences

20.5.2020
Dr. C. Shanthi
HOD / Sciences

20/5
Dr. M. Renuga
Chairperson BOS,
Science and Humanities

20.05.2020 **B.E. / B.Tech. Regulations 2019**

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT401C	Operations Research	3	1	0	4
2	U19IT401	Operating Systems	3	0	2	4
3	U19IT402	Principles of Communication	3	0	0	3
4	U19IT403	Design and Analysis of Algorithms	3	0	2	4
5	U19IT404	Java Programming	3	0	0	3
6	U19GE402	**Mandatory Course:** Environment and Climate Science	2	0	0	-
Practical						
7	U19IT405	Java Programming Laboratory	0	0	2	1
8	U19IT406	Microprocessors Laboratory	1	0	2	2
9	U19GE401	Soft Skills and Aptitude - II	0	0	2	1
					Total Credits	**22**

Approved By

Chairperson, Information Technology BoS
Dr.J.Akilandeswari

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Information Technology, Fourth Semester B.Tech IT Students and Staff, COE

U19MAT401C OPERATIONS RESEARCH 3 1 0 4

COURSE OUTCOMES

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

1. Solve the linear programming problem using suitable methods.
2. Apply the concept of duality and dual simplex method to solve the linear programming problem.
3. Apply the optimization technique to the transportation and assignment problems.
4. Analyze project management problems using critical path method and project evaluation and review technique.
5. Determine an optimum sequence of performing a number jobs by a number of facilities.

UNIT – I LINEAR PROGRAMMING PROBLEM 12

Linear programming problem - Mathematical formulation – Graphical solution method – Canonical and standard forms of Linear Programming Problem – Simplex method (using slack variables only) – Use of artificial variables – Big-M method.

UNIT – II DUALITY IN LINEAR PROGRAMMING PROBLEM 12

Duality in linear programming problem – Formulation of dual linear programming problem – primal-dual relationship – solving linear programming problem using dual concepts – dual simplex method.

UNIT – III TRANSPORTATION AND ASSIGNMENT PROBLEMS 12

Transportation problem – initial basic feasible solution – north west corner rule – least cost method – Vogel's approximation method – modified distribution method – assignment problem – Hungarian method.

UNIT – IV CPM AND PERT 12

Network construction – critical path method (CPM) – computations of total, free and independent floats – project evaluation and review technique (PERT) analysis – computation of expected time and standard deviation.

UNIT – V SEQUENCING PROBLEM 12

Sequencing problem – processing □ jobs through two machines – processing □ jobs through three machines – processing □ jobs through □ machines – processing two jobs through □ machines.

THEORY: 45 HOURS TUTORIAL: 15 HOURS TOTAL: 60 HOURS

TEXT BOOKS:

1. H. A. Taha, "Operation Research: An Introduction", Pearson Publishers, 10th Edition, 2019.
2. J. K. Sharma, "Operations Research: Theory and Applications", Lakshmi Publishers, 6th Edition, Reprint, 2017.

REFERENCE BOOKS:

1. R. Panneerselvam, "Operations Research", Prentice Hall of India Publishers, 2nd Edition, 2012.
2. K. Swarup, P. K. Gupta and Man Mohan, "Introduction to Operations Research", Sultan Chand and Sons Publishers, 14th Edition, 2008.
3. P. K. Gupta and D. S. Hira, "Problems in Operation Research", Sultan Chand and Sons Publishers, 4th Edition, 2015.
4. S.D. Sharma, "Operations Research", Kedarnath Publishers, 8th Edition, 2007.

U19IT401 OPERATING SYSTEMS 3 0 2 4

COURSE OUTCOMES

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

1. Explain structures of Operating System.
2. Apply fundamental Operating System abstractions such as processes, process scheduling, Semaphores, IPC abstractions, shared memory regions, deadlock and threads.
3. Explain the principles of concurrency and synchronization, and apply them to write concurrent programs/software.
4. Implement basic resource management techniques and principles.
5. Describe the types of disk scheduling, disk management and learn the basics of Linux.

UNIT I INTRODUCTION 9

Introduction - Operating System Structure – Operating system Operations – Operating System Components: Process Management – Memory Management – Storage Management – I/O Management – Network Management - Protection and Security.

Classes of Operating Systems: Mainframe Systems – Single Processor System - Multiprocessor Systems - Desktop Systems — Distributed Systems – Clustered Systems – Real-Time Systems – Handheld Systems - Open Source Operating Systems.

Operating System Structures: Operating System Services – User and Operating System Interface – System Calls – Types of System Calls.

UNIT II PROCESS MANAGEMENT AND THREADING 9

Processes: Process concept – Process scheduling – Operation on Processes - Inter-process Communication: Shared Memory Systems - Message Passing Systems.

Process Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms: First-Come, First-Served – Priority – Round-Robin – Multilevel Queue – Multilevel Feedback Queue.

Threads: Overview – Multithreading models - Threading issues.

UNIT III PROCESS SYNCHRONIZATION AND DEADLOCKS 9

Process Synchronization: Background - The critical-section problem (Software based solution and hardware based solution) – Semaphores – Classic Problems of Synchronization – Monitors.

Deadlocks: System model - Deadlock Characterization – Methods for Handling Deadlocks - Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlocks.

UNIT IV MEMORY MANAGEMENT 9

Memory Management Strategies: Background – Swapping – Memory allocation: Contiguous Memory Allocation – Non-contiguous Memory Allocation: Segmentation - Paging – Segmentation with Paging - Structure of the Page Table.

Virtual Memory: Background - Demand Paging – Page Replacement – Allocation of Frames – Thrashing.

UNIT V STORAGE MANGEMENT AND CASE STUDY 9

Mass Storage Structure: Overview of Mass Storage Structure – Disk Structure - Disk Scheduling – Disk Management - Swap Space Management.

Case Study: Linux System –Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, Inter-process communication

TOTAL: 45 HOURS

TEXT BOOK

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", Ninth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2018.

REFERENCES

1. Harvey M. Deitel, "Operating Systems", Pearson Education, 3rd edition 2016.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India, 3rd edition 2013.
3. William Stallings, "Operating Systems: Internals and Design Principles", Prentice Hall of India, 7th edition, 2013.
4. D M Dhamdhere, "Operating Systems: A Concept-Based Approach", Tata Mc-graw Hill Publishing, 3rd edition, 2017.

LIST OF EXPERIMENTS

1. Program to report the behaviour of the OS to get the CPU type and model, kernel version.
2. Program to get the amount of memory configured into the computer, amount of memory currently available.
3. Simulate the principles of process management algorithms
4. Implement various memory allocation methods
5. Implement various page replacement algorithms
6. Implement various disk scheduling algorithms
7. Implement threads and fork
8. Simulate Inter process communications

U19IT402 PRINCIPLES OF COMMUNICATION 3 0 0 3

COURSE OUTCOMES

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

1. Explain and apply various types of modulation and demodulation in analog and digital communication.
2. Describe the concept of digital communication techniques.
3. Describe the concept of various digital transmission techniques.
4. Comprehend the Cellular communication techniques.
5. Explain the concepts of 5G Wireless communication.

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9

Principles of amplitude modulation - AM envelope - frequency spectrum and bandwidth - modulation index and percent modulation - AM Voltage distribution - AM power distribution - Angle modulation - FM and PM waveforms - phase deviation and modulation index - frequency deviation and percent modulation - Frequency analysis of angle modulated waves - Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION 9

Shannon limit for information capacity - Digital amplitude modulation - Frequency Shift Keying - FSK bit rate and baud - FSK transmitter - BW consideration of FSK - FSK receiver - Phase Shift Keying – BPSK , QPSK, DPSK transmitter and receiver ,Quadrature Amplitude modulation - bandwidth efficiency.

UNIT III DIGITAL TRANSMISSION 9

Pulse modulation - PCM – PCM sampling - Sampling rate - Signal to Quantization noise rate - Companding- analog and digital - Delta modulation PCM - Adaptive Delta modulation PCM - Differential PCM - Intersymbol interference - Eye patterns.

UNIT IV INTRODUCTION TO MOBILE TECHNOLOGY 9

Introduction - 2G - General Concept for GSM System Development - GSM System Architecture - SIM Concept - 3G – UMTS Architecture - Major Parameters of 3G WCDMA Air Interface - Spectrum Allocation for 3G WCDMA - 4G - Long Term Evolution (LTE) System - 4G Architecture of an Evolved Packet System - LTE Integration with Existing 2G/3G Network - Overall Operational Requirements for a 5G Network System - Device Requirements - Capabilities of 5G -Spectrum - 5G System Architecture - General Concepts - Architecture Reference Model.

UNIT V CELLULAR COMMUNICATION 9

Fundamental concept of Cellular telephone - Frequency reuse, Interference - Co-channel Interference, Adjacent channel Interference - Cell splitting - Cell sectoring - Segmentation and Dualization - Roaming and Handoff.

Total : 45 hours

TEXT BOOK

1. Wayne Tomasi, "Electronic Communication Systems Fundamentals through Advanced", 6th Edition, Pearson Education, 2018.
2. Alexander Kukushkinl, "Introduction to Mobile Network Engineering - GSM, 3G-WCDMA, LTE and the Road to 5G" , 1st Edition, Wiley, 2018.

REFERENCES

1. H.Taub,D L Schilling ,G Saha ,"Principles of Communication", 3rd edition, 2018.
2. B.P.Lathi,"Modern Analog and Digital Communication systems", 6th edition, Oxford University Press, 2017.
3. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2018.
4. Martin S.Roden, "Analog and Digital Communication System", 3rdedition, PHI, 2016.
5. B.Sklar,"Digital Communication Fundamentals and Applications", 2nd edition, Pearson Education, 2017.
6. Simon Haykin, "Communication Systems", 5thedition, John Wiley & Sons. 2018.

U19IT403 DESIGN AND ANALYSIS OF ALGORITHMS 3 0 2 4

COURSE OUTCOMES

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

1. Define algorithm and describe its characteristics.
2. Analyse the algorithmic time complexity for recursive and non-recursive algorithms using different asymptotic notations.
3. Apply the algorithmic techniques - Brute Force, Divide and conquer Decrease and Conquer to different problems and analyse the time complexity.
4. Apply the algorithmic techniques - Transform and conquer, Dynamic Programming and Greedy approach to solve different problems and analyse the time complexity.
5. Explain the algorithm design methods such as backtracking, branch and bound to solve complex problems and express the type of problems as NP, NP-Complete and NP-Hard.

UNIT I BASIC CONCEPTS OF ALGORITHMS 8

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT II MATHEMATICAL BACKGROUND AND ANALYSIS OF ALGORITHMS 8

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT III ANALYSIS OF SORTING AND SEARCHING ALGORITHMS 10

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Decrease and Conquer – Algorithm for generating combinatorial objects.

UNIT IV ALGORITHMIC TECHNIQUES 10

Transform and conquer – Presorting – Analysis of heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Approximate bin packing algorithm – Huffman trees.

UNIT V ADVANCED ALGORITHMIC TECHNIQUES 9

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – P, NP and NP complete problems – Introduction to approximate algorithms- Approximation algorithms for NP- hard problems -Travelling salesman problem and Knapsack problem.

Practical: **30 hours Total : 75 hours**

TEXT BOOK

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, Third edition, 2011.

REFERENCES

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", 3rd edition, The MIT Press, 2009.
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", 3rd Edition, Pearson Education Asia, 2009.
3. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms",Pearson Education, 2009.
4. Ellis Horowitz, Sartaj Sahni , Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgothia publications, 2013.

List of experiments

1. Practice on estimating the running time of an algorithm
2. Implement algorithms using brute force technique
3. Implement algorithms using divide and conquer technique
4. Implement algorithms using decrease and conquer technique
5. Implement algorithms using transform and conquer technique
6. Implement algorithms using dynamic programming technique
7. Implement algorithms using greedy technique
8. Implement approximation algorithms

U19IT404 JAVA PROGRAMMING 3 0 0 3

COURSE OUTCOMES

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

1. Apply basic features of Java to write programs.
2. Write efficient programs with inheritance, packages, interface and handle different types of exceptions.
3. Apply collection framework for writing efficient programs to solve real time problems.
4. Apply event handling techniques for interaction with GUI based application with multithreaded.
5. Write programs with functional programming, Lambda Expressions and data driven application using JDBC.

UNIT I CLASS, METHODS AND STRINGS 9

History and Evolution of Java – An overview of Java – Data Types, Variables, and Arrays – Operators – Control Statement – Introducing Class – Methods – String, StringBuffer, StringBuilder.

