

SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.E-Computer Science and Engineering

CURRICULUM and SYLLABI

[For students admitted in 2022-2023]

B.E / B.Tech Regulation 2019

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem

(An Autonomous Institution)

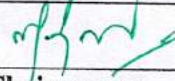
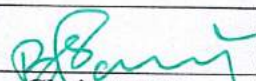
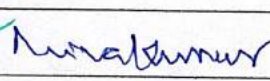

Courses of Study for B.E/B. Tech. Semester I under Regulations 2019 (CBCS)

Branch: Computer Science and Engineering

S.No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19ENG101B ✓	English for Engineers– I ✓	1 ✓	0	2 ✓	2 ✓	HS	45 ✓ (15L+30P)
2	U19MAT102A ✓	Linear Algebra and Calculus ✓	3 ✓	1 ✓	0	4 ✓	BS	60 ✓
3	U19PHY103B ✓	Engineering Physics ✓	3 ✓	0	0	3 ✓	BS	45 ✓
4	U19CHE104B ✓	Applied Chemistry -I ✓	3 ✓	0	0	3 ✓	BS	45
5	U19PPR105 ✓	Problem Solving Using Python Programming ✓	3 ✓	0	0	3 ✓	ES	45
6	U19BEE106A ✓	Basic Electrical and Electronics Engineering ✓	3	0	0	3	ES	45
Practical								
7	U19PCL108B ✓	Physics and Chemistry Laboratory ✓	0	0	2 ✓	1 ✓	BS	30
8	U19BEEL113A ✓	Basic Electrical and Electronics Engineering Laboratory ✓	0	0	2 ✓	1 ✓	ES	30
9	U19PPL111 ✓	Python Programming Laboratory ✓	0	0	2 ✓	1 ✓	ES	30
10	U19GE101 ✓	Basic Aptitude -I ✓	0	0	2 ✓	0	EEC	30
						Total Credits	21	
Optional Language Elective*								
11	U19OLE1101 ✓	French	0	0	2 ✓	1 ✓	HS	30
12	U19OLE1102 ✓	German						30
13	U19OLE1103 ✓	Japanese						30

*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, Computer Science and Engineering BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. B. Sathiyabhama	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

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30.06.2022

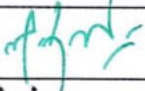

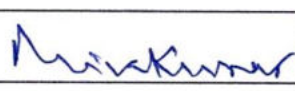
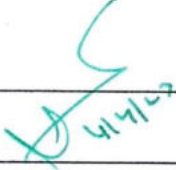
B.E/B. Tech Regulations-2019

Sona College of Technology, Salem – 636 005
(An Autonomous Institution)
Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)
Branch: Computer Science and Engineering

S.No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19TAM201	தமிழர் மரபு / Heritage of Tamils	1	0	0	1	HSMC	15
2	U19ENG201B	English for Engineers-II	1	0	2	2	HSMC	45 (15L+30P)
3	U19MAT202B	Discrete Mathematics	3	1	0	4	BSC	60
4	U19PHY203A	Material Science	2	0	0	2	BSC	30
5	U19CHE204A	Applied Chemistry -II	2	0	0	2	BSC	30
6	U19CS201	Programming in C	3	0	0	3	ESC	45
7	U19EGR206A	Engineering Graphics	2	0	2	3	ESC	60 (30L+30P)
Practical								
8	U19WPL212	Workshop Practice	0	0	2	1	ESC	30
9	U19CS202	C Programming Laboratory	0	0	2	1	ESC	30
10	U19GE201	Basic Aptitude - II	0	0	2	0	EEC	30
Total Credits						19		
Optional Language Elective*								
11	U19OLE1201	French	0	0	2	1	HSMC	30
12	U19OLE1202	German						
13	U19OLE1203	Japanese						

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

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03.03.2023


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: Computer Science and Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hour
Theory							
1	U19MAT301B	Probability and Statistics	3	1	0	4	60
2	U19CS301	Data Structures	3	0	0	3	45
3	U19CS302	Computer Architecture	3	0	0	3	45
4	U19CS303	Computer and Information Ethics	3	0	0	3	45
5	U19CS304	Object Oriented Programming	3	0	0	3	45
6	U19EC306	Communication Systems	3	0	0	3	45
7	U19TAM301	தமிழ்நரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	1	15
8	U19GE302	Mandatory Course : Environment and Climate Science	2	0	0	0	30
Practical							
9	U19CS305	Data Structures Laboratory	0	0	4	2	60
10	U19CS306	Object Oriented Programming Laboratory	0	0	4	2	60
11	U19GE301	Soft Skills and Aptitude- I	0	0	2	1	30
Total Credits						25	

Approved By


Chairperson, Computer Science and Engineering BoS
Dr.B.Sathiyabhama


Member Secretary, Academic Council
Dr.R.Shivakumar


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

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HOD/Computer Science and Engineering, Third Semester BE CSE Students and Staff, COE

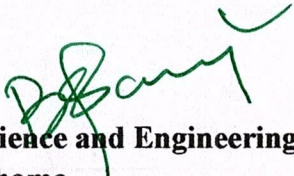
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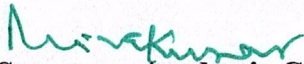
Regulations-2019

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

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact hours
Theory							
1	U19MAT401A	Numerical and Regression Analysis	3	1	0	4	60
2	U19CS401	Operating Systems	3	0	0	3	45
3	U19CS402	Database Management Systems	3	0	0	3	45
4	U19CS403	Design and Analysis of Algorithms	3	0	0	3	45
5	U19GE405	Principles of Management	3	0	0	3	45
6	U19GE403	Mandatory Course: Essence of Indian Traditional knowledge	2	0	0	0	30
Practical							
7	U19CS404	Operating Systems Laboratory	0	0	4	2	60
8	U19CS405	Database Management Systems Laboratory	0	0	4	2	60
9	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
Total Credits						21	

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Member Secretary, Academic Council
Dr.R.Shivakumar


Chairperson, Academic Council & Principal
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Sona College of Technology, Salem-5

List of Professional Electives B.E/B.Tech under Regulation 2019

Department of Computer Science and Engineering

S.No	Course Code	Course Name	L	T	P	C
1.	U19CS901	Software ProjectManagement	3	0	0	3
2.	U19CS902	Agile Methodologies	3	0	0	3
3.	U19CS903	Parallel and DistributedAlgorithms	3	0	0	3
4.	U19CS904	Graph Theory	3	0	0	3
5.	U19CS905	Software Design and Architecture	3	0	0	3
6.	U19CS906	Software Testing	3	0	0	3
7.	U19CS907	Software Agents	3	0	0	3
8.	U19CS908	Big DataAnalytics	3	0	0	3
9.	U19CS909	MachineLearning	3	0	0	3
10.	U19CS910	Knowledge Engineering	3	0	0	3
11.	U19CS911	DatabaseTuning	3	0	0	3
12.	U19CS912	Information Retrieval	3	0	0	3
13.	U19CS913	Business Intelligence	3	0	0	3
14.	U19CS914	Data Warehousingand Data mining	3	0	0	3
15.	U19CS915	DistributedSystems	3	0	0	3
16.	U19CS916	Digital ImageProcessing	3	0	0	3
17.	U19CS917	Mobile Computing	3	0	0	3
18.	U19CS918	Cloud Computing	3	0	0	3
19.	U19CS919	Wireless Sensor Networks	3	0	0	3
20.	U19CS920	Quantum Computing	3	0	0	3
21.	U19CS921	Green Computing	3	0	0	3
22.	U19CS922	Deep Learning	3	0	0	3
23.	U19CS923	Human Computer Interaction	3	0	0	3
24.	U19CS924	ComputerGraphics	3	0	0	3
25.	U19CS925	Web Development	3	0	0	3
26.	U19CS926	Multimediasystems	3	0	0	3
27.	U19CS927	Mobile Application Development	3	0	0	3
28.	U19CS928	Advanced JavaProgramming	3	0	0	3
29.	U19CS929	Augmented Reality and Virtual Reality	3	0	0	3
30.	U19CS930	Security inComputing	3	0	0	3
31.	U19CS931	SoftwareDefined Networks	3	0	0	3
32.	U19CS932	Bio Informatics	3	0	0	3
33.	U19CS933	Cyber Forensics	3	0	0	3
34.	U19CS934	Cyber Lawand Ethics	3	0	0	3
35.	U19CS935	Ethical Hacking	3	0	0	3