UNIT II INHERITANCE, PACKAGE AND INTERFACE AND EXCEPTION HANDLING 9

Inheritance – Packages and Interfaces – Exception Handling Fundamentals – Exception Types – Uncaught Exception – Using try and catch – Multiple catch Clauses – Nested try statements – throw – throws – finally – Built-in Exception – Creating our own Exception class – Chained Exception.

UNIT III I/O AND THE COLLECTIONS FRAME WORK 9

I/O Basics – Exploring java.io: Stream class, Character Streams – Serialization – The Collection Framework – The ArrayList class – The HashSet class – Working with Maps – The Vector class - Accessing a Collection via an Iterator.

UNIT IV GUI , EVENT HANDLING AND THREADS 9

Introducing Swing – Exploring Swing: JLabel and ImageIcon, JTextField, Swing Buttons, JList, JComboBox, JTable - Event Handling –Threads - Interrupting Threads - Thread States - Thread Properties – Synchronization

UNIT V DATABASE CONNECTIVITY AND FUNCTIONAL PROGRAMMING 9

JDBC Programming concept – Executing Queries – Scrollable and Updatable Resultset – Auto Boxing – Generics – Lambda Expressions- Functions as First Class Objects – Pure Functions – Higher Order Functions..

Total: 45 Hours

TEXT BOOK

1. Herbert Schildt, "Java™ : The Complete Reference", 11th edition, Oracle Press, 2018.
2. Anita Seth, B.L.Juneja, " JAVA: One Step Ahead", Oxford University Press, 2017.

REFERENCES

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", 9th edition, Prentice Hall, 2013.
2. K. Arnold, D. Holmes and J. Gosling, "The JAVA programming language", 4th edition, Addison Wesley Professional, 2005.
3. Timothy Budd, "Understanding Object-oriented programming with Java", 3rd edition, Addison Wesley, 2000.
4. C. Thomas Wu, "An introduction to Object-oriented programming with Java", 5th edition, Tata McGraw-Hill Publishing company Ltd., 2009.

COURSE OUTCOMES

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

1. Apply the basic features of JAVA such as Control statements, Arrays, Classes, Inheritance, Interface and Packages in solving a problem
2. Apply appropriate IO stream and collection framework for solving real time problem
3. Write multithreaded and GUI based data driven application using JDBC concepts

LIST OF EXPERIMENTS

1. Write the programs using the concept of nested loops, recursion, arrays, String and StringBufferclass.
2. Write the programs using the concept of Class, Inheritance, Interface and Packages
3. Write a program that uses the I/O package for reading and writing a text file.
4. Write a program that uses the different exception handling mechanism.
5. Write a program that persistently stores the current state of the object.
6. Write a program that uses generic concept for writing efficient program.
7. Write a program that uses different collection class for managing data of different applications.
8. Implementing a GUI based on Swings and Frames. Also, write the program to handle GUI based events.
9. Write the programs that uses the concept of Threads.
10. Write a program that uses JDBC API for interacting with the database.
11. Implement java programs with Lambda Expressions and Functional Programming

Total: 30 Hours

U19IT406 MICROPROCESSORS LABORATORY 1 0 2 2

COURSE OUTCOMES

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

1. Write ALP programs for arithmetic manipulations using Microprocessors.
2. Interface different I/Os with microprocessors and perform arithmetic manipulations using Microcontroller.
3. Solve real time industry based problems with Microprocessors and Microcontrollers.

UNIT I MICROPROCESSORS 5

Introduction - 8085 – 8086 Microprocessor- –Register organization of 8086 - Architecture – Signal description of 8086 – Addressing Modes - Instruction Set - Assembly Language Programming

.UNIT II INTERFACING WITH MICROPROCESSORS 5

Memory interfacing with Microprocessors – Parallel Communication Interface (8255) – Serial Communication Interface (8251) – Timer (8253) - Keyboard/display controller (8279).

UNIT III MICROCONTROLLER 5

8051 Microcontroller- Architecture – signals descriptions of 8051– Register set of 8051- Addressing modes - Assembly Language Programming.

REFERENCES BOOKS

1. Ramesh S. Gaonkar ,"Microprocessor – Architecture, Programming and Applications with the 8085" Penram International Publisher , 6th Edition, 2018.
2. A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", 3rd edition, Tata Mc Graw Hill, 2017.
3. Douglas V.Hall and SSSP Rao, " Microprocessors and Interfacing", third edition , Tata Mc Graw Hill ,2016.
4. Yn-cheng Liu,Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", second edition, Prentice Hall of India , 2018 .
5. Mohamed Ali Mazidi,Janice Gillispie Mazidi," The 8051 microcontroller and embedded systems using Assembly and C", 2nd edition, Pearson education /Prentice hall of India , 2018.
6. Kenneth J.Ayala, "The 8051 microcontroller and Embedded systems using assembly and C", 1st edition, Cengage learning publisher,2017.

LIST OF EXPERIMENTS

1. 8-bit and 16 bit Manipulations- Addition, Subtraction, Multiplication and Division using Microprocessors.
2. Code conversions - BCD to Binary and Binary to BCD using Microprocessors.
3. Decimal Arithmetic and Bit Manipulation using Microprocessors.
4. Double precision – Addition and subtraction using Microprocessors.
5. 8255 Interface -Experiments with mode 0 and mode1 using Microprocessors.
6. 8279 Interface -Keyboard/ Display Interface with Microprocessors.
7. 8253 Interface -Timer Interface with Microprocessors.
8. 8-bit and 16 bit Manipulations- Addition, Subtraction and Multiplication using 8051.
9. Array Operations-Sum of N Elements using 8051.
10. Applications – Traffic light controller and stepper motor using Microprocessors and Microcontroller.

Total: 45 hours

Semester – IV	U19GEL401 SOFT SKILLS AND APTITUDE – II	L	T	P	C	Marks
		0	0	2	1	100

Course Outcomes

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

1. Demonstrate capabilities in additional soft-skill areas using hands-on and/or case-study approaches
2. Solve problems of increasing difficulty than those in SSA-I in given areas of quantitative aptitude and logical reasoning and score 65-70% marks in company-specific internal tests
3. Demonstrate greater than SSA-I level of verbal aptitude skills in English with regard to given topics and score 65-70% marks in company-specific internal tests

1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics:** a. SWOT b. Goal setting c. Time management d. Stress management e. Interpersonal skills and Intrapersonal skills f. Presentation skills g. Group discussions
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. Equations: Basics of equations , Linear, Quadratic Equations of Higher Degree and Problem on ages. b. Logarithms, Inequalities and Modulus c. Sequence and Series: Arithmetic Progression, Geometric Progression, Harmonic Progression, and Special Series. d. Time and Work: Pipes & Cistern and Work Equivalence. e. Time, Speed and Distance: Average Speed, Relative Speed, Boats & Streams, Races and Circular tracks and Escalators. f. Arithmetic and Critical Reasoning: Arrangement, Sequencing, Scheduling, Network Diagram, Binary Logic, and Logical Connection. h. Binary number System.- Binary to decimal, Octal, Hexadecimal
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Critical reasoning b. Theme detection c. Verbal analogy d. Prepositions e. Articles f. Cloze test g. Company specific aptitude questions

Department of Placement Training

Sona College of Technology, Salem **Department of Sciences (Chemistry)**

SEMESTER – IV

MANDATORY COURSE

U19GE402 - ENVIRONMENT AND CLIMATE SCIENCE

(Common for MCT, IT,FT,ECE and BME)

L	T	P	C
2	0	0	0

Course Outcomes:

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

1. state the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.
2. explain the concepts of an ecosystem and provide an overview of biodiversity and its conservation.
3. explain environmental based pollution their causes, effects and their remedial measures
4. discuss their causes, effects and the control measures of Global Warming, Acid Rain, Ozone Layer Depletion
5. describe the effect of climate change due to pollution

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 6

Definition, Scope and Importance Forest Resources:- Use and over - exploitation, deforestation, Case Studies, Water Resources:- Use and Over-Utilization of Surface and ground water , Floods, Drought, Food Resources- Effects of Modern Agriculture, Fertilizer- Pesticide Problems–Role of an Individual in Conservation of Natural Resources.

UNIT II ECOSYSTEMS AND BIODIVERSITY 6

Structure and Function of an Ecosystem– Energy Flow in the Ecosystem -Food Chains, Food Webs and Ecological Pyramids.

Introduction to Biodiversity –Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values –India as a Mega-Diversity Nation — Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity.

UNIT III ENVIRONMENTAL POLLUTION 6

Definition – Causes, Effects and Control Measures of:- (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution, Solid Waste Management- Effects and Control Measures of Acid Rain,– Role of an Individual in Prevention of Pollution..

23.01.2021 **B.E. / B.Tech. Regulations 2019**

UNIT IV CLIMATE CHANGE ON THE ENVIRONMENT 6

Sustainable Development- - Climate Change- Causes and effects of Global Warming - Effect of global warming in food supply, plants, sea, coral reef, forest, agriculture, economy - Kyoto Protocol in reduction of greenhouse gases - Ozone Layer Depletion - mechanism, effects and control measures- Montreal Protocol to protect ozone layer depletion - Rain Water Harvesting - .Effect of climate change due to air pollution Case study - CNG vehicles in Delhi

UNIT V EFFECT OF CLIMATE CHANGE ON POLLUTION 6

Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments, buildings, consumption of energy, agriculture and in electric power sector - Carbon credit - carbon footprint - disaster management -Role of an individual to reduce climate change.

TOTAL: 30 HOURS

Text Books:

1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018
2. Anubha Kaushik and Kaushik, "Environmental Science and Engineering" New Age International Publication, 4th Multicolour Edition, New Delhi, 2014.

References:

1. S. Radjarejesri et al., "Environmental Science" Sonaversity, Sona College of Technology, Salem, 2018.
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., 2nd Edition, 2004.
3. Erach, B., "The Biodiversity of India", Mapin Publishing P.Ltd.,Ahmedabad, India.
4. Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad – 500029.

23/1/21
Dr. M. Raja
Course Coordinator / Sciences

23/1/2021
Dr. C. Shanthi
HOD / Sciences

Dr. M. Renuga
Chairperson BOS,
Science and Humanities

23.01.2021 **B.E. / B.Tech. Regulations 2019**

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester V Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19IT501	Computer Networks	3	0	0	3	45
2	U19IT502	Database Management Systems	3	0	0	3	45
3	U19IT503	Theory of Computation	3	1	0	4	60
4	U19IT504	Software Engineering	3	0	0	3	45
5	noc21-cs63	**Elective-** NPTEL Introduction to internet of things	3	0	0	3	45
Practical							
6	U19IT505	Database Management Laboratory	0	0	4	2	60
7	U19IT506	Mobile Application Development Laboratory	0	0	4	2	60
8	U19IT507	Internet Of Things Laboratory	0	0	2	1	30
9	U19GE501	Soft Skills and Aptitude – III	0	0	2	1	30
					Total Credits	**22**	

Approved By

Chairperson, Information Technology BoS	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr.J.Akilandeswari	Dr.R.Shivakumar	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Information Technology, Fifth Semester B.Tech IT Students and Staff, COE

U19IT501 COMPUTER NETWORKS 3 0 0 3

COURSE OUTCOMES

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

1. Describe the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers.
2. Analyze the link layer concepts of error-detection and correction techniques, multiple access protocols, point-to-point protocols and characteristics of link layer media (including wireless links).
3. Explain the transport layer concepts and protocol design including connection oriented and connection-less models, techniques to provide reliable data delivery and algorithms for congestion control and flow control.
4. Apply subnetting and supernetting concepts to maintain networks and explain the network layer concepts and protocol design including datagram forwarding, routing algorithms, and network interconnections.
5. Explain the basic concepts of application layer protocol design including client/server models, peer-to-peer models, and network naming.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	3							3	3	2
CO2	2	2	3	3	3							3	3	2
CO3	2	2	3	3	3							3	3	2
CO4	2	2	3	3	3							3	3	2
CO5	2	2	3	3	3							3	3	2

UNIT I INTRODUCTION 9

Data Communications Networks, Network Types- Standards and administration- OSI Model- TCP/IP Protocol Suite.

Physical layer: Performance - Transmission Media: Guided and Unguided media –Switching: Circuit switched networks and Packet Switched Networks.

UNIT II DATA LINK LAYER 9

Introduction – Link Layer addressing - Error Detection: Types of Errors, Redundancy, Cyclic Codes - Cyclic Redundancy Check- Check Sum.

DLC Services – Data Link Layer Protocols, Media Access Control – Random Access, Controlled Access - Ethernet protocol – Standard Ethernet.

UNIT III NETWORK LAYER 9

Services, Packet Switching – Internet Protocol-Routing Algorithms - Unicast Routing Protocols - IPv6 Protocol.

UNIT IV TRANSPORT LAYER 9

Introduction - User Datagram Protocol (UDP) - User Datagram, UDP Services, UDP applications Transmission Control Protocol (TCP) - Services-Features-segment - TCP connection - Windows in TCP - Flow Control - Error Control - TCP Congestion Control.

UNIT V APPLICATION LAYER 9

Application Layer – WWW and Http, FTP – Two connections, Control connection, Data connection, security of FTP – Electronic Mail – Architecture, web based mail – Email security.

TOTAL: 45 HOURS

TEXT BOOK

1. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill, 5th Edition 2017.

REFERENCES

1. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 6th edition 2017.
2. Larry L.Peterson and Peter S. Davie, "Computer Networks: A Systems Approach", Harcourt Asia Pvt. Ltd., 5th edition, 2015.
3. Andrew S. Tanenbaum, "Computer Networks", Prentice Hall PTR, 5th Edition, 2013
4. Halsall, Fred, "Computer Networking and Internet", Pearson Education, 5th edition, 2015.

U19IT502 DATABASE MANAGEMENT SYSTEMS 3 0 0 3

COURSE OUTCOMES

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

1. Comprehend the need, background, architecture and evolution of database management system and design ER diagram for database design
2. State the characteristics of relational model with an emphasis on how to organize, maintain, retrieve and secure information efficiently and effectively from a RDBMS and write queries to retrieve and manipulate databases
3. Design and evaluate the normality of a logical data model, and correct any anomalies
4. Explain the general idea of data storage, indexing techniques and query processing
5. Summarize the transaction management and recovery management techniques adopted in database management system

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3						1	1		1	2	3
CO2	3	3	2	1	1				1	1		1	2	2
CO3	3	3	3	1	1				1	1		1	2	2
CO4	3	3	3	1	1				1	1		1	2	2
CO5	3	1							1	1		1		

UNIT I INTRODUCTION 9

Database and Database Users: Characteristics of database approach, Advantages of DBMS Approach, Database Applications.

Database system concepts and architecture: Data models, Schemas, Instance, Three schema architecture and data independence, DBMS languages, DBMS interfaces, database system Environment, ER model, EER data model.

UNIT II RELATIONAL MODEL 9

Relational data model, relational constraints and relational Algebra: Relational model concepts, Relational constraints and Relational data base schema, update operations, basic Relational algebra operations, additional relational operations.

SQL: Data definition and constraints, Basic queries, insert, delete, update, complex queries, views, assertions and triggers, embedded SQL, dynamic SQL.

Database security and Authorization: security issues, grant/revoke privileges, SQL injections.

UNIT III RELATIONAL DATABASE DESIGN 9

Functional dependencies and normalization: Functional dependencies, Normal forms: 1NF, 2NF, 3NF, Boyce Codd NF, decomposition, multivalued dependencies and 4NF, join dependencies and 5NF.

UNIT IV DATA STORAGE AND QUERY PROCESSING 9

Disk Storage, Basic File Structures, and Hashing: Secondary Storage Devices, RAID, Operations on Files, Heap Files, Sorted Files, Hashing Techniques.

Indexing Structures for Files: Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+-Trees.

Query Processing: Translating SQL Queries into Relational Algebra, Algorithms for External Sorting, Algorithms for SELECT and JOIN Operations, Algorithms for PROJECT and Set Operations.

UNIT V TRANSACTION MANAGEMENT 9

Transaction Processing: Introduction, Transaction and System Concepts, desirable Properties of Transactions, Schedules based on Recoverability, Schedules based on Serializability.

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control, Timestamp Ordering.

Database Recovery Techniques: Recovery Concepts, Deferred Update, Immediate Update, Shadow Paging, ARIES recovery algorithm.

TOTAL: 45 HOURS

TEXT BOOK

1. Ramez Elmasri and Shamkant Navathe, "Fundamentals of Database Systems ", 6th Edition, Addison-Wesley, 2014

REFERENCES

1. Abraham Silberschatz, Henry F. Korth and Sudarshan. S, "Database System Concepts", 6th Edition, McGraw-Hill, 2016
2. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003
3. Date. C. J, Kannan. A, Swamynathan. S, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2012
4. Rajesh Narang, "Database Management systems", PHI Learning pvt. Ltd, New Delhi,2011.

U19IT503 THEORY OF COMPUTATION 3 1 0 4

COURSE OUTCOMES

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

1. Prove results using proof by induction, contradiction and understand formal definitions of automata, languages and Grammars.
2. Apply the models of Finite automata and explain the properties of languages with applications.
3. Explore the models of Pushdown automata, context free languages and describe the different forms of context free grammars.
4. Classify the different representations, techniques, extensions and simulating a Turing machine by Computer.
5. Describe concrete examples of computationally undecidable or inherently infeasible problems from different fields.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2									1			
CO2	3		3							1	1			
CO3	3	3	3		2					1				
CO4	3	3	3		2					1				
CO5	3	1	1	1						1				

UNIT I AUTOMATA THEORY 15

Finite Automata: Constructing Automata, Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA) Equivalence of DFA and NFA: Finite Automata with Epsilon Transitions, Finite Automata without Epsilon Transitions, Subset Construction Method, Minimizing Automata - Applications of Finite Automata

UNIT II REGULAR EXPRESSIONS AND CONTEXT FREE GRAMMARS 15

Regular Expressions and Properties: Constructing Regular Expressions, Finite Automata and Regular Expressions - Conversion of RE to Automata and Automata to RE, Applications of Regular Expressions, Pumping Lemma, Closure Properties.

Context Free Grammars: Definitions and Derivations, Parse trees, Applications, Ambiguity in Grammars and Languages.

UNIT III PUSHDOWN AUTOMATA AND CONTEXT FREE LANGUAGES 15

Pushdown Automata: Definition, The Languages of a PDA, Constructing PDA's, Equivalence of PDA and CFG, Deterministic Pushdown Automata

Normal Forms and Properties: Chomsky Normal Form (CNF), Greibach Normal Form (GNF), Pumping Lemma and Closure Properties of CFL.

UNIT IV TURING MACHINE AND RECURSIVE ENUMERABLE LANGUAGE 15

Introduction: Definition, Constructing Simple TM's, Representations, Programming Techniques – Automata with storage, Multi-tape tracks, Checking of symbols, Subroutines, Universal Turing Machine, Turing Machines and Computers

UNIT – V UNDECIDABILITY AND COMPLEXITY 15

Undecidability: Language that is not Recursively Enumerable, Undecidable Problem that is Recursive Enumerable, Undecidable Problem about Turing Machine, Post Correspondence Problem, Modified PCP

P and NP: The Class P, The class NP, The NP-Complete Problem

TUTORIALS: 15 HOURS

TOTAL : 60 HOURS

TEXT BOOKS

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman "Introduction to Automata Theory, Languages, and Computation ", 3rd Edition, Pearson Education, 2008

REFERENCES

1. Kavi Mahesh "Theory of Computation – A Problem-Solving Approach", John Wiley-India, First Edition, 2012
2. A.M. Natarajan, A. Tamilarasi, P. Balasubramani "Theory of Computation ", New Age International Publishers, 2007
3. Raymond Greenlaw, H. James Hoover "Fundamentals of the Theory of Computation: Principles and Practice", Morgan Kaufmann Publishers, 1998
4. John C. Martin "Introduction to Languages and the Theory of Computation", 4th Edition, McGraw-Hill, 2010

U19IT504 SOFTWARE ENGINEERING 3 0 0 3

COURSE OUTCOMES

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

1. Identify the scope and requirements of software engineering in IT industry and apply different SDLC models in different applications.
2. Prepare Software Requirements Specification (SRS) document for real time applications.
3. Explain the object-oriented methodologies and workflows and apply object-oriented principles, techniques, appropriate UML models, and other artifacts to construct a design for a real-world problem.
4. Analyze and design system requirements using UML model to determine the use cases and identifying classes and their relationships.
5. Describe the different kind of software testing, System Usability Testing, User Satisfaction Testing.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3		3					3		2	2	3
CO2	2	3	3		3				3	3		2	2	3
CO3	2	3	3		3			3		3		2	2	3
CO4	1	3	3		3					3		2	2	3
CO5	1	3	3		3		3			3		2	2	3

UNIT I SOFTWARE PRODUCT AND PROCESS 9

Introduction: The Nature of Software, Software Process, Process Models - A Generic Process Model, Prescriptive Process Models: The Waterfall Model, Incremental Model, Evolutionary Process Models, Concurrent Model, Agile Development- Agile process, Scrum.

UNIT II SOFTWARE REQUIREMENTS AND ANALYSIS 9

Software Requirements: Functional and Non-Functional requirements, Requirements Engineering: Requirement Engineering Process -Establishing the Groundwork, Eliciting requirements, Negotiating requirements, Validating requirements. Feasibility Studies, Software Requirement Specification (SRS) Document.

UNIT III METHODOLOGY, MODELING, AND UNIFIED MODELING LANGUAGE 9

Object Oriented Systems Development Life Cycle - Object Oriented Methodologies**:** Rumbaugh Methodology, Booch Methodology, Jacobson Methodology and Unified Approach.

Unified Modeling Language: UML diagrams: Use case diagram, Activity Diagram, Class diagram, Sequence and collaboration diagram, Component Diagram, Deployment diagram.

UNIT IV OBJECT ORIENTED ANALYSIS AND DESIGN 9

Object Oriented Analysis: Identifying use cases, Classification, Identifying Object relationships. Software Design: Modular Design, Architectural Design, User Interface Design. Object Oriented Design: Axioms, Corollaries, Designing Classes.

UNIT V SOFTWARE QUALITY AND USABILITY TESTING 9

Introduction, Software Quality Assurance Testing, Testing strategies: Black Box Testing, White Box Testing, Top-Down Testing, Bottom-Up Testing. Test cases, Test Plan, Continuous Testing, Myer's Debugging Principles, System Usability Testing, User Satisfaction Testing.

TOTAL: 45 HOURS

TEXT BOOKS

1. Roger S. Pressman, "Software Engineering – A practitioner's Approach", 8th Edition, McGraw-Hill International Edition, 2019.
2. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 2008.

REFERENCES

1. Ian Sommerville, "Software Engineering", 10th Edition, Pearson Education Asia, 2017.
2. Carlo Ghezzi, "Fundamentals of Software Engineering, 2/e", Pearson Education, 2016.

U19IT505 DATABASE MANAGEMENT SYSTEMS LABORATORY 0 0 4 2

COURSE OUTCOMES

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

1. Build tables, construct relationships among them and retrieve data with simple and complex queries
2. Build various constraints, triggers and indexes on the tables
3. Design and implement a database and to integrate into a simple application

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3							3	3	2
CO2	3	3	3	3	3							3	3	2
CO3	3	3	3	3	3							3	3	2

LIST OF EXPERIMENTS

1. Create a relational database system using DDL commands with constraints.
2. Update the database system using DML commands.
3. Query the database using simple and complex queries.
4. Create and update views.
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Create triggers.
7. Create assertions and indexes.
8. Queries working on transaction control, .locking rows for update and creating password and security features.
9. Use of front end tools to manipulate the database.
10. Generate reports using a reporting tool.
11. Database Design and implementation of an application system. (Suggested Mini Project)

TOTAL: 60 HOURS

U19IT506 MOBILE APPLICATION DEVELOPMENT LABORATORY 0 0 4 2

COURSE OUTCOMES

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

1. Write android based programs to create simple applications using communication features and multimedia
2. Write android based programs with maps and database connectivity
3. Build an iOS application using Xcode

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1						1				
CO2	3	3	3	3	2					3	3		2	
CO3	3	3	3	3	3					3	3			3

LIST OF EXPERIMENTS

1. Calculator with simple operations.
2. Android application for the demonstration of date time picker and alarm manager.
3. Creating an application with multiple activities and a simple menu using listview.
    A. Sending SMS with toast notification from android application,
    B. Sending an email from android application.
4. Implement an application that implements Multi-threading
5. Using audio and video functions in android application.
6. Develop an application that makes use of RSS Feed.
7. Application development using web service in android.
8. Android application for obtaining user location using GPS.
9. Android application for database connectivity with MySQL.
10. Implement an application that writes data to the SD card.
11. Develop an iOS application that uses GUI components.
12. Develop an iOS application to demonstrate the use of imageview.