SONA COLLEGE OF TECHNOLOGY, SALEM-5

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LIST OF PROFESSIONAL ELECTIVES FOR HONOURS DEGREE

Date: 12.05.2023

S.No	Vertical 1: Data Science	Vertical 2: Full Stack Development	Vertical 3: Cloud Computing And Data Center Technologies	Vertical 4: Cyber Security And Data Privacy	Vertical 5: Software Engineering
1.	Exploratory Data Analysis	Web Development	Cloud Computing	Digital and Mobile Forensics	Software Project Management
2.	Recommender Systems	Mobile Application Development	Virtualization	Social Network Security	Software Testing
3.	Neural Networks	Cloud Services Management	Cloud Services Management	Security in Computing	Agile Methodologies
4.	Information Retrieval	DevOps	Storage Technologies	Cyber Forensics	Software Quality Assurance
5.	Text and Speech Analysis	Game Development	Data Warehousing and Data mining	Cyber Law and Ethics	Software Architecture
6.	Business Intelligence	Web3	Software Defined Networks	Cyber Security in Health Care	Software Agents
7.	Image and Video Analytics	Metaverse	Cloud Security	Cloud Security	Secure Coding
8.	Supply Chain Management	Secure Coding	Edge Computing	Risk Management	Software Design patents
9.	Knowledge Engineering		Docker Essentials	Threat Intelligence	Software Documentation

Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee

SONA COLLEGE OF TECHNOLOGY, SALEM-5

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LIST OF PROFESSIONAL ELECTIVES FOR HONOURS DEGREE

Date: 12.05.2023

S.No	Vertical 6: Blockchain Technologies	Vertical 7: Creative Media	Vertical 8: Data Analytics
1.	Introduction to Blockchain Technologies	Visual Effects	Knowledge Engineering
2.	FinTech	Metaverse	Image and Video Analytics
3.	Bitcoin and Cryptocurrency Technologies	Animation	HealthCare Analytics
4.	Web3 and Blockchain	Digital Marketing	Bio Inspired Computations
5.	Blockchain Application Development using Python	Video Creation and Editing	Business Intelligence
6.	Ethereum and Solidity	UI and UX Design	Text and Speech Analysis
7.	Smart Contract and HyperLedger	Short Film Development	Social Media Analytics
8.	Supply Chain Management	Digital Audio and Video Design	Information Retrieval
9.		Motion Graphics	
10.		3D Printing and Design	

Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of Computer Science and Engineering

Honours Degree- Verticals & Courses

(Offered to UG students admitted during AY 2021- 2022 onwards, Regulation 2019)

Vertical 1: DATA SCIENCE

S.No	Course Code	Course Name	L	T	P	C
1	U19CS2001	Exploratory Data Analysis	3	0	0	3
2	U19CS2002	Recommender Systems	3	0	0	3
3	U19CS2003	Neural Networks	3	0	0	3
4	U19CS912	Information Retrieval	3	0	0	3
5	U19CS2004	Text and Speech Analysis	3	0	0	3
6	U19CS913	Business Intelligence	3	0	0	3
7	U19CS2005	Image and Video Analytics	3	0	0	3
8	U19CS2006	Supply Chain Management	3	0	0	3
9	U19CS910	Knowledge Engineering	3	0	0	3
Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee						

Vertical 2: FULL STACK DEVELOPMENT

S.No	Course Code	Course Name	L	T	P	C
1	U19CS925	Web Development	3	0	0	3
2	U19CS927	Mobile Application Development	3	0	0	3
3	U19CS2007	Cloud Services Management	3	0	0	3
4	U19CS2008	DevOps	3	0	0	3
5	U19CS2009	Game Development	3	0	2	4
6	U19CS2010	Web3	3	0	0	3
7	U19CS2011	Metaverse	3	0	0	3
8	U19CS2012	Secure Coding	3	0	0	3
Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee						

Vertical 3: CLOUD COMPUTING AND DATA CENTER TECHNOLOGIES

S.No	Course Code	Course Name	L	T	P	C
1	U19CS918	Cloud Computing	3	0	0	3
2	U19CS2013	Virtualization	3	0	0	3
3	U19CS2007	Cloud Services Management	3	0	0	3
4	U19CS2014	Storage Technologies	3	0	0	3
5	U19CS914	Data Warehousing and Data mining	3	0	0	3
6	U19CS931	Software Defined Networks	3	0	0	3
7	U19CS2015	Cloud Security	3	0	0	3
8	U19CS2016	Edge Computing	3	0	0	3
	U19CS2017	Docker Essentials	3	0	0	3
Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee						

Vertical 4: CYBER SECURITY AND DATA PRIVACY

S.No	Course Code	Course Name	L	T	P	C
1	U19CS2018	Digital and Mobile Forensics	3	0	0	3
2	U19CS2019	Social Network Security	3	0	0	3
3	U19CS930	Security in Computing	3	0	0	3
4	U19CS933	Cyber Forensics	3	0	0	3
5	U19CS934	Cyber Law and Ethics	3	0	0	3
6	U19CS2020	Cyber Security in Health Care	3	0	0	3
7	U19CS2015	Cloud Security	3	0	0	3
8	U19CS2021	Risk Management	3	0	0	3
9	U19CS2022	Threat Intelligence	3	0	0	3
Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee						

Vertical 5: SOFTWARE ENGINEERING

S.No	Course Code	Course Name	L	T	P	C
1	U19CS901	Software Project Management	3	0	0	3
2	U19CS906	Software Testing	3	0	0	3
3	U19CS902	Agile Methodologies	3	0	0	3
4	U19CS2023	Software Quality Assurance	3	0	0	3
5	U19CS2024	Software Architecture	3	0	0	3
6	U19CS907	Software Agents	3	0	0	3
7	U19CS2012	Secure Coding	3	0	0	3
8	U19CS2025	Software Design patents	3	0	0	3
9	U19CS2026	Software Documentation	3	0	0	3
Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee						

Vertical 6: BLOCKCHAIN TECHNOLOGIES

S.No	Course Code	Course Name	L	T	P	C
1	U19CS2027	Introduction to Blockchain Technologies	3	0	0	3
2	U19CS2028	FinTech	3	0	0	3
3	U19CS2029	Bitcoin and Cryptocurrency Technologies	3	0	0	3
4	U19CS2030	Web3 and Blockchain	3	0	0	3
5	U19CS2031	Blockchain Application Development using Python	3	0	0	3
6	U19CS2032	Ethereum and Solidity	3	0	0	3
7	U19CS2033	Smart Contract and HyperLedger	3	0	0	3
8	U19CS2006	Supply Chain Management	3	0	0	3

Vertical 7: CREATIVE MEDIA

S.No	Course Code	Course Name	L	T	P	C
1	U19CS2035	Visual Effects	3	0	2	4
2	U19CS2011	Metaverse	3	0	0	3
3	U19CS2036	Animation	3	0	0	3
4	U19CS2037	Digital Marketing	3	0	0	3
5	U19CS2038	Video Creation and Editing	3	0	0	3
6	U19CS2039	UI and UX Design	3	0	2	4
7	U19CS2040	Short Film Development	3	0	2	4
8	U19CS2041	Digital Audio and Video Design	3	0	0	3
9	U19CS2042	Motion Graphics	3	0	2	4
10	U19CS2043	3D Printing and Design	3	0	0	3
Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee						