TOTAL: 60 HOURS

U19IT507 INTERNET OF THINGS LABORATORY 0 0 2 1

COURSE OUTCOMES

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

1. Interface various sensors with Arduino and Raspberry pi boards.

2. Implement the control applications using Arduino programming

3. Experiment the different IoT applications with Raspberry pi using Python Programming.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1		3	3	2	2									3
CO2		3	3	2	2									3
CO3		3	3	2	2									3

List of Experiments

1. Installation of Arduino IDE and Blink LED

2. Creating different LED Patterns using Loops and functions

3. Interfacing Arduino Nano with Joystick

4. Control the brightness of an LED by using PWM

5. Control servo motor using Joystick

6. Control LED, Buzzer and Relay from smart phone using Bluetooth Module.

7. Interface DHT 11 sensor with Arduino Nano and upload the humidity and temperature on the cloud.

8. Familiarization of Raspberry pi by blink LED program

9. Interface PIR sensor with Raspberry pi for motion detection.

10. Control the stepper motor using Raspberry pi based on specific input

11. Measure the humidity and temperature using DHT sensor and display the data readings on the LCD screen.

12. Build a secret code based security system using Raspberry pi

13. Interface ultrasonic sensor with Raspberry PI for distance measurement

TOTAL: 30 HRS

B-E-V Sem
2019-Batch

Semester –V	U19GE501 : SOFT SKILLS AND APTITUDE - III	L	T	P	C	Marks
		0	0	2	1	100

Course Outcomes
At the end of the course the student will be able to:

1. Demonstrate capabilities in supplementary areas of soft-skills and job-related selection processes using hands-on and/or case-study approaches
2. Solve problems of advanced levels than those in SSA-II in specified areas of quantitative aptitude and logical reasoning and score 70-75% marks in company-specific internal tests
3. Demonstrate greater than SSA-II level of verbal aptitude skills in English with regard to given topics and score 70-75% marks in company-specific internal tests

1.SOFT SKILLS

Demonstrating soft-skill capabilities with reference to the following topics:

a. **Career planning:** Importance; Exploring various career options, Field research, Social media management; Process, benefits and limitations of career planning; Mapping SWOT and GOALS to career planning; Self-evaluation

b. **Resume writing :** Build credentials and resume, Positioning yourself and your career, JD mapping, Video resume, Relevant resume phrases and components; Cover letter; Portfolio management and Social media cover

c. **Group discussion :** Skills needed for GD; Frequently Asked topics and Practice; Types of topics; Various framework and tools to handle GD; Practice and assessment

d. **Teamwork :** Definition and importance of team-building; Stages of team-building; Communication within a team; Various styles of teams and their analysis; Activities demonstrating a team

e. **Leadership skills :** Role of a leader; Difference between a manager and a leader; Various Leadership styles; Compelling qualities of a leader; Famous leaders and their impact to the world; Self-assessment

f. **Interview skills :** Process and types of interview; Appearance and grooming etiquette; Do's and Don'ts (Before – During interview); Brainstorming interview possible questions; Hot seat; Transactional Analysis for effective communication and handling interviewers; mock interviews and assessment parameters discussion

g. **Mock interviews :** Frequently Asked Questions practice and assessment; Discussion and demonstrations on Stress and Technical interviews; Group interview

h. **Mock GDs :** Frequently Asked Topics Practice; Assessment and feedback

2.QUANTITATIVE APTITUDE AND LOGICAL REASONING	**Solving problems with reference to the following topics :** a. **Geometry:** 2D, 3D, Coordinate Geometry, and Height & Distance. b. **Permutation & Combinations :** Principles of counting, Circular Arrangements and Derangements. c. **Probability:** Addition & Multiplication Theorems, Conditional Probability and Bayes Theorem. d. **Statistics :** Mean Median, Mode, Range and Standard Deviation. e. **Interest Calculation :**Simple Interest and Compound Interest f. **Crypto arithmetic:** Addition and Multiplication based problem. g. **Logical Reasoning :**Blood Relations, Directions Test, Series, Odd man out, Analogy, Coding & Decoding, Problems and Input – Output Reasoning. h. Statement & Assumptions, Statements & Arguments, Inference. i. **Company Specific Pattern :**Infosys and TCS company specific problems
3. VERBAL APTITUDE	**Demonstrating English language skills with reference to the following topics:** a. Subject verb agreement b. Selecting the best alternative for the stated parts of given sentences c. Reading comprehension d. Contextual synonyms e. Sentence fillers f. Writing a story for a given picture g. Company specific aptitude questions

Dr.S.Anita

Head/Training

Department of Placement Training
Sona College of Technology,
Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester VI Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19IT601	Full Stack Development	3	0	0	3	45
2	U19IT602	Machine Learning	3	0	0	3	45
3	U19IT925	**Elective –** Agile Software Development	3	0	0	3	45
	U19IT927	**Elective –** Data Science					
4	U19IT911	**Elective –** Cloud Computing	3	0	0	3	45
	U19IT912	**Elective –** Total Quality Management					
Open Elective							
5	U19BM1001	Hospital Management	3	0	0	3	45
	U19CE1001	Building Services and Safety Regulations					
	U19CE1003	Energy Efficiency and Green Building					
	U19EE1002	Energy Conservation and Management					
	U19EE1004	Renewable Energy Systems					
	U19FT1001	Fundamentals of Fashion Design					
	U19MC1003	Smart Automation					
Practical							
6	U19IT603	Full stack Development Laboratory	0	0	4	2	60
7	U19IT604	Software Design and Testing Laboratory	0	0	4	2	60
8	U19IT605	Machine Learning Laboratory	0	0	2	1	30
9	U19GE601	Soft Skills and Aptitude - IV	0	0	2	1	30
					Total Credits	**21**	

Approved By

Chairperson, Information Technology BoS Dr.J.Akilandeswari

Member Secretary, Academic Council Dr.R.Shivakumar

Chairperson, Academic Council & Principal Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Information Technology, Sixth Semester B.Tech IT Students and Staff, COE

U19IT601 FULL STACK DEVELOPMENT 3 0 0 3

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

1. Design a front end of web application using HTML and CSS
2. Write a java script code to validate the user data and asynchronously invoke backend application
3. Design a front end of web application using Bootstrap
4. Develop a front end of web application using a React JS library and make a call to server side programs
5. Develop a back end of web application using Node JS and Mongo DB.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1		2	2		2									2
CO2	2	3	3		3									3
CO3		2	2		2									2
CO4		3	3		3									3
CO5	2	3	3		3									3

UNIT I HTML and CSS 9

Introduction to www, HTML: Tags, Lists, Images, Forms, Links, Tables, iframes, videos, anchors, HTML Divs – CSS : Inline, Internal, External, CSS Display, CSS Backgrounds, Borders, Margins, Padding, CSS Font Styling, Stylings Lists, Tables, Forms, Gradients, Font, Tool tips, Buttons, Transitions, Transformation, Animations Box sizing, Flex, Grid

UNIT II JAVA SCRIPT AND jQuery 9

Introduction to Javascript, Variables, scoping, Data type, Strings, Numbers, Operators, Loops, Functions, Objects, Events, Working with DOM, AJAX, ES5 vs ES6 Vs ES7, jQuery – Introduction to jQuery, Syntax, Selectors, Events, Effects, Traversing, and jQuery AJAX

UNIT III BOOTSTRAP 9

Introduction to Bootstrap , Bootstrap Basics – Container, Color, Table, Images, Alerts, Buttons, Badges, Bars, Spinner, Cards, Pagination, Drop down, Carousel, Bootstrap Grids, Bootstrap Themes, Bootstrap CSS, Bootstrap JS

UNIT IV REACT JS 9

Introduction to React, Install node, JSX, Virtual DOMs, Single Page Apps, React Lifecycle, States, Class Component Vs Function Component, Event Handling, Props, Routes, Hooks ,Conditional rendering, Pure Components, High order components , Controlled Vs uncontrolled components, Redux, Babel, webpack, Axios,

UNIT V NODE.JS, EXPRESS AND MONGO DB 9

Introduction, Environmental setup, Simple Server, Response Type – HTML, JSON, Routing, Express Introduction, Express params and query string, Express Middleware, API Authentication
SQL Vs NO SQL, Mongo DB overview, Installation, connecting and performing CRUD operations

TOTAL: 45 Hours

TEXT BOOK

1. Eric Bush, "Node.Js, Mongodb,React, React native Full Stack Fundamentals and Beyond", Blue sky productions, 2018

REFERENCE BOOKS

1. P.Deitel, H.Deitel, and A.Deitel, " Internet and World Wide Web – How to program", 5th Edition, Pearson, 2019.
2. B. Jakobus, J.Maraj, " Mastering Bootstrap 4", Packt publisher, 2016
3. Kirupa Chinnathambi, "Learning React", Addison-Wesley Professional, 2018
4. Marc Wandschneider, "Learning Node.js:A Hands-on guide to building web applications in javascript",2nd edition, 2018

U19IT602 MACHINE LEARNING 3 0 0 3

COURSE OUTCOMES

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

1. Explain the concepts of different types of learning and apply linear regression
2. Summarize the concepts of logistic regression and implement the same with python
3. Explain and apply the concepts of Neural networks and support vector machines
4. Evaluate the hypothesis based on factors like bias and variance
5. Explain the concepts of clustering, dimensionality reduction and anomaly detection.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	1				1	1		1	2	2
CO2	3	3	3	3	3				1	1		1	2	2
CO3	3	3	3	3	3				1	1		1	2	2
CO4	3	3	3	1	1				1	1		1	2	2
CO5	3	3	1	1	1				1	1		1	2	2

UNIT I INTRODUCTION AND LINEAR REGRESSION 9

Introduction to Artificial Intelligence - What is machine learning? – Supervised Learning – unsupervised learning – Linear Regression – cost function – gradient descent algorithm – normal equation - Gradient descent for multiple variables – feature scaling – learning rate – polynomial regression – normal equation

UNIT II LOGISTIC REGRESSION 9

Hypothesis representation – decision boundary – nonlinear decision boundaries – cost function – gradient descent – advanced optimizations – multi class classification problems – **Regularization -** Problem of overfitting – cost function optimization for regularization – regularized linear regression – regularization with normal equation - regularized logistic regression

UNIT III NEURAL NETWORKS AND SUPPORT VECTOR MACHINES 9

Overview and summary – neurons and brain – model representation – artificial neural networks representation – example – multiclass classification – cost function – back propagation algorithm – gradient checking – random initialization – Support vector machines – optimization objective – cost function – large margin intuition – decision boundary – kernels – adapting to nonlinear classifiers- Introduction to Decision Trees – K-NN classifier

UNIT IV ADVICE FOR APPLYING MACHINE LEARNING 9

Debugging a learning algorithm – evaluating a hypothesis – model selection and training, validation test sets – bias Vs variance – regularization and bias/variance – learning curves machine learning system design

UNIT V OTHER TOPICS 9

Unsupervised learning – k-means algorithm – optimization objective – choosing number of clusters - Dimensionality reduction – principle component analysis - Anomaly detection – algorithm – developing and evaluating the algorithm – anomaly detection Vs supervised algorithm -Case study – recommender system – collaborative filtering - Large scale machine learning – online learning – map reduce and parallelism.

Total: 45 hours

REFERENCES

1. Stanford's machine learning course presented by Professor Andrew Ng – online resource - http://www.holehouse.org/mlclass/
2. James, G., Witten, D., Hastie, T., Tibshirani, R, "An Introduction to Statistical Learning with Applications in R", Springer, 2013.
3. Tom M. Mitchell, "Machine Learning", 1st edition, McGraw Hill Education, 2017.
4. Ethem Alpaydın, "Introduction to Machine Learning", The MIT Press, 2nd edition, 2013.
5. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2007.
6. Sebastianraschka, "Python Machine Learning", Packt Publishing Ltd., 2017.

U19IT603 FULL STACK DEVELOPMENT LABORATORY 0 0 4 2

After completion of the course, students will be able to

- Design a Front End of application using HTML,CSS,BOOTSTRAP
- Write programs to validate data and initiate a call to backend using javascript code and jQuery
- Develop a Full Stack application using React JS, Node JS and Mongo DB

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1		2	2		2									2
CO2	2	3	3		3									3
CO3	2	3	3		3									3

LIST OF PROGRAMS

1. Create your own Blog page using HTML/CSS
2. Create a home page of your website using BootStrap
3. Add a functionality to your Blog using Javascript and jQuery
4. Create a front end of online assessment pages using React JS
5. Build a Node.js server to say a given string is palindrome or not (Explore a node server with only API)

   input: localhost:8080/is_palindrome?text=madam

   output: true/false
6. Node.js with SQL Database (nodejs with DB access)

   a) Create a database and insert the given data into the table

   b) Fetch the record based by
   - joining the tables
   - Search criteria
   - recent data order
   - Limit first 5 records
7. a) Whenever a user is logged in set the email in the MongoDB

   b) Write a nodejs script to pull the MongoDB email value which is set and provide as a api end point
8. Email

   a) Build a script in nodejs to send a email with a default content

   b) Use task '7-b' and integrate the task '8-a' to send a email to the user that they have logged in from this IP

9. Create a back end of backend of online assessment using Node JS and Mongo DB
10. Create a full stack application comprising React JS, Node JS and Mongo DB to manage information of employees working in the organization. Admin of the application should able to perform CRUD operation on the employee database.

TOTAL: 60 Hours

U19IT604 SOFTWARE DEVELOPMENT AND TESTING LABORATORY 0 0 4 2

COURSE OUTCOMES

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

1. Understand the problem statement of the real-time application.
2. Use the UML review to do analysis through gathering all requirement of the system.
3. Apply appropriate design patterns by design UML diagrams.
4. Develop software/application using new Information Technology such as Machine learning, Deep learning, Full stack development, IoT, Black chain and Cloud Computing.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	1	3					2		3
CO2	3	3	3	2	2	1	1					2		3
CO3	3	3	2	2		2						2		3

EXPERIMENTS

To develop a mini-project by following the exercises listed below application using software engineering methodology.

1. PROGRAM ANALYSIS AND PROJECT PLANNING

- Thorough study of the problem – Identify project scope, Objectives and Infrastructure.

2. REQUIREMENT ENGINEERING

- Develop a complete problem statement.
- Write the IEEE standard SRS (Software Requirement Specification) document.

3. ANALYSIS AND DESIGN

- Identify the stockholder and use case requirement
- Using the identified requirement, do the analysis (view) activity in Rational Requisite Pro software.
- Identify Use Cases and develop the Use Case model.
- Identify the business activities and develop an UML Activity diagram.
- Identify the conceptual classes and develop a domain model with UML Class diagram.
- Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and collaboration diagrams
- Draw relevant state charts diagram.
- Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML component and deployment diagram notation.

4. SOFTWARE DEVELOPMENT AND DEBUGGING

- Implement the real-time application using any one of new information technology such that Machine learning, Deep learning, Full stack development, IoT, Black chain and Cloud Computing

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HOURS: 60 HOURS

U19IT605 MACHINE LEARNING LABORATORY 0 0 4 2

After completion of the course, students will be able to

- Apply data preprocessing and visualization techniques required for implementing ML algorithms
- Make use of Data sets in implementing machine learning algorithms
- Implement the machine learning concepts and algorithms

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1		2	2		2									2
CO2	2	3	3		3									3
CO3	2	3	3		3									3

LIST OF PROGRAMS

1. Write a program to perform simple computations on the given dataset using numpy and pandas.
   Sample Exercises:

   Write a Python program to load the data from a given csv file into a dataframe and print the shape of the data, type of the data, first 3 rows, number of rows-columns, feature names and missing values.
   Write a Python program to view basic statistical details like percentile, mean, std etc. of given dataset.
   Write a Python program to access first four cells from a given Dataframe using the index and column labels.

2. Write a program to visualize the data and features in the given dataset using matplotlib and pyplot.
   Sample Exercise:

   Write a Python program to create a plot to get a general Statistics of the given dataset. Draw box plot, joinplot, scatterplot, pairplot, kernel density estimate plot(using seaborn) to explore the frequency of data in the dataset.

3. *Write a program to implement simple linear regression to minimize the cost function.*
   Sample Exercise: In AB Company, there is a salary distribution table based on Year of experience. Y*ou are a HR officer and you got a candidate with 5 years of experience. Plot the given data. and find the best salary to offer the candidate.*

4. Write a program to implement multivariate linear regression.
   Sample Exercise:

Consider a housing price data set with 2 variables (size of the house in square feet and number of bedrooms) and a target (price of the house). Write a program to normalize the features and predict the price of a new house (given the size and the number of bedrooms) by minimizing the cost function.

5. Build a logistic regression model to classify the data in the given dataset.
   Sample Exercise: Suppose that you are the administrator of a university department and you want to determine each applicant's chance of admission based on their results on two exams. You have historical data from previous applicants that you can use as a training set. For each training example, you have the applicant's scores on two exams and the admissions decision. Write a program to build a classification model (logistic regression) that estimates the probability of admission based on the exam scores.

6. Write a program to fit a logistic regression model with regularization to avoid overfitting of the given dataset.

7. Write a program to implement a Neural Network model to classify the data in the given dataset.

8. Implement a ML model for the given datasets using Support Vector Machines(SVM).
   Sample Exercise: Classify emails as spam or not spam using SVM classifier.

9. Load the given dataset, split it into train and test sets, then estimate the mean squared error (MSE) for a linear regression as well as the bias and variance for the model error over 100 bootstrap samples.

10. Apply K means algorithm to cluster a set of data stored in a .CSV file and plot the clusters.

TOTAL: 60 Hours

U19IT925 AGILE SOFTWARE DEVELOPMENT 3 0 0 3

COURSE OUTCOMES

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

1. Explain the genesis of Agile and driving forces for choosing Agile techniques.
2. Comprehend the Agile Scrum framework and development practices.
3. Assess the software product using Agile testing methodologies and perform testing activities within an agile project.
4. Apply software design principles and refactoring techniques to achieve agility.
5. Evaluate the agile approach impact on cutting-edge technologies and also realize the business value for adopting agile software development.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		2					1				
CO2	3	1	1	1						1				
CO3	3	3	3								1	1		
CO4	3	3	3							1	1	1		
CO5	3	2									1			

UNIT I FUNDAMENTALS OF AGILE 9

The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Extreme Programming, Feature Driven development, Lean Software Development, Adaptive Software development, Dynamic System Development Method, Crystal, Agile Modeling, Agile Unified Process, Kanban, Agile project management, Continuous Integration, Pair Programming, Simple Design.

UNIT II AGILE SCRUM FRAMEWORK 9

Introduction to Scrum, Project phases, Agile Estimation, Planning game in XP, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Burn up chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team.

UNIT III AGILE TESTING 9

The Agile lifecycle and its impact on testing, Agile Testing Methodologies – Test Driven development, Acceptance Test Driven development, Behavior Driven development, Role of Tester in Agile Team, Tracking Testing activities, Agile Testing in Scrum, Agile Testing in Kanban, Agile Testing Techniques- Exploratory testing, Risk based testing, Regression tests, Agile Testing Work products.

UNIT IV AGILE SOFTWARE DESIGN AND DEVELOPMENT 10

Agile design practices, Design Principles - Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles and Dependency Inversion Principle, Need and significance of Refactoring, Refactoring Techniques.

UNIT V INDUSTRY TRENDS 8

Agile Application Lifecycle Management (ALM), Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile rapid development technologies.

Total : 45 hours

REFERENCES

1. Ken Schwaber, Mike Beedle, "Agile Software Development with Scrum", Pearson, 2014.
2. Robert C. Martin, "Agile Software Development, Principles, Patterns and Practices"Pearson, 2003.
3. Lisa Crispin, Janet Gregory," Agile Testing: A Practical Guide for Testers and Agile Teams" Addison Wesley, 2008.
4. Alistair Cockburn," Agile Software Development: The Cooperative Game"Addison Wesley, Second Edition, 2006.
5. Mike Cohn," User Stories Applied: For Agile Software" Addison Wesley, 2004.

U19IT927 DATA SCIENCE 3 0 0 3

COURSE OUTCOMES

At the end of the course, student will able to

1. Apply data visualisation and EDA in big-data analytics
2. Utilise inference and Matrix decomposition techniques to perform data analysis
3. Apply data pre-processing techniques
4. Utilize regression techniques in building a model
5. Apply Basic Machine Learning Algorithms in different use cases of Data science

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3						1	1		1	2	3
CO2	3	3	2	1	1				1	1		1	2	2
CO3	3	3	3	1	1				1	1		1	2	2
CO4	3	3	3	1	1				1	1		1	2	2
CO5	3	1							1	1		1		3

UNIT I - INTRODUCTION TO DATA SCIENCE 9

Big Data and Data Science - Big Data Analytics, Business intelligence vs Big data, big data frameworks, Current landscape of analytics, data visualisation techniques, visualisation software. Exploratory Data Analysis (EDA), statistical measures, Basic tools (plots, graphs and summary statistics) of EDA, Data Analytics Lifecycle, Discovery

UNIT II REVIEW OF STATISTICAL INFERENCE AND LINEAR ALGEBRA 9

Developing Initial Hypotheses, Identifying Potential Data Sources, EDA case study, testing hypotheses on means, proportions and variances

Matrices to represent relations between data, Linear algebraic operations on matrices – Matrix decomposition: Singular Value Decomposition (SVD) and Principal Component Analysis (PCA).

UNIT III DATA PRE-PROCESSING AND FEATURE SELECTION 9

Data cleaning - Data integration - Data Reduction - Data Transformation and Data Discretization, Feature Generation and Feature Selection, Feature Selection algorithms: Filters- Wrappers - Decision Trees - Random Forests

UNIT IV REGRESSION MODELS AND CLASSIFICATION 10

Regression models: Simple linear regression, least-squares principle, MLR, logistic regression, Multiple correlation, Partial correlation.

Classifiers - Decision tree - Naive Bayes - k-Nearest Neighbors (k-NN), k-means – SVM Association Rule mining – Ensemble methods

UNIT V USE CASES FOR ROLE OF MACHINE LEARNING IN DATA SCIENCE 8

Credit Card Fraud Detection – Customer Segmentation – Customer Churn Prediction – Sales Forecasting

TOTAL: 45 Hours

TEXT BOOKS

1. Mining of Massive Datasets. v2.1, Jure Leskovek, Anand Rajaraman and Jefrey Ullman., Cambridge University Press. (2019).
2. Big Data Analytics, paperback 2nd ed., Seema Acharya, Subhasini Chellappan, Wiley (2019).

REFERENCES

1. Doing Data Science, Straight Talk From The Frontline, Cathy O'Neil and Rachel Schutt, O'Reilly (2014).
2. Data Mining: Concepts and Techniques", Third Edition, Jiawei Han, Micheline Kamber and Jian Pei, ISBN 0123814790,(2011).
3. Big Data and Business Analytics, Jay Liebowitz, CRC press (2013) 4 Data mining methods,2nd edition, C. Rajan, Narosa (2016)

U19IT911 CLOUD COMPUTING 3 0 0 3

COURSE OUTCOMES

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

1. Describe the architecture of Cloud computing and the applications can be deployed.
2. Select suitable deployment models and services from the cloud providers.
3. Identify the suitable technology for networking and storage in the cloud environment.
4. Discuss the various virtualization technologies chosen by the cloud service providers.
5. Examine the network and security issues in cloud computing.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2									1			
CO2	3	3	3		2					1				
CO3	3	1	1	1						1				
CO4	3	2	3			1		2			1			
CO5	3	2	2		2				1		1			

UNIT I INTRODUCTION AND CLOUD COMPUTING ARCHITECTURE 9

Computing Paradigms- Cloud Computing Fundamentals- Motivation for Cloud Computing- Defining Cloud Computing- Principles of Cloud computing- Cloud Ecosystem- Requirements for Cloud Services- Cloud Application- Benefits and Drawbacks - Introduction- Cloud Architecture- Anatomy of the Cloud- Network Connectivity in Cloud Computing- Applications on the Cloud- Managing the Cloud- Migrating Application to Cloud

UNIT II CLOUD DEPLOYMENT AND SERVICE MODELS 9

Introduction- Private Cloud- Public Cloud- Community Cloud- Hybrid Cloud- Infrastructure as a Service- Platform as a Service- Software as a Service- Other Cloud Service Models.

UNIT III TECHNOLOGICAL DRIVERS FOR CLOUD COMPUTING 9

SOA and Cloud - Multicore Technology- Virtualization - Memory and Storage Technologies- Networking Technologies – Web 2.0 – Web 3.0 - Pervasive Computing- Power of Cloud Computing in Application Development- Cloud Application Development Platforms – cloud computing APIs.