Vertical 8: DATA ANALYTICS

S.No	Course Code	Course Name	L	T	P	C
1	U19CS910	Knowledge Engineering	3	0	0	3
2	U19CS2005	Image and Video Analytics	3	0	0	3
3	U19CS2044	HealthCare Analytics	3	0	0	3
4	U19CS2045	Bio Inspired Computations	3	0	0	3
5	U19CS913	Business Intelligence	3	0	0	3
6	U19CS2004	Text and Speech Analysis	3	0	0	3
7	U19CS2046	Social Media Analytics	3	0	0	3
8	U19CS912	Information Retrieval	3	0	0	3
Maximum of two SWAYAM Courses in specific vertical identified by Department Consultative Committee						

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of Computer Science and Engineering

Minor Degree- Verticals & Courses

(Offered to UG students admitted during AY 2021- 2022 onwards, Regulation 2019)

Minor Vertical : CYBER SECURITY

S.No	Course Code	Course Name	L	T	P	C
1	U19CS2047	Data Communications & Networking	3	0	0	3
2	U19CS2048	Cryptography	3	0	0	3
3	U19CS935	Ethical Hacking	3	0	0	3
4	U19CS2049	Digital Forensics	3	0	0	3
5	U19CS2019	Social Network Security	3	0	0	3
6	U19CS2050	Security in IOT and Cloud	3	0	0	3
7	U19CS2051	Security Information and Event Management	3	0	0	3
8	U19CS934	Cyber Law and Ethics	3	0	0	3
Maximum of two SWAYAM Courses in specific minor identified by Department Consultative Committee						

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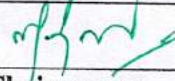
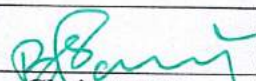
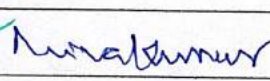

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Branch: Computer Science and Engineering

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2	U19MAT102A ✓	Linear Algebra and Calculus ✓	3 ✓	1 ✓	0	4 ✓	BS	60 ✓
3	U19PHY103B ✓	Engineering Physics ✓	3 ✓	0	0	3 ✓	BS	45 ✓
4	U19CHE104B ✓	Applied Chemistry -I ✓	3 ✓	0	0	3 ✓	BS	45
5	U19PPR105 ✓	Problem Solving Using Python Programming ✓	3 ✓	0	0	3 ✓	ES	45
6	U19BEE106A ✓	Basic Electrical and Electronics Engineering ✓	3	0	0	3	ES	45
Practical								
7	U19PCL108B ✓	Physics and Chemistry Laboratory ✓	0	0	2 ✓	1 ✓	BS	30
8	U19BEEL113A ✓	Basic Electrical and Electronics Engineering Laboratory ✓	0	0	2 ✓	1 ✓	ES	30
9	U19PPL111 ✓	Python Programming Laboratory ✓	0	0	2 ✓	1 ✓	ES	30
10	U19GE101 ✓	Basic Aptitude -I ✓	0	0	2 ✓	0	EEC	30
Total Credits						21		
Optional Language Elective*								
11	U19OLE1101 ✓	French	0	0	2 ✓	1 ✓	HS	30
12	U19OLE1102 ✓	German						30
13	U19OLE1103 ✓	Japanese						30

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30.06.2022

B.E/B. Tech Regulations-2019

U19ENG101B – English for Engineers – I

First year I semester

Common to CSE

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.

	COURSE OUTCOMES	PROGRAMME OUTCOMES												Ps o1	Ps o2
		1	2	3	4	5	6	7	8	9	10	11	12		
1	Use grammatical components effectively in both written and spoken communication	2	1	1	1	1	2	3	2	2	3	3	3	3	3
2	Develop speaking skills for self-introduction, delivering speeches and technical presentation	3	2	2	3	3	3	3	2	3	3	3	3	3	3
3	Speak effectively in real time and business situations	3	3	2	3	3	3	3	2	3	3	3	3	3	3
4	Write email, formal letters and descriptions of graphics	1	1	1	2	2	1	2	2	1	3	1	1	1	1
5	Develop skills for writing reports and proposals, and for general purpose and technical writing.	2	1	1	3	2	2	3	3	3	3	2	3	3	3

UNIT –I

- General Vocabulary, 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.
- Checklists, 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, office arrangements, facilities, office functions, sales, purchases, training recruitment, advertising, applying for financial assistance, applying for a job, team work, discussion, presentation.
- Job application letter and resume, recommendations,

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
- Note making, Proposal

UNIT – V

- If conditionals
- 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.
- Memo, technical report writing, feasibility reports, accident report, survey report

TOTAL: 45 hours

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

TEXT BOOK:

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

Extensive Reading

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

Reference

Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.

A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.

HOD

Humanities and Languages

Dr. M. RENUGA,
Professor & Head,

Department of Humanities & Languages,
College of Technology,
SALEM - 636 004

B. E. / COMPUTER SCIENCE AND ENGINEERING

SEMESTER – I	LINEAR ALGEBRA AND CALCULUS	L	T	P	C
UI9MAT102A		3	1	0	4

COURSE OUTCOMES

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

1. find the rank of the matrix and solve linear system of equations by direct and indirect methods
2. apply the concepts of vector spaces and linear transformations in real world applications
3. 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
4. find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables
5. apply appropriate techniques of multiple integrals to find the area and volume.

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	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3		3	2							2	2		2
CO2	3	3		3	2							2	2		2
CO3	3	3		3	2							2	2		2
CO4	3	3		3	2							2	2		2
CO5	3	3		3	2							2	2		2

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**

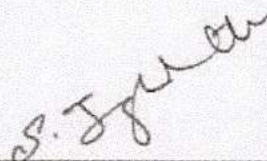
Total: **60 Hours**

TEXT BOOKS:

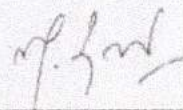
1. T. Veerarajan, “Linear Algebra and Partial Differential Equations”, McGraw Hill Publishers, 1st Edition, 2018.
2. T. Veerarajan, “Engineering Mathematics for Semesters I & II”, McGraw Hill Publishers, 1st Edition, 2019.

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.



Prof. S. JAYABHARATHI
Head / Department of Mathematics
Sona College of Technology
Salem – 636 005



Dr. M. RENUGA
BoS - Chairperson
Science and Humanities
Sona College of Technology
Salem – 636 005

Course Code:

U19PHY103B

L T P C

Course Name:

ENGINEERING PHYSICS

3 0 0 3 100

(Common to I semester B.E. Computer Science and Engineering, Computer Science and Engineering (Artificial Intelligence and Machine Learning), Computer Science and Design & Mechatronics Engineering)

(CSE, CSE(AIML), CSD & MCT)

COURSE OUTCOMES:

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

- CO1** Discuss the dual nature of matter and radiation and the application of wave nature of particles.
- CO2** Describe the basic components of lasers.
- CO3** Analyse the relation between arrangement of atoms and material properties.
- CO4** Deduce Maxwell's equations using the fundamentals of electromagnetism.
- CO5** Elucidate the different modes of heat transfer.

CO / PO, PSO Mapping														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-2	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-3	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-4	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-5	3	2	-	-	-	-	-	-	-	-	2	2	-	3

Unit 1 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 2 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 (CO₂ laser) - semiconductor laser (homojunction and hetero junction laser)

Holography - Construction and reconstruction of hologram.

Unit 3 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 4 Electromagnetism

9

Electrostatics - Electric field - Electric field intensity – Field due to discrete and continuous charges – Electric lines of forces – Electric flux – Gauss's law – Divergence of E – Applications of Gauss's law – Curl of E.