UNIT IV VIRTUALIZATION AND PROGRAMMING MODELS FOR CLOUD COMPUTING 9

Virtualization Opportunities- Approaches to Virtualization- Hypervisors- Virtualization to cloud computing - Extended Programming Models for Cloud- Cloud Service Providers- EMC, Google, Amazon Web Services, Microsoft, IBM-Open Source Support for Cloud- Eucalyptus, Red Hat OpenShift Origin, Dropbox, CloudSim.

UNIT V NETWORKING, SECURITY AND ADVANCED CONCEPTS 9

Overview of data center environment – Networking issues – Transport layer issues – TCP enhancements – Security in cloud computing – Introduction – Security aspects – Platform related security – Audit and compliance – Advanced concepts in cloud computing.

TOTAL: 45 HOURS

TEXT BOOK

1. K.Chandrasekaran, "Essentials of Cloud Computing", CRC press, 2015
2. Barrie Sosinsky, "Cloud Computing Bible", Wiley, 2011.

REFERENCE

1. Michael Miller, "Cloud Computing", Pearson Education, New Delhi, 2009.

U19IT912 TOTAL QUALITY MANAGEMENT 3 0 0 3

COURSE OUTCOMES

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

1. Implement the concepts of planning, leadership to achieve quality.
2. Apply the principles of Total Quality Management in the projects.
3. Apply the statistical process to measure the quality.
4. Apply various tools available in Total Quality Management to improve FMEA.
5. Select appropriate software quality model to design better quality systems.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		2					1				
CO2	3	3	3		2					1				
CO3	3	1	1	1						1				
CO4	3	3	3								1	1		
CO5	3	3	3							1	1	1		

UNIT I INTRODUCTION 9

Definition of Quality-Basic Approach –TQM frame work – Awareness – Defining quality – Dimensions of Quality - Obstacles – Benefits of TQM - Leadership – Characteristics – Concepts - Deming Philosophy - Role of TQM Leaders - Strategic Planning,.

UNIT II TQM PRINCIPLES 9

Customer satisfaction – Customer Perception of Quality, Feedback - Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Unions and Employee Involvement- Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen.

UNIT III STATISTICAL PROCESS CONTROL 9

The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Concept of six sigma.

UNIT IV TQM TOOLS 9

Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – QFD Team – Benefits of QFD – Voice of the Customer - QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs.

UNIT V QUALITY MANAGEMENT SYSTEMS 9

Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO IEC 9126 Model.

Total: 45 hours

TEXT BOOK

1. Dale H.Besterfiled, et al., "Total Quality Management", Pearson Education, Inc. 2019.

REFERENCES

1. Oakland.J.S. "Total Quality Management", Butterworth – Hcinemann Ltd., Oxford.2005
2. Narayana V. and Sreenivasan, N.S. "Quality Management – Concepts and Tasks", New Age International 2003.

Semester –VI	U19GE601-SOFT SKILLS AND APTITUDE – IV (Common to All except Civil)	L	T	P	C	Marks
		0	0	2	1	100

Course Outcomes

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

1. Demonstrate capabilities in job-oriented company selection processes using the hands-on approach
2. Solve problems of any given level of complexity in all areas of quantitative aptitude and logical reasoning and score 70-75% marks in company-specific internal tests
3. Demonstrate advanced-level verbal aptitude skills in English and score 70-75% marks in company-specific internal tests

1. Soft Skills	**Demonstrating Soft -Skills capabilities with reference to the following topics:** a. Mock group discussions b. Mock interviews c. Mock stress interviews
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. Functions and Polynomials b. Clocks and Calendars c. Data Sufficiency: Introductions, 3 Options Data Sufficiency, 4 Options Data Sufficiency and 5 Options Data Sufficiency. d. Logical reasoning: Cubes, Non Verbal reasoning and Symbol based Reasoning. e. Decision making table and Flowchart Campus recruitment papers: Solving of previous year questions paper of all major recruiters f. Miscellaneous: Cognitive gaming Puzzles-(Picture, Word and Number based), IQ Puzzles, Calculation Techniques and Time Management Strategies. g. Trigonometry.- Concepts
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Writing captions for given pictures b. Reading comprehension c. Critical reasoning d. Theme detection e. Jumbled sentences f. Writing a story on given pictures g. Company specific verbal questions

Dr.S.Anita

Head/Training

Department of Placement Training

IT

U19IT1001 PROBLEM SOLVING TECHNIQUES USING JAVA PROGRAMMING 3 0 0 3

PREAMBLE

The students opting for this course will learn to code in Java and improve the programming and problem-solving skills. Through this course, the students will acquire appropriate skills to design algorithms as well as develop and debug programs. We are excited to offer a unique course structure, designed to support learners of different engineering departments and to fulfill their dreams of pursuing a career in an IT industry.

This course aims to satisfy the curiosity of the learners who wants to know how a ticket is booked in railways, or how an electricity consumption bill is generated. After the completion of the course, learners will be able to code real time problems in JAVA programming language.

COURSE OUTCOMES

1. Apply Object Oriented Programming concepts and basic features of Java to write programs for solving problems
2. Write java programs with objects and classes of java
3. Develop real time systems using java inheritance concepts
4. Build java applications using exceptions and I/O
5. Solve real time problems using java packages and connect java applications with relational databases using JDBC for storing and retrieving sensitive data

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1		3	3	2	3									3
CO2		3	3	2	3									3
CO3		3	3	2	3									3
CO4		3	3	2	3									3
CO5		3	3	2	3									3

UNIT I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS 9

Introduction to Object Orientation- Need for Object Oriented Paradigm- Characteristics of Object Oriented Programming - The History and Evolution of Java – An Overview of Java – Java Virtual Machine - Data Types –Variables - Arrays – Operators- Control Statements - Command Line Arguments

UNIT II OBJECTS AND CLASSES 9

Introducing Classes - Class fundamentals - Declaring Objects – Introducing Methods – Constructors- Parameterized Constructor – Copy Constructor – this keyword- Method Overloading – Constructor Overloading –Access control – Static keyword– Nested and Inner classes – Local Inner class

UNIT III INHERITANCE AND INTERFACE 9

Inheritance basics – Types of Inheritance – Super keyword – Method Overriding – Abstract Classes - final keyword- Interfaces- Default Interface Methods-Use static methods in an interface- Nested interfaces

UNIT IV EXCEPTION HANDLING AND I/O 9

Exception Handling Fundamentals – Exception Types – Uncaught Exception – Using try and catch – Multiple catch clauses – Nested try statements – throw – throws – finally - finalize method - I/O FileInputStream – I/O FileOutputStream

UNIT V PACKAGES AND JDBC CONNECTIVITY 9

Working with predefined and user defined packages - Access Protection – Importing Packages - Basics of JDBC Connectivity – SQL Queries – create – insert – select - delete – update.

TOTAL: 45 HOURS

TEXT BOOK

1. Herbert Schildt, "Java™: The Complete Reference", Ninth Edition, Tata McGraw Hill, 2014.

REFERENCES

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Ninth Edition, Prentice Hall, 2013.
2. K. Arnold, D. Holmes and J. Gosling, "The JAVA programming language", Fourth Edition, Addison Wesley Professional, 2005.
3. Timothy Budd, "Understanding Object-oriented programming with Java", Third Edition, Addison Wesley, 2000.
4. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fifth Edition, Tata McGraw-Hill Publishing company Ltd., 2009.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester VII under Regulations 2019
Branch: Information Technology

S.No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19GE701	Professional Ethics and Human Values	3	0	0	3	45
2	U19IT701	Cryptography and Network Security	3	0	0	3	45
3	U19IT918	**Professional Elective –** Intellectual Property Rights	3	0	0	3	45
4	U19IT905	**Professional Elective –** Information Security	3	0	0	3	45
	U19IT912	**Professional Elective –** Total Quality Management					
5	U19GE702	**Professional Elective** - Professional readiness for Innovation, Employability and Entrepreneurship	0	0	6	3	90
6	U19CE1004	**Open Elective –** Disaster Management	3	0	0	3	45
	U19EC1001	Biomedical Instrumentation and Measurements					
	U19EE1001	Electric Mobility					
	U19EE1002	Energy Conservation and Management					
	U19EE1004	Renewable Energy Systems					
	U19EE1005	Electrification in Building Construction					
	U19FT1001	Fundamentals of Fashion Design					
	U19FT1002	Garment Manufacturing Technology					
	U19MC1003	Smart Automation					
	U19MC1004	Fundamentals of Robotics					
Practical							
7	U19IT702	Cloud computing Laboratory	0	0	4	2	60
8	U19IT703	Mini Project	0	0	4	2	60
					Total	**22**	

Approved By

Chairperson, Information Technology BoS	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr.J.Akilandeswari	**Dr.R.Shivakumar**	**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Information Technology, Seventh Semester B.Tech IT Students and Staff, COE

U19GE701 PROFESSIONAL ETHICS AND HUMAN VALUES 3 0 0 3

COURSE OUTCOMES:

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

1. Identify the core values that shape the ethical behavior of an engineer.
2. Analyze and practice engineering ethics in their profession.
3. Apply codes of ethics in the context of social experimentation.
4. Explore various safety issues and ethical responsibilities of an engineer.
5. Adopt ethical practices pertaining to global issues.

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1						3		3	2		1			
CO2			2	2		3		3	2		1			
CO3			2	2		3		3	2		3			
CO4			3	2		3		3	2		1			
CO5			3			3	3	3	2		1			

UNIT-I HUMAN VALUES 9

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – Caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT -II ENGINEERING ETHICS 9

Senses of Engineering Ethics – Variety of moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Profession and Professionalism – Professional Ideals and Virtues –Theories of Right action- Self Interest- Customs and Religion -Uses of Ethical Theories.

UNIT-III ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as Experimentation – Contrasts with standard experiments- Engineers as Responsible Experimenters – Importance and limitations of Codes of Ethics - Industrial Standards - A Balanced Outlook on Law – Industrial Standards- Case Study: Space shuttle challenger disaster.

UNIT-IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and Risk – Types of risk - Assessment of Safety and Risk – Risk Benefit analysis-Reducing Risk – Case Studies - Chernobyl and Bhopal plant disaster.

Collegiality and Loyalty –Respect for Authority- Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Importance and consequences of whistle blowing - Professional Rights – Employee Rights – Intellectual Property Rights (IPR) and its components– Discrimination.

UNIT-V GLOBAL ISSUES 9

Multinational Corporations – Environmental Ethics – Computer Ethics and Internet- Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Participation in professional societies- –Code of Conduct – Corporate Social Responsibility.

LECTURE: 45, TUTORIAL: 0, TOTAL: 45 HOURS

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, Indian Edition, Tenth reprint, 2017.
2. Professional Ethics and Human values- Sonaversity, Edition 2018.

REFERENCES

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 2012.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2016.
3. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2000.
4. R.Subramanian, "Professional Ethics ",Oxford University Press , Second Edition, 2017.

U19IT701 CRYPTOGRAPHY AND NETWORK SECURITY 3 0 0 3

COURSE OUTCOMES

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

1. Apply classical encryption algorithms, Data Encryption Standard and Advanced Encryption standard to encrypt a data.
2. Apply appropriate public key cryptographic algorithms RSA Encryption, Diffie-Hellman Key Exchange and Elliptic Curve Cryptography to ensure the confidentiality with the concept of number theory.
3. Implement Hash Functions and Message Authentication code to ensure integrity of data with the authentication requirements.
4. Describe the concepts of Email security, IP security and Web Security.
5. Analyze the vulnerabilities in any network and able to provide a security solution with the concepts of firewalls, intrusion detection techniques, and virus countermeasures.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3	3						3	3	2	
CO2	3	3		3	3						3	3	2	
CO3	3	3		3	3						3	3	1	1
CO4	3	3		3	3						3	3	1	1
CO5	3	3		3	3						3	3	1	1

UNIT I SYMMETRIC CIPHERS 9

OSI Security Architecture: Security Attacks, Security Services, and Security Mechanisms - Classical Encryption techniques: Substitution Techniques, Transposition Techniques, Steganography – Block Cipher Principles – Data Encryption Standard (DES) – DES algorithm, Avalanche effect, Strength of DES – Advanced Encryption Standard (AES): AES Structure, AES Transformation Functions, AES Key Expansion – Block Cipher Modes of Operation.

UNIT II ASYMMETRIC CIPHERS 9

Basic concepts in Number Theory–Euclidean algorithm, Modular arithmetic - Prime Numbers, Fermat's and Euler's Theorem, Discrete Logarithms – Principle of Public-Key cryptosystem- RSA algorithm – Diffie-Hellman Key Exchange – Elliptic Curve Arithmetic – Elliptic Curve Cryptography.

UNIT III AUTHENTICATION AND DATA INTEGRITY ALGORITHMS 9

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Two simple hash Functions, Requirements and Security, SHA-512 – Message Authentication Code: Message Authentication Requirements, Message Authentication Functions, Requirements for MACs, Security of MACs, HMAC – Digital Signature: Properties and Requirements, Digital Signature Standard (DSS).

UNIT IV KEY MANAGEMENT AND INTERNET SECURITY 9

Symmetric Key Distribution using Symmetric Encryption and Asymmetric Encryption – Distribution of Public keys – Public-Key Infrastructure – Transport-Level Security: SSL Architecture, – Electronic Mail Security : Pretty Good Privacy (PGP) – IP Security : IP Security overview, Encapsulating Security Payload (ESP).

UNIT V APPLICATIONS OF CRYPTOGRAPHY IN NETWORKS 9

Intrusion Techniques- Statistical Anomaly Detection-Rule-Based Intrusion Detection -Password Management – Types of Malicious Software- Nature of Viruses- Virus Classification - Virus Countermeasures- Distributed Denial of Service Attacks- DDoS Attack Description, Constructing the Attack Network, DDoS Countermeasures – Firewall- Need for Firewalls, Firewall Characteristics-,Types of Firewalls.

LECTURE: 45, TUTORIAL: 0, TOTAL: 45 HOURS

TEXT BOOK

1. William Stallings, "Cryptography and Network Security – Principles and Practice", Pearson Education, Seventh Edition, 2017.

REFERENCES

1. Douglas Robert Stinson, "Cryptography: Theory and Practice", Chapman & Hall ,CRC, 2019.
2. Lawrie Brown , "Computer Security" , Principles and Practice , Fourth Edition , Pearson, 2019
3. Charlie Kaufman , Radia Perlman , Mike Speciner , "Network Security: Private Communication in a Public World", Prentice Hall ,2016
4. Forouzan, " Cryptography And Network Security" 3rd Edition , McGraw Hill Education, 2015
5. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, Second Edition, 2008.
6. Alfred J. Menezes, "Handbook of Applied Cryptography", CRC Press, 1997.
7. Bragg, "Network Security: The Complete Reference", Tata McGraw-Hill Education, 2004.

U19IT702 CLOUD COMPUTING LABORATORY 0 0 4 2

COURSE OUTCOMES

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

1. Run virtual machines of different configuration, install programs in virtual machines and run the programs
2. Install cloud platforms and write applications
3. Explore different cloud services and identify their applications

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1							1				
CO2	3	3	3		2					2	2		1	
CO3	3	3	3	3	3					1	2			2

LIST OF EXPERIMENTS:

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at a particular time. Use VMware workstation to do the configuration.
2. Install a C compiler in the virtual machine and execute a sample program. Use VMware workstation for execution.
3. Use VMware workstation to show the virtual machine migration based on the certain condition from one node to the other.
4. Install Google App Engine. Create hello world app and other simple web applications using python/java. Use GAE launcher to launch the web applications.
5. Install and Configure Hadoop.
6. Use Apache Hadoop to write a program to use the API's of Hadoop to interact with it.
7. Use Apache Hadoop write a word count program to demonstrate the use of Map and Reduce tasks.
8. Installation of Manjarasoft Aneka.
9. Case study on AWS.
10. Case study on Google Cloud.
11. Find a procedure to launch virtual machine using TryStack.

TOTAL: 60 HOURS

U19IT703 MINI PROJECT 0 0 4 2

COURSE OUTCOMES:

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

1. Apply the relevant knowledge and skills where are acquired within the technical area to a given project.
2. Design and Develop a software system capturing the user and system requirements.
3. Demonstrate leadership, effective communication, ethical sense and team work.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2	2	3	2				3	3	
CO2	3	3	3	1	3	3	1	2			2	3		3
CO3								3	3	3	3	3		2

EVALUATION METHOD: HACKATHON MODEL

THE RULES OF THE HACKATHON

1. There is a maximum team size of 3 people.
2. Teams can work on project listed that has already been done.
3. Teams can use libraries, frameworks, or open-source code in their projects.
4. Adding new features to existing projects is allowed. Judges will only consider new functionality introduced or new features added during the hackathon.
5. Any plagiarism in projects will not be entertained.

JUDGING CRITERIA

Teams will be judged on these four criteria. Judges will weigh the criteria according to their discretion. During judging, participants should try to describe what they did for each criterion in their project.

- **Technology:** How technically impressive was the project? Was the technical problem the team tackled difficult? Did it use a particularly clever technique or did it use many different components? Did the technology involved make you go "Wow"?
- **Design:** Did the team put thought into the user experience? How well designed is the interface? For a website, this might be about how beautiful the CSS or graphics are. For a hardware project, it might be more about how good the human-computer interaction is (e.g. is it easy to use or does it use a cool interface?).
- **Completion:** Does the project work? Did the team achieve everything they wanted?
- **Learning:** Did the team stretch themselves? Did they try to learn something new? What kind of project?

TOTAL: 60 HOURS

U19IT918 INTELLECTUAL PROPERTY RIGHTS 3 0 0 3

COURSE OUTCOMES

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

1. Explain the. Importance of intellectual property rights
2. File Trademark application under the international Madrid Protocol.
3. Independently file, prosecute and obtain Patents and Copyrights in India.
4. Claim a breach of contract if the person who let the trade secret out had nondisclosure in the contract.
5. Analyse ethical and professional issues which arise in the intellectual property law context.

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1						1				
CO2	3	3	3								1	1		
CO3	3	3	3							1	2	1		
CO4	3	2									1			
CO5	3	3								1				

UNIT I INTRODUCTION 9

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT II TRADE MARKS 9

Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT III LAW OF COPY RIGHTS AND PATENTS 9

Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT IV TRADE SECRETS 9

Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT V NEW DEVELOPMENTS 9

New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

LECTURE: 45, TUTORIAL: 0, TOTAL: 45 HOURS

TEXT BOOKS

1. Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets", Delmar Cengage Learning, 4th Edition, 2012.
2. Prabuddha Ganguli, "Intellectual Property Rights: Unleashing the Knowledge Economy", Tata Mc Graw Hill Education, 1st Edition, 2008.

REFERENCES

1. D Llewelyn & T Aplin W Cornish, "Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights", Sweet and Maxwell, 1st Edition, 2016.
2. Ananth Padmanabhan, "Intellectual Property Rights-Infringement And Remedies", Lexis Nexis, 1st Edition, 2012.
3. Ramakrishna B and Anil Kumar H.S, "Fundamentals of Intellectual Property Rights: For Students, Industrialist and Patent Lawyers", Notion Press, 1st Edition, 2017.

U19IT905 INFORMATION SECURITY 3 0 0 3

COURSE OUTCOMES

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

1. Define the essential fundamentals of information security
2. Apply the Laws and code of Ethics in Information Security
3. Identify the vulnerability of an information system and establish a plan for risk management
4. Describe the access control mechanism used for user authentication and authorization
5. Develop the different security infrastructure

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		2					1				
CO2	3	3	3		2					1				
CO3	3	1	1	1						1				
CO4	3	3	3								1	1		
CO5	3	3	3							1	1	1		

UNIT I INTRODUCTION 9

An overview of Information Security, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC.

UNIT II SECURITY INVESTIGATION 9

Need for Security - Business Needs, Threats, and Attacks. Legal, Ethical and Professional Issues - Law and Ethics in Information Security, International Laws and Legal Bodies, Ethics and Information Security.

UNIT III RISK MANAGEMENT AND SECURITY POLICY AND STANDARDS 9

Risk Management: Risk Identification, Risk Assessment, and Risk Control Strategies. Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model.

UNIT IV SECURITY TECHNOLOGY 9

Access Control, Firewalls, Protecting Remote Connections, Intrusion Detection and Prevention Systems, Scanning and Analysis Tools.

UNIT V IMPLEMENTING INFORMATION SECURITY AND SECURITY MAINTENANCE 9

Information Security Project Management, Technical and non-technical Aspects of Implementation, Security Management Maintenance Models, Digital Forensics.

LECTURE: 45, TUTORIAL: 0, TOTAL: 45 HOURS

TEXT BOOK

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003.

REFERENCES

1. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol 1-3, CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw-Hill, 2003.
3. Matt Bishop, "Computer Security Art and Science", Pearson/PHI, 2002.
4. Charles P.Pfleeger, Shari Lawrence Pfleeger, "Security in computing", 4th Edition, Pearson Publication, 2012.

U19IT912 TOTAL QUALITY MANAGEMENT 3 0 0 3

COURSE OUTCOMES

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

1. Implement the concepts of planning, leadership to achieve quality.
2. Apply the principles of Total Quality Management in the projects.
3. Apply the statistical process to measure the quality.
4. Apply various tools available in Total Quality Management to improve FMEA.
5. Select appropriate software quality model to design better quality systems.

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		2					1				
CO2	3	3	3		2					1				
CO3	3	1	1	1						1				
CO4	3	3	3								1	1		
CO5	3	3	3							1	1	1		

UNIT I INTRODUCTION 9

Definition of Quality-Basic Approach –TQM frame work – Awareness – Defining quality – Dimensions of Quality - Obstacles – Benefits of TQM - Leadership – Characteristics – Concepts - Deming Philosophy - Role of TQM Leaders - Strategic Planning,.

UNIT II TQM PRINCIPLES 9

Customer satisfaction – Customer Perception of Quality, Feedback - Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Unions and Employee Involvement- Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen.

UNIT III STATISTICAL PROCESS CONTROL 9

The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Concept of six sigma.

UNIT IV TQM TOOLS 9

Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – QFD Team – Benefits of QFD – Voice of the Customer - QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs.

UNIT V QUALITY MANAGEMENT SYSTEMS 9

Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO IEC 9126 Model.

LECTURE: 45, TUTORIAL: 0, TOTAL: 45 HOURS

TEXT BOOK

1. Dale H.Besterfiled, et al., "Total Quality Management", Pearson Education, Inc. 2019.

REFERENCES

1. Oakland.J.S. "Total Quality Management", Butterworth – Hcinemann Ltd., Oxford.2005
2. Narayana V. and Sreenivasan, N.S. "Quality Management – Concepts and Tasks", New Age International 2003.

U19GE701 PROFESSIONAL ETHICS AND HUMAN VALUES 3 0 0 3

COURSE OUTCOMES:

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

- Identify the core values that shape the ethical behavior of an engineer.
- Analyze and practice engineering ethics in their profession.
- Apply codes of ethics in the context of social experimentation.
- Explore various safety issues and ethical responsibilities of an engineer.
- Adopt ethical practices pertaining to global issues.

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12
CO1	2	1	1	1	1	2	3	3	3	2	2	3
CO2	2	1	1	1	2	2	3	3	3	3	3	3
CO3	2	1	3	1	2	3	3	3	3	3	3	3
CO4	2	1	3	1	1	3	3	3	3	2	3	3
CO5	2	1	3	1	1	3	3	3	3	3	3	3

UNIT-I HUMAN VALUES 9

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – Caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT -II ENGINEERING ETHICS 9

Senses of Engineering Ethics – Variety of moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Profession and Professionalism – Professional Ideals and Virtues –Theories of Right action- Self Interest- Customs and Religion-Uses of Ethical Theories.

UNIT-III ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as Experimentation – Contrasts with standard experiments- Engineers as Responsible Experimenters – Importance and limitations of Codes of Ethics - Industrial Standards - A Balanced Outlook on Law – Industrial Standards- Case Study: Space shuttle challenger disaster.

UNIT-IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and Risk – Types of risk - Assessment of Safety and Risk – Risk Benefit analysis-Reducing Risk – Case Studies - Chernobyl and Bhopal plant disaster.

Collegiality and Loyalty –Respect for Authority- Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Importance and consequences of whistle blowing - Professional Rights – Employee Rights – Intellectual Property Rights (IPR) and its components– Discrimination.

UNIT-V GLOBAL ISSUES 9

Multinational Corporations – Environmental Ethics – Computer Ethics and Internet- Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Participation in professional societies- –Code of Conduct – Corporate Social Responsibility.

Lecture: 45, Tutorial: 0, TOTAL: 45 Hours

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, Indian Edition, Tenth reprint, 2017.
2. Professional Ethics and Human values- Sonaversity, Edition 2018.

REFERENCES

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 2012.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2016.
3. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
4. R.Subramanian, "Professional Ethics ",Oxford University Press , Second Edition, 2017.