Magnetostatics – Magnetic fields – Magnetic Lorentz force – Force experienced by current carrying conductor in magnetic field – Steady currents – Magnetic field due to steady current - Biot - Savart Law - Straight line currents – Ampere's circuital law – Divergence and curl of B – Applications of Ampere's circuital law - Comparison of Magneto statics and Electrostatics.

Unit 5 Thermal Physics

9

Heat and temperature - Modes of heat transfer (Conduction, convection and radiation) - Specific heat capacity - thermal capacity and coefficient of linear thermal expansion.

Thermal conductivity - Measurement of thermal conductivity of good conductor - Forbe's

method - Measurement of thermal conductivity of bad conductor - Lee's disc method - Radial flow of heat - Cylindrical flow of heat - Practical applications of conduction of heat.

Thermal radiations - Properties of thermal radiations - Applications of thermal radiations.

Lecture: 45, Tutorial: 00, Total: 45 Hours

Text Book:

1. M.N.Avadhanulu, 'Engineering Physics' S.Chand & Company Ltd, New Delhi (2015)
2. D. K. Bhattacharya, Poonam Tandon "Engineering Physics" Oxford University Press 2017.

References:

1. Engineering Physics, Sonaversity, Sona College of Technology, Salem (Revised Edition 2018).
2. B. K. Pandey and S. Chaturvedi, Engineering Physics , Cengage Learning India Pvt. Ltd., Delhi, 2019
3. Rajendran, V, and Marikani A, 'Materials science' TMH Publications, (2004) New Delhi.
4. Palanisamy P.K, 'Materials science', SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)

Dr. C. Shanthi
HOD / Science

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
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SALEM-636 005.

I SEMESTER (CSE)**COURSE CODE U19CHE104B**

L T P C

COURSE NAME APPLIED CHEMISTRY-I

3 0 0 3

Course outcome:

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

- CO1** Outline the principles and applications of electrochemistry to engineering and technology.
- CO2** Discuss the principle, applications of surface chemistry and catalysis in engineering and technology.
- CO3** Analyze the types of corrosion and describe the methods of corrosion control.
- CO4** Describe the basics of nano chemistry, synthesis, properties and applications of nano materials in engineering and technology.
- CO5** Analyze the types of polymers, methods of polymerization, methods of fabrication and their applications.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO - 1	3	2												2
CO - 2	3	2												2
CO - 3	3	2												2
CO - 4	3	2												2
CO - 5	3	2												2

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 – Fe²⁺ 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.

Reference Books:

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.


Dr. C. Shanthi
HOD/Sciences

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
Professor of Physics
Head, Department of Sciences
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SALEM-636 005.

U19PPR105 PROBLEM SOLVING USING PYTHON PROGRAMMING 3 0 0 3
 (Common to ADS, IT, CSE, ECE, EEE, BME, MCT, AIML & CSD)

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.

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	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	3	1	1	2	2	1	3	3	3
CO2	3	3	3	3	3	2	1	1	1	1	1	3	3	3
CO3	3	3	3	3	3	3	2	1	1	1	1	3	3	3
CO4	3	3	3	3	3	2	2	1	1	2	1	3	3	3
CO5	3	3	3	3	3	3	3	1	1	1	1	3	3	3

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

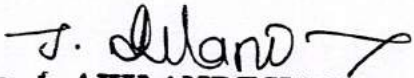
Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, input function, print function, Formatting numbers and strings, implicit/explicit type conversion.

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.


Dr. J. AKILANDESWARI
 PROFESSOR & HEAD
 Department of Information Technology
 SONA COLLEGE OF TECHNOLOGY
 SALEM - 636 005

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

1. Reema Thareja, "Problem Solving and Programming with Python", Oxford University Press, 2018.
2. 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

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


Dr. J. AKILANDESWARI
PROFESSOR & HEAD
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SONA COLLEGE OF TECHNOLOGY
SALEM - 636 005

(Common to CSE, IT and AI&DS Branches)

Course Outcomes:

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

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

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	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO2	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO3	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO4	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO5	2	2	1	1	1	2	1	-	2	2	2	2	1	1

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.

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.



Dr. S. PADMA, M.E., Ph.D
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U19BEEL113A BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

L T P C
0 0 2 1

(Common to CSE, IT and AI&DS Branches)


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

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

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	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	1	1	1	2	2	2	2	1	1
CO2	2	2	2	2	2	1	1	1	2	2	2	2	1	1
CO3	2	2	2	2	2	1	1	1	2	2	2	2	1	1

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.


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 Department of EEE,
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Total: 30 Hours

U19PCL108B	PHYSICS AND CHEMISTRY LABORATORY [For CSE & MCT]	L	T	P	C
		0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

- CO1:** Apply the principles of Optics, Thermal Physics, Electricity and Elasticity to determine the Engineering properties of materials.
- CO2:** Identify hardness and suggest the quality of water suitable for domestic purpose and analyze the concentration of carbonate, bicarbonate and hydroxide present in the given sample of water.
- CO3:** Determine the resistivity of the given copper turn used for house hold applications and determine the amount of pH of house hold water sample and suggest the remedial measures.

Pre-requisite: Capable of using Screw guage, Vernier calliper, Travelling microscope and Spectrometer

CO/PO, PSO Mapping

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

Programme Outcomes (POs) and Programme Specific Outcome (PSOs)

COs	PO1	PO 2	P O3	PO 4	PO 5	PO 6	PO 7	PO 8	P09	PO1 0	PO1 1	PO12	PSO1	PSO2
	CO1	3			1		1					1		
CO2	3			1		1					1			2
CO3	3			1		1					1			2

Course Assessment methods

Direct

Indirect

Mean of 1st half of Experiment (10)

Quiz on 2nd half (5)

Course end

Quiz on 1 st half (5)	Internal test II (10)	survey
Internal test I (10)	RTPS (10)	
Mean of 2 nd half of Experiment (10)	End semester Examination (40)	

List of Experiments (Physics part) (Any five experiments from the below list)

1	Determination of velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
2	Determination of dispersive power of the prism for various pairs of colors in the mercury spectrum using a spectrometer.
3	Determination of laser wavelength, particle size of lycopodium powder, acceptance angle and numerical aperture of an optical fibre using diode laser.
4	Determination of specific resistance of a given wire using Carey Foster's bridge.
5	Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.
6	Determination of band gap of the given semiconductor diode.

List of Experiments (Chemistry part) (Any five experiments from the below list)

7	Estimation of hardness of water sample by EDTA method.
8	Estimation of alkalinity of water sample by indicator method.
9	Estimation of HCl by pH metry.
10	Estimation of HCl by conductometry. (HCl vs NaOH)
11	Estimation of ferrous ion by potentiometric titration.
12	Evaluate the iron content of the water by spectrophotometry.
Total Hours: 30 Hrs	


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 HOD / Sciences
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1 Jan
2018

Semester-I U19GE101	Basic Aptitude – I (Common to All Departments)	L	T	P	C	Marks
		0	0	2	0	100
Course Outcomes U19GE101						
At the end of the course the student 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:					
	<ul style="list-style-type: none"> a. Numbers – HCF & LCM b. Decimal fractions c. Simplification d. Square roots & cube roots e. Surds & indices f. Ratio and proportion g. Averages h. Area and volume i. Coding and decoding & artificial language 					
2. Verbal Aptitude	Demonstrating plain English language skills with reference to the following topics:					
	<ul style="list-style-type: none"> a. Synonyms b. Antonyms c. Verbal analogy d. Editing passages e. Sentence filler words 					

30 hours

S. Anita
Dr.S.Anita

Head/Training

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

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

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	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2	1		1	2	2	1	2	3	3
CO2	3	3	3	3	2	2		1	2	2	1	2	3	3
CO3	3	3	3	3	2	2		1	2	2	1	3	3	3

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

J. Akilandeswar
Dr. J. AKILANDESWAR
PROFESSOR & HEAD
 Department of Information Technology

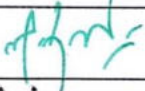


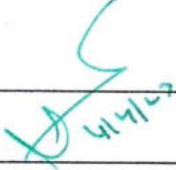
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Sona College of Technology, Salem – 636 005
(An Autonomous Institution)
Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)
Branch: Computer Science and Engineering

S.No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19TAM201	தமிழர் மரபு / Heritage of Tamils	1	0	0	1	HSMC	15
2	U19ENG201B	English for Engineers-II	1	0	2	2	HSMC	45 (15L+30P)
3	U19MAT202B	Discrete Mathematics	3	1	0	4	BSC	60
4	U19PHY203A	Material Science	2	0	0	2	BSC	30
5	U19CHE204A	Applied Chemistry -II	2	0	0	2	BSC	30
6	U19CS201	Programming in C	3	0	0	3	ESC	45
7	U19EGR206A	Engineering Graphics	2	0	2	3	ESC	60 (30L+30P)
Practical								
8	U19WPL212	Workshop Practice	0	0	2	1	ESC	30
9	U19CS202	C Programming Laboratory	0	0	2	1	ESC	30
10	U19GE201	Basic Aptitude - II	0	0	2	0	EEC	30
Total Credits						19		
Optional Language Elective*								
11	U19OLE1201	French	0	0	2	1	HSMC	30
12	U19OLE1202	German						
13	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, Computer Science and Engineering BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. B. Sathiyabhama	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

Copy to:-HOD/Computer Science and Engineering, Second Semester BE CSE Students and Staff, COE

03.03.2023

B.E/B.Tech Regulations-2019

UNIT I LANGUAGE AND LITERATURE

3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE

3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS

3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS

3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

HOD

Dr. M.RENUGA,
Professor & Head,

Department of Humanities & Languages
Sona College of Technology,
SALEM - 636 005.

அலகு I மொழி மற்றும் இலக்கியம்:

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை:

3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளூர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாத்தஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்:

3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:

3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருளை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.



HOD

Dr. M. RENUGA,
Professor & Head,

Department of Humanities & Language
Sona College of Technology,
SALEM - 636 001.

U19ENG201B - English for Engineers – II
First year II semester
CSE

Course Outcome: At the end of 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.

	COURSE OUTCOMES	PROGRAMME OUTCOMES												Ps o1	Ps o2
		1	2	3	4	5	6	7	8	9	10	11	12		
1	Frame sentences correctly, both in written and spoken forms of language with accuracy and fluency	2	1	2	3	2	3	3	3	3	3	3	3	3	3
2	Develop and demonstrate listening skills for academic and professional purposes	2	2	2	3	2	3	3	3	3	3	3	3	3	3
3	Draw conclusions on explicit and implicit oral information	3	2	2	3	2	3	3	3	3	3	3	3	3	3
4	Develop effective reading skills and reinforce language skills required for using grammar and building vocabulary	3	3	2	3	2	3	3	3	3	3	3	3	3	3
5	Read for gathering and understanding information, following directions and giving responses.	3	3	2	3	2	3	3	3	3	3	3	3	3	3

UNIT –I

9

- 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

9

- 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

9

- 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

9

- 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

9

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

(Theory: 15 hours: Practical: 30 hours) TOTAL: 45 hours

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

Textbook:

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.

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.



HOD

Dr. M. RENUGA,
Professor & Head,
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Jona College of Technology,
SALEM - 636 005.

B. E. / COMPUTER SCIENCE AND ENGINEERING

SEMESTER – II	DISCRETE MATHEMATICS	L	T	P	C
U19MAT202B		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. interpret and analyze the ordered structure using the concepts of relations and lattices.
4. produce an output for each input in computer programming and Turing machine.
5. apply the concepts of group theory in the field of coding theory and cryptography.

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)												PSO1	PSO2	PSO3	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12				
CO1	3	3		3	2								2	2		2
CO2	3	3		3	2								2	2		2
CO3	3	3		3	2								2	2		2
CO4	3	3		3	2								2	2		2
CO5	3	3		3	2								2	2		2

UNIT – I PROPOSITIONAL CALCULUS

12

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautology and contradiction – Contrapositive – Logical equivalences and implications – De Morgan's laws – Normal forms – Principal conjunctive and disjunctive normal form – 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 – Implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

UNIT – III 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 – IV FUNCTIONS

12

Definition – Classification – Types of functions – Examples – Compositions of functions – Inverse functions – Characteristic function of a set – Permutation functions.

UNIT – V GROUPS AND GROUP CODES

12

Algebraic systems – Groups – Cyclic groups – Subgroups – Group homomorphism – Cosets – Lagrange's theorem – Normal subgroups – Rings (Definition and examples only) – Codes and group codes – Basic notions of error detection and error correction.

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

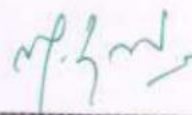
1. T. Veerarajan, "Discrete Mathematics", McGraw Hill Publishers, 1st Edition, 21st Reprint, 2015.

REFERENCE BOOKS:

1. J. P. Tremblay and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill Publishers, 1st Edition, 2017.
2. K. H. Rosen, "Discrete Mathematics and Its Applications", McGraw Hill Publishers, 8th Edition, 2019.
3. B. Kolman, R. C. Busby and S. C. Ross, "Discrete Mathematical Structures", Pearson Publishers, 6th Edition, 2006.



Prof. S. JAYABHARATHI
Head / Department of Mathematics
Sona College of Technology
Salem – 636 005



Dr. M. RENUGA
BoS - Chairperson
Science and Humanities
Sona College of Technology
Salem – 636 005

10. 05. 2019

B. E. / B. Tech. Regulations 2019

Course Code:
Course Name:

U19PHY203A
MATERIALS SCIENCE

L T P C
2 0 0 2 100

(for Computer Science and Engineering)

COURSE OUTCOMES:

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

- CO1** Differentiate the electrical and thermal conductivity of metals.
CO2 Elucidate the classification and theory of semiconducting materials.
CO3 Distinguish the types of Magnetic materials.
CO4 Explain the Optical data storage techniques.
CO5 Discuss the novel properties of metallic glasses and nanomaterials.

CO / PO, PSO Mapping														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-2	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-3	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-4	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-5	3	2	-	-	-	-	-	-	-	-	2	2	-	3

Unit 1 Conducting materials

6

Classical free electron theory of metals - Postulates of classical free electron theory - Electrical conductivity - definition and expression for electrical conductivity - thermal conductivity - definition and expression for thermal conductivity - Wiedemann - Franz law and Lorentz number.

Quantum free electron theory - Drawbacks of quantum free electron theory - origin of energy bands - Fermi energy and Fermi distribution function - Effect of temperature on Fermi function - Density of energy states - carrier concentration in metals.

Unit 2 Semiconducting Materials

6

Intrinsic semiconductor - 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 (no derivation) - 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.

Unit 3 Magnetic materials**6**

Basic definitions - Magnetic moment - Magnetic field - Magnetic field intensity - Magnetic permeability - Magnetization - Intensity of magnetization - Magnetic susceptibility.

Types of magnetic materials - Dia , Para , and Ferromagnetic materials - Domain theory and origin of domains – Anti ferromagnetic materials - Ferrimagnetic materials or Ferrites - Structure, properties and applications - hysteresis - Hard and soft magnetic materials.

Unit 4 Optoelectronic devices and Optical data storage techniques**6**

Optoelectronic devices - LED - Organic LED - Polymer light emitting materials - Plasma light emitting devices - LCD - Laser diodes.

Optical data storage techniques - DVD - Blue ray disc - Holographic data storage.

Unit 5 New Engineering Materials:**6**

Metallic glasses -Preparation, properties and applications.

Nanoscience and Nanotechnology - Significance of nanoscale - different types of nanostructures (0-D, 1-D, 2-D and 3-D) - Fabrication of nanomaterials - Ball milling and Chemical vapour deposition technique (CVD).

Carbon nanotubes - structure - properties and applications - fabrication - pulsed laser deposition method.

Lecture: 30, Tutorial: 00, Total: 30 Hours**Text Book:**

1. M.N.Avadhanulu, ‘Engineering Physics’ S.Chand &Company Ltd, New Delhi (2015)
2. B. K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning India Pvt. Ltd., Delhi, 2012.

References:

1. Shanthi C, ‘Physics of materials’ Sonaversity , Sona College of Technology, Salem (Revised Edition 2016).

2. Rajendran, V, and Marikani A, 'Materials science' TMH Publications, (2004) New Delhi.
3. Palanisamy P.K, 'Materials science', SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)
4. M. Arumugam, 'Materials Science' Anuradha Publications, Kumbakonam, (2006).

C. Shanthi
30.6.2022

Dr. C. Shanthi
HOD / Science

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
Professor of Physics
Head, Department of Sciences
Sona College of Technology (Autonomous)
SALEM-636 005.

II SEMESTER (CSE)

COURSE CODE U19CHE204A

L T P C

COURSE NAME APPLIED CHEMISTRY-II

2 0 0 2

Course outcome:

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

- CO1** Analyze the characteristics, conducting mechanism, synthesis and applications of conducting polymers.
- CO2** Describe the construction, working principle and applications of energy storage devices for electronic appliances.
- CO3** Discuss the principles, advantages and applications of organic electronic materials in electronic devices.
- CO4** Explain the electrochemical processes carried out in electronic industries.
- CO5** Outline the principles and applications of photochemistry and spectroscopy.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO - 1	3	2												2
CO - 2	3	2												2
CO - 3	3	2												2
CO - 4	3	2												2
CO - 5	3	2												2

UNIT I CONDUCTING POLYMERS

6

Introduction - Structural characteristics and doping concept in metals and metal oxide nanoparticles - Charge carriers and conducting mechanism - Classification of conducting polymers: Intrinsic and extrinsic conducting polymers - Synthesis of conducting polymers - bulk and solution polymerization - Applications of conducting polymers in corrosion protection and sensors.

UNIT II MODERN ENERGY DEVICES FOR ELECTRONIC APPLIANCES

6

Reversible and Irreversible Cells - Batteries - Types of Batteries - Battery Characteristics- Voltage - Current - Capacity - Electricity Storage Density - Power - Discharge Rate - Cycle Life - Energy Efficiency and Shelf Life - Fabrication and Working of Alkaline Battery - Lead-Acid Battery - Ni-Cd - Lithium Ion Batteries and Solar cells - Hydrogen oxygen Fuel Cells.

UNIT III CHEMISTRY OF ORGANIC ELECTRONIC MATERIALS

6

Organic semiconducting materials – working principle and advantages over inorganic semiconducting materials - p-type and n-type organic semiconducting materials - Pentacene Fullerenes-C-60 – Organic dielectric material – Definition - Working principle and examples - Polystyrene – PMMA – Organic Light Emitting Diodes (Oleds) – Construction - Working principle and applications = Organic transistors – Construction - Working principle and applications in electronic Industries.

UNIT IV ELECTROCHEMICAL PROCESSES IN ELECTRONIC INDUSTRIES **6**

Electroplating – Principle and process - Plating parameters - Current and energy efficiency - Electroplating of nickel - Fundamentals of electroless deposition – Electroless plating of nickel - fabrication of PCB's - Electrochemical etching of copper from PCBs - Anodizing - Definition, principle and working methodology of aluminium anodizing - Chemical sensors - Optical and heat sensors – definitions and applications.

UNIT V PHOTOCHEMISTRY AND SPECTROSCOPY **6**

Photochemistry: Laws of photochemistry - Grotthuss-Draper law, Stark-Einstein law and Lambert-Beer Law. Quantum efficiency – Determination - Photo processes - Fluorescence, Phosphorescence, Chemiluminescence and Photo-sensitization. Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. UV-Visible and IR spectroscopy – Principles, instrumentation (Block diagram only) and applications.

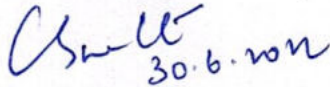
TOTAL: 30 HOURS

Text Books :

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi , 2010.
2. T. Maruthavanan et al., "Applied Chemistry-II", Sonaversity, Sona College of Technology, Salem, 2019.

Reference Books :

1. B. Sivasankar, "Engineering Chemistry", Tata McGraw-Hill Pub. Co. Ltd., New Delhi (2008).
2. Electroplating, Anodizing and Metal treatment", Hand book, NIIR board, 2004.
3. Hagen Klauk, "Organic Electronics: Materials, Manufacturing and Applications", Wiley-VCH, 2006.
4. Douglas A Skoog, Donald M West, James Holler F Stanley, R Crouch, " Fundamentals Of Analytical Chemistry", Thomson learning, 2006.


Dr. C. Shanthi
HOD / Sciences
Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
Professor of Physics
Head, Department of Sciences
Sona College of Technology (Autonomous)

30.06.2022

B.E. / B.Tech. Regulations 2019

Course Outcomes

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

- Write simple C programs using console input and output functions
- Write C programs using arrays, decision making and looping statements
- Design and develop simple application using functions and pointers.
- Design and develop real-time applications using structures and unions
- Design and develop real-time applications using file operation

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)															
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	2	3	2	2	2	1	2	1	2	2	3	3	2	3
CO 2	2	2	3	2	2	1	1	2	1	2	2	3	2	2	3
CO 3	2	3	3	2	2	1	1	2	1	2	2	3	3	2	3
CO 4	2	3	3	2	2	1	1	2	1	2	1	3	3	2	3
CO 5	2	3	3	2	2	2	1	2	1	2	2	3	3	2	3

UNIT I C PROGRAMMING BASICS

9

Structure of 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. Unformatted and formatted Input/Output functions, pre-processor directives and storage classes.

UNIT II CONTROL STATEMENTS, ARRAYS AND STRING

9

Conditional statements, Unconditional 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 – Pointers and Functions - Dynamic memory Allocation - Example Programs.


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 Dept. of Computer Science and Engineering
 SONA COLLEGE OF TECHNOLOGY
 SALEM - 636 005

UNIT IV STRUCTURES AND UNIONS

9

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

UNIT V FILE MANIPULATIONS

9

Files-File operations- Binary files and text files – Types of File processing-Sequential access -Random Access File - Command line arguments.

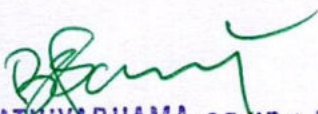
TOTAL: 45 Hours

TEXT BOOKS

1. Deitel and Deitel, “C How to Program”, Pearson Education, New Delhi, 2011.
2. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 14th edition, 2016.

REFERENCES

1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006.
2. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
4. E. Balagurusamy, “Programming in ANSI C”, seventh edition, Tata McGraw Hill, 2016.


Dr.B. SATHIYABHAMA, B.E.,M.Tech.,Ph.D.
PROFESSOR & HEAD,
Dept. of Computer Science and Engineering
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U19EGR206A – ENGINEERING GRAPHICS

L T P C
2 0 2 3

Course Outcomes: Upon completion of this course the students will be able to

- CO1** Predict the construction of various curves in civil elevation, plan and machine components.
- CO2** Analyze the principles of projection of various planes by different angle to project points, lines and planes.
- CO3** Draw the principles of projection of simple solid by the axis is inclined to one reference plane by change of position method.
- CO4** Understand the interior details of complex components, machineries by sectioning the solid body. Study the development of surfaces for prisms and pyramids.
- CO5** Draw the projection of three dimensional objects representation of machine structure and explain standards of orthographic views by different methods.

CO / PO, PSO Mapping														
<i>(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</i>														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	1	1	1	1	3	2	2	3	2	2
CO2	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO3	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO4	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO5	3	2	2	1	1	1	1	1	3	2	2	3	2	2

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. Jolhe, 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), SubhasPublications, 1998.
4. Bertoline & Wiebe fundamentals of graphics communication III edition McGrawhill 2002



Dr. D. SENTHIL KUMAR, M.E., Ph.D
PROFESSOR & HEAD
DEPT. OF MECHANICAL ENGG.
SONA COLLEGE OF TECHNOLOGY
JUNCTION MAIN ROAD, SALEM-5.

U19WPL212 - WORKSHOP PRACTICE

L T P C
0 0 2 1

Course Outcomes: Upon completion of this course the students will be able to

- CO1:** Familiarize with the basic of tools and equipment's used in fitting, carpentry, welding and sheet metal.
- CO2:** Fabricate the different simple products in above trades.
- CO3:** Produce different joining of metals.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	3	2	1	3	3	2	3	2	3	3	2	2
CO 2	3	2	3	2	1	3	3	2	3	2	3	3	2	2
CO 3	3	2	3	2	1	3	3	2	3	2	3	3	2	2

LIST OF EXPERIMENTS

SECTION 1: FITTING

Tools and Equipment's- Practice in filling.
Making of Vee joint and square (T-fitting) joint.

SECTION 2: SHEET METAL

Tools and Equipment's- Practice
Making of Dust Pan and Funnel.

SECTION 3: WELDING

Tools and Equipment's – Practice
Arc welding of Butt joint and Lap Joint.

SECTION 4: CARPENTRY

Tools and Equipment's- Planning Practice
Making of Half Lap joint and Dovetail Joint.

TOTAL: 30 hours

Course Outcomes:

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

1. design and develop simple programs using branching, looping statements
2. develop programs using functions, arrays, structures and string handling
3. write programs using pointers and dynamic memory allocation and file handling

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)															
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	3	3	3	3	1	1	1	1	2	2	3	3	2	3
CO 2	2	3	3	3	2	1	1	1	2	1	2	3	3	2	3
CO 3	2	3	3	3	2	1	3	3	3	3	3	3	3	2	3

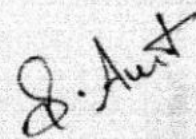
List of Experiments

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 Arrays
6. Programs using Structures
7. Programs using Strings
8. Programs using Pointers (both data pointers and function pointers)
9. Programs using dynamic memory allocation
10. Programs using Recursion
11. Programs using Files
12. Develop a Mini Project for real time application

TOTAL: 30 Hours


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 Dept. of Computer Science and Engineering
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 SALEM - 636 005

Semester-II	Basic Aptitude – II - U19GE201 (Common to All Departments)	L T P C Marks 0 0 2 0 100
Course Outcomes		
At the end of the course the student will be able to:		
1. Solve more elaborate problems than those in BA-I* in specific areas of quantitative aptitude		
2. Solve problems of greater intricacy than those in BA-I in stated areas of logical reasoning		
3. Demonstrate higher than BA-I level verbal aptitude skills in English with regard to specific topics		
1. Quantitative Aptitude and Logical Reasoning	Solving quantitative aptitude and logical reasoning problems with reference to the following topics: <ol style="list-style-type: none"> a. Profit & loss b. Partnership c. Chain rule d. Numbers e. Ages f. Percentages g. Logarithms h. Geometry i. Direction sense j. Symbols and series 	
2.. Verbal Aptitude	Demonstrating verbal aptitude skills in English with reference to the following topics: <ol style="list-style-type: none"> 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 	



Dr.S.Anita

Head/Training

Dr. S. ANITA

*Professor and Head
Department of Training,*

**SONA COLLEGE OF TECHNOLOGY,
SALEM - 636 005.**

French Language A1 Level 2/A2
First year II semester

Course code: U19OLE1201

0 0 2 1

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

1. Accept and refuse of an invitation, give some instruction of do's and don'ts, converse in commercial centres, write an invitation
2. Describe a city, locate a place in a city, ask further details, describe one's hometown
3. Talk about things around us, recite a past event, identify sign boards, express agree and disagree, express obligation and prohibition, sell an object in online
4. Talk about one's goals, express one's feelings, write a list of things to do, express an opinion, talk about weather, draft a mail response
5. Express one's interest and wish, describe a pet animal, express one's aversions, encourage others, write to ask for a help, narrate a past event, write a biography

Unit-I Gouter à la campagne

6 hours

Hr 2: City shopping and services, conjugation: payer, manger and acheter, negative sentence

Hr 4: Imperative sentence, food and beverages, utensils, cutleries, corckeries

Hr 6: Quantitative articles, quantities, pronoun 'en', express appreciation, write an invitation

Unit-II Voyager dans sa ville

6 hours

Hr 8: City and localities, Conjugation: prendre, adjectives of place, pronoun 'y'

Hr 10: Transport, leisure activities, preposition of place, degrees of comparison

Hr 12: Asking information about a new place, describe a city

Unit-III Faire du neuf avec du vieux

6 hours

Hr 14: Things in a store, conjugation : faire, imparfait 2, passé composé

Hr 16: Things in a repairing shop, computer, relative pronouns: que and qui

Hr 18: Imperative negative, express obligation and interdiction, online sale and response

Unit-IV Changer d'air

6 hours

Hr 20: Professions, conjugation: croire, voir, recent past tense

Hr 22: Traveling formalities, expressing about health condition, future tense

Hr 24: Pronoun COD, talk about weather condition, write about one's plans and projections

Unit-V Devenir éco-citoyen

6 hours

Hr 26: Citizenship and solidarity, conjugation: connaitre and savoir, depuis vs pendant

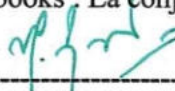
Hr 28: Imparfait vs passé composé, nature and environment, indirect pronouns COI

Hr 30: Animals, conditional, talk on supporting others, write a biography

Total : 30 hours

Text Books

1. The course faculty will provide relevant audios, videos, handouts and notes.
2. Books : Saison (Méthode de français, cahier d'activités)
3. Reference books : La conjugaison, Dondon, Echo



Dr. M. Renuga
BoS – Chairperson,
Science & Humanities
HOD / H&L

Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 001.

German Language Course

First year II semester

Course Code: U19OLE1202

L T P C
0 0 2 1

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

1. Use grammatical expressions appropriately in day-to-day conversation.
2. Make them frame simple sentences /questions.
3. Accentuate to start and sustain basic conversation
4. Helps them articulate thoughts in German
5. Identify the different forms of the verb.

UNIT – I 6

- Nominative/accusative case, adjectives

UNIT – II 6

- Modes of transportation, orientation, giving/understanding simple directions

UNIT – III 6

- Food and beverages, Modal verbs, Separable verbs

UNIT – IV 6

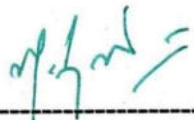
- Simple sentences using modal / separable verbs

UNIT – V 6

- Articles of clothing

Total : 30 hours

Text Book
Netzwerk A1


Dr. M. Renuga
BoS – Chairperson,
Science & Humanities
HOD / H&L

Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 001

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

- 1.0 Use verbs in polite conversation or for dissuasion and describe two different activities
- 2.0 Demonstrate the application of causative verbs and those that express ability or possibility, and describe experiences
- 3.0 Use plain-style expressions, those that state opinions, and verbs and adjectives that go with nouns
- 4.0 Express sentences that use ‘when’ and ‘if’ and those that describe how services are given and received
- 5.0 Read 126 letters of Kanji, and demonstrate adequate knowledge of the lessons learnt in Levels I and II to pass the Japanese Language Proficiency Test (JLPT) for the N5 Level

Unit-I

6 hours

Hr 1-2: Words and verbs expressing requests / Kanji 1-10

Hr 3-4: Asking for permission; making statements to prohibit something / Kanji 11-20

Hr 5-6: Describing two activities / Kanji 21-30

Unit-II

6 hours

Hr 7-8: Verbs that express ‘I have to ...’ / Kanji 31-40

Hr 9-10: Verbs which express ability or possibility / Kanji 41-50

Hr 11-12: Describing experience / Kanji 51-60

Unit-III

6 hours

Hr 13-14: Plain-style expressions / Kanji 61-70

Hr 15-16: Expressions like ‘I think that ...’ / Kanji 71-80

Hr 17-18: Qualifying nouns with verbs and adjectives / Kanji 81-90

Unit-IV

6 hours

Hr 19-20: Expressions using ‘When ...’ / Kanji 91-100

Hr 21-22: Describing the giving and receiving of services / Kanji 101-110

Hr 23-24: Expressions using ‘If ...’ / Kanji 111-126

Unit-V

6 hours

Hr 25-26: Preparing for JLPT N5

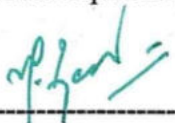
Hr 27-28: Preparing for JLPT N5

Hr 29-30: Preparing for JLPT N5

Total : 30 hours

Text Books

1. The course faculty will provide handouts / notes / course material.
2. Books on Basic Japanese language available in the college library.



Dr. M. Renuga
BoS – Chairperson,
Science & Humanities
HOD / H&L


Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 005.

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

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hour
Theory							
1	U19MAT301B	Probability and Statistics	3	1	0	4	60
2	U19CS301	Data Structures	3	0	0	3	45
3	U19CS302	Computer Architecture	3	0	0	3	45
4	U19CS303	Computer and Information Ethics	3	0	0	3	45
5	U19CS304	Object Oriented Programming	3	0	0	3	45
6	U19EC306	Communication Systems	3	0	0	3	45
7	U19TAM301	தமிழ்நரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	1	15
8	U19GE302	Mandatory Course : Environment and Climate Science	2	0	0	0	30
Practical							
9	U19CS305	Data Structures Laboratory	0	0	4	2	60
10	U19CS306	Object Oriented Programming Laboratory	0	0	4	2	60
11	U19GE301	Soft Skills and Aptitude- I	0	0	2	1	30
Total Credits						25	

Approved By


Chairperson, Computer Science and Engineering BoS
Dr.B.Sathiyabhama


Member Secretary, Academic Council
Dr.R.Shivakumar


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

Copy to:-

HOD/Computer Science and Engineering, Third Semester BE CSE Students and Staff, COE

B. E / COMPUTER SCIENCE AND ENGINEERING

SEMESTER – III	PROBABILITY AND STATISTICS	L	T	P	C
UI9MAT301B		3	1	0	4

COURSE OUTCOMES

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

1. apply the concepts of measures 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.

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)												PSO1	PSO2	PSO3
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12			
CO1	3	3		3	2							2	2		2
CO2	3	3		3	2							2	2		2
CO3	3	3		3	2							2	2		2
CO4	3	3		3	2							2	2		2
CO5	3	3		3	2							2	2		2

UNIT – I BASIC STATISTICS

12

Measures of central tendency (simple arithmetic mean, median, mode) – Quartiles – 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 THEORETICAL DISTRIBUTIONS

12

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

UNIT – IV TWO DIMENSIONAL RANDOM VARIABLES

12

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

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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 - tests for independence of attributes and goodness of fit and F distribution.

Theory: 45 Hours

Tutorial: 15 Hours

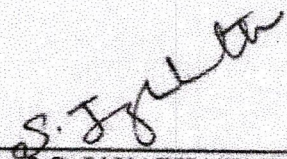
Total: 60 Hours

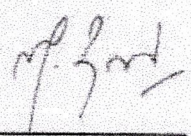
TEXT BOOKS:

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

REFERENCE BOOKS:

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 – Volume I", Wiley Publishers, 3rd Edition, 2008.
5. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.


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BoS - Chairperson
Science and Humanities
Sona College of Technology
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20. 05. 2020

B. E. / B. Tech. Regulations 2019


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Course Outcomes

Upon completion of this course the students will be able to

- CO1** Describe the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.
- CO2** Illustrate the concepts of an ecosystem and provide an overview of biodiversity and its conservation.
- CO3** Analyze the causes, effects of various environmental pollution and their appropriate remedial measures.
- CO4** Provide solutions to combat environmental issues like global warming, acid Rain, ozone layer depletion
- CO5** Analyze the effect of climate change in various sectors and their remedial measures.

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..

UNIT IV FUNDAMENTALS OF CLIMATE CHANGE 6

Sustainable Development- - Climate Change-Causes and effects of Global Warming - Effect of global warming in food supply, plants, sea, coralreef, 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 pollutionCase study - CNG vehicles in Delhi

UNIT V EFFECT OF CLIMATE CHANGE

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 PERIODS

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.

Reference Books:

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. ErachBharucha, "Textbook of Environmental Studies for Undergraduate Courses", 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad – 500029.

Dr.M.Raja
Course Coordinator/EVS

Dr.C.Shanthi
HOD/ Sciences


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COURSE OUTCOMES

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

- Implement abstract data types for linear data structures
- Solve real world problems using stack and queue linear data structures
- Apply various non-linear tree data structures in real time applications
- Design algorithms to solve common graph problems
- Analyze various searching, sorting and hashing techniques

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	DATA STRUCTURES														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	1	1	1	1	1	3	1	3	2	3
CO2	2	2	1	2	3	2	2	1	2	1	1	2	3	2	2
CO3	3	2	3	1	3	1	1	1	2	1	2	1	2	2	3
CO4	2	3	3	3	3	1	2	2	1	1	2	1	2	2	2
CO5	2	2	1	2	2	1	2	2	1	1	1	2	3	1	2

UNIT I LINEAR DATA STRUCTURES – LIST

9

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation - Singly linked lists - Circularly linked lists - Doubly-linked lists – Applications of lists – Polynomial Manipulation.

UNIT II LINEAR DATA STRUCTURES – STACKS, QUEUES

9

Stack ADT – Operations – Applications – Evaluating arithmetic expressions - Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – Double ended queue – Applications of queues.

UNIT III NON LINEAR DATA STRUCTURES – TREES

9

Trees – Traversals – Binary Trees – Expression trees – Applications of trees – Binary search trees - AVL Trees – B-Tree – Heap – Applications of heap -Tries.

UNIT IV NON LINEAR DATA STRUCTURES – GRAPHS

9

Graphs - Representation of graph – Graph traversals – Breadth-first traversal – Depth-first traversal – Minimum Spanning Trees: Prim's algorithm, Kruskal's algorithm – Shortest path algorithms: Dijkstra's algorithm, Floyd Warshall algorithm - Applications of Graphs: Topological Sort.

UNIT V SEARCHING, SORTING AND HASHING TECHNIQUES

9

Searching - Linear Search – Binary Search, Sorting – Bubble sort – Selection sort – Insertion sort – Merge sort, Hashing - Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.



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TEXT BOOKS

1. Mark Allen Weiss, "Data structures and Algorithm Analysis in C", Pearson Education, New Delhi, Second Edition, 2012.

REFERENCES

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest , Clifford Stein, "Introduction to Algorithms" ,3rd Edition, MIT Press, 2010.
2. Jean Paul Tremblay and Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill Publishing Company, New Delhi, Second Edition, 2007.
3. Yedidyah Langsam, Moshe J Augenstein and Aaron M Tanenbaum, "Data Structures using C and C++", Prentice Hall of India/ Pearson Education, New Delhi, 