5/7/2022

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IT

U19IT1001 PROBLEM SOLVING TECHNIQUES USING JAVA PROGRAMMING 3 0 0 3

PREAMBLE

The students opting for this course will learn to code in Java and improve the programming and problem-solving skills. Through this course, the students will acquire appropriate skills to design algorithms as well as develop and debug programs. We are excited to offer a unique course structure, designed to support learners of different engineering departments and to fulfill their dreams of pursuing a career in an IT industry.

This course aims to satisfy the curiosity of the learners who wants to know how a ticket is booked in railways, or how an electricity consumption bill is generated. After the completion of the course, learners will be able to code real time problems in JAVA programming language.

COURSE OUTCOMES

1. Apply Object Oriented Programming concepts and basic features of Java to write programs for solving problems
2. Write java programs with objects and classes of java
3. Develop real time systems using java inheritance concepts
4. Build java applications using exceptions and I/O
5. Solve real time problems using java packages and connect java applications with relational databases using JDBC for storing and retrieving sensitive data

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1		3	3	2	3									3
CO2		3	3	2	3									3
CO3		3	3	2	3									3
CO4		3	3	2	3									3
CO5		3	3	2	3									3

UNIT I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS 9

Introduction to Object Orientation- Need for Object Oriented Paradigm- Characteristics of Object Oriented Programming - The History and Evolution of Java – An Overview of Java – Java Virtual Machine - Data Types –Variables - Arrays – Operators- Control Statements - Command Line Arguments

UNIT II OBJECTS AND CLASSES 9

Introducing Classes - Class fundamentals - Declaring Objects – Introducing Methods – Constructors- Parameterized Constructor – Copy Constructor – this keyword- Method Overloading – Constructor Overloading –Access control – Static keyword– Nested and Inner classes – Local Inner class

UNIT III INHERITANCE AND INTERFACE 9

Inheritance basics – Types of Inheritance – Super keyword – Method Overriding – Abstract Classes - final keyword- Interfaces- Default Interface Methods-Use static methods in an interface- Nested interfaces

UNIT IV EXCEPTION HANDLING AND I/O 9

Exception Handling Fundamentals – Exception Types – Uncaught Exception – Using try and catch – Multiple catch clauses – Nested try statements – throw – throws – finally - finalize method - I/O FileInputStream – I/O FileOutputStream

UNIT V PACKAGES AND JDBC CONNECTIVITY 9

Working with predefined and user defined packages - Access Protection – Importing Packages - Basics of JDBC Connectivity – SQL Queries – create – insert – select - delete – update.

TOTAL: 45 HOURS

TEXT BOOK

1. Herbert Schildt, "Java™: The Complete Reference", Ninth Edition, Tata McGraw Hill, 2014.

REFERENCES

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Ninth Edition, Prentice Hall, 2013.
2. K. Arnold, D. Holmes and J. Gosling, "The JAVA programming language", Fourth Edition, Addison Wesley Professional, 2005.
3. Timothy Budd, "Understanding Object-oriented programming with Java", Third Edition, Addison Wesley, 2000.
4. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fifth Edition, Tata McGraw-Hill Publishing company Ltd., 2009.

U19IT1002 PYTHON PROGRAMMING 3 0 0 3

PREAMBLE

Python is an easy to learn, powerful programming language. It has efficient high-level data structures. It is a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms. This programming language has become a preferred development technology in IT industries.

Python can be integrated with many other technologies also. It is rapidly becoming a de-facto language for data analytics and / or machine learning as many packages are added to perform more complex tasks. This course aims to teach everyone the basics of programming using Python.

COURSE OUTCOMES

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

1. Write simple applications
2. Develop programs using loops
3. Create applications using functions
4. Develop application using files
5. Create application using Python and MySQL

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1		3	3	2	3									3
CO2		3	3	2	3									3
CO3		3	3	2	3									3
CO4		3	3	2	3									3
CO5		3	3	2	3									3

UNIT I INTRODUCTION 9

The way of programming-What is programming- debugging – formal and natural languages - Python: Features - Installing - Running – The Basics-variables-Operators and Expressions

UNIT II CONTROL FLOW 9

Control Flow: introduction- if – else – while statement – do while – for loop –break – continue

UNIT III PYTHON FUNCTIONS 9

Sequences: String - List – Tuple – Dictionary - Functions – Function Parameters, Local and Global Variables, Default Arguments, Keyword Arguments, Return Statements.

UNIT IV PYTHON MODULES, PACKAGES AND FILES 9

Introduction – Byte files – from import – making own modules – Files and Input/Output: File Objects and Built in functions – Command line Arguments – Packages.

UNIT V PYTHON DATABASE CONNECTIVITY 9

SQL Introduction – simple queries – create - insert – update – delete, MySQL Introduction – connecting python and MySQL database.

Total: 45 hours

TEXT BOOK

1. Swaroop C N, " A Byte of Python ", ebshelf Inc., 1st Edition, 2013.

REFERENCES

1. Wesley J. Chun, "Core Python Programming", Pearson, 2nd Edition, 2006.

2. Allen B.Downey, "Think Python: How to Think Like a Computer Scientist", O'Reilly Media, 2nd Edition, 2015.

U19IT1003 FOUNDATIONS OF CRYPTOGRAPHY 3 0 0 3

PREAMBLE

The students opting for this course will learn basic understanding of cryptographic algorithms used in securely storing as well as transmitting the data over the networks. Students will able to build a secure system ensuring the three security services such as Confidentiality, Authentication, and Integrity. Also, Students will be learning the latest security solutions used in e-mail, and web communication. After the completion of the course, Students will gain basic knowledge to learn advance courses such as Cyber Security and Blockchain Technology.

COURSE OUTCOMES

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

1. Identify various types of security attacks, services and mechanisms and apply classical encryption techniques to encrypt the data.
2. Explain the principles of block ciphers such as DES, and AES
3. Apply appropriate public key cryptographic algorithms to ensure the confidentiality with the concept of number theory.
4. Apply the different kinds of Hash and MAC algorithms for data integrity and authentication
5. Apply cryptographic principles in email, web, and system security.

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2											2
CO2	2	2	2											2
CO3	3	3	2	2										2
CO4	3	3	2	2										2
CO5	2	2	2	2									2	2

UNIT I INTRODUCTION 9

Need for Data Security - OSI Security Architecture- Security attacks, Security services and Security mechanisms - Classical encryption techniques- Substitution techniques – Caesar Cipher, Monoalphabetic Cipher, Playfair Cipher, Hill Cipher, Polyalphabetic Cipher, One Time pad- Transposition techniques- Concept of Steganography

UNIT II SYMMETRIC KEY CRYPTOGRAPHY 9

Block Cipher Principles- Data Encryption Standard (DES) – Single round operation of DES-Avalanche Effect – Strength of DES - Advanced Encryption Standard (AES)-AES Structure -AES Round Functions- AES Key Expansion-Block Cipher Operation – Double DES – Triple DES- Block cipher modes of operation .

UNIT III PUBLIC KEY CRYPTOGRAPHY 9

Mathematics of Asymmetric Key Cryptography: Euclidean Algorithm , Modular Arithmetic, Prime numbers – Fermat‘s Theorem- Euler‘s Totient function- Euler‘s Theorem- Principles of Public Key Cryptosystem- RSA algorithm – Security of RSA- Diffie Hellman key exchange Algorithm- Man in the middle attack –Elliptic curve cryptography.

UNIT IV MESSAGE AUTHENTICATION AND INTEGRITY 9

Authentication requirements – Authentication functions – Message Authentication Code (MAC) – Basic Uses of MAC – Requirements for MAC - Hash Function –Applications of Hash Functions - Requirements for a Hash Function- Secure Hash Algorithm (SHA)- SHA 512- MAC Based on hash Function: HMAC- MAC Based on Block Ciphers : DAA and CMAC–Digital Signature – Properties and Requirements - Digital Signature Standard

UNIT V SECURITY PRACTICE AND SYSTEM SECURITY 9

Electronic Mail security – PGP – Services, Structure of Key Rings- PGP message generation and reception – IP security – ESP Header, Transport Mode and Tunnel Mode- Web Security – SSL Architecture - Intrusion Detection – Statistical Anomaly Detection , Rule Based Detection– Malicious Software – Types – Viruses and Countermeasures – Firewalls- Characteristics and Types

TOTAL : 45 Hours

TEXT BOOK:

1. William Stallings, “Cryptography and Network Security: Principles and Practice”, 8th Edition, Pearson Education,2019.

REFERENCE:

1. Christof Paar, Jan Pelz, “Understanding Cryptography”, 2nd Edition, Springer, 2010
2. Behrouz A Forouzan, Debdeed Mukhopadhyay, “Cryptography and Network Security”, 2nd Edition, Tata McGraw-Hill, 2010
3. Atul Kahate, “Cryptography and Network Security”, 4th edition, Tata McGraw-Hill, 2019.

U19IT1004 INTRODUCTION TO DATABASE TECHNOLOGY 3 0 0 3

PREAMBLE

The objective of this course is to introduce the concepts of database systems. Any of the digital applications used by the people be it web applications or mobile applications run with the database in the background. For any e-commerce application like flipkart or amazon, database is the core requirement. Social media sites like Facebook or Twitter stores all the content such as user profiles, likes, shares, and messages in the database. All the organizations maintain their data in the database with lots of security features. Working with a database system is the most important skill needed by the IT industry.

The course is designed in such a way that the students will acquire necessary skills to store, manipulate and retrieve data. The students will learn the fundamental concepts of database systems and write queries to manipulate the database. The students will have hands on experience in working with an open source database management system. This course is designed for the students of both circuit (EEE, ECE) and non-circuit branches (Mechanical, Civil and Fashion Technology).

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3						1	1		1	2	3
CO2	3	3	2	1	1				1	1		1	2	2
CO3	3	3	3	1	1				1	1		1	2	2
CO4	3	3	3	1	1				1	1		1	2	2
CO5	3	1							1	1		1		

COURSE OUTCOMES

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

1. Comprehend the need, background, architecture and evolution of database management system
2. Construct ER diagrams that capture the requirements of an application and map the ER diagram to relational databases
3. Write SQL queries to create, maintain, retrieve, manipulate and provide security to databases.
4. Design and evaluate the normality of a logical data model, and correct any anomalies.
5. Summarize the general ideas behind indexing techniques

UNIT I INTRODUCTION 9

Database and Database Users: Characteristics of database approach, Advantages of DBMS Approach, Database Applications

Database system concepts and architecture: Data models, Schemas, Instance, Three schema architecture and data independence, DBMS languages, DBMS interfaces, database system Environment

UNIT II ENTITY RELATIONSHIP AND RELATIONAL MODEL 9

ER model: Entity types, attributes, keys,, relationship types, constraints, weak entity, ER diagrams, EER concepts

Relational data model, relational constraints and relational Algebra: Relational model concepts, Relational constraints and Relational data base schema, update operations, basic Relational algebra operations, additional relational operations, ER to relational mapping

UNIT III QUERY LANGUAGE 9

SQL: Data definition and constraints, Basic queries, insert, delete, update, Joins, complex queries, views, assertions and triggers

Database security and Authorization: security issues, grant/revoke privileges, SQL injections

UNIT IV RELATIONAL DATABASE DESIGN 9

Functional dependencies and normalization: Functional dependencies, Normal forms: 1NF, 2NF, 3NF, Boyce Codd NF, decomposition

UNIT V STORAGE STRUCTURES AND INDEXING 9

Secondary Storage Devices **–** Placing file records – Operations on files – unordered files – ordered files - hashing – RAID - **Indexing Structures:** Types of Single-Level Ordered Indexes, Multilevel Indexes

Total: 45 hours

TEXT BOOK

1. Ramez Elmasri and Shamkant Navathe, "Fundamentals of Database Systems ", 6th Edition, Addison-Wesley, 2014.

REFERENCES

1. Abraham Silberschatz, Henry F. Korth and Sudarshan. S, "Database System Concepts", 6th Edition, McGraw-Hill, 2016
2. Raghu Ramakrishnan,"Database Management System", Tata McGraw-Hill Publishing Company, 2003
3. Date. C. J, Kannan. A, Swamynathan. S, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2012
4. Rajesh Narang, "Database Management systems", PHI Learning pvt. Ltd, New Delhi,201

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester VIII Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Practical							
1	U19IT801	Project Work	0	0	24	12	360
					Total Credits	**12**	

Approved By

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Chairperson, Academic Council & Principal
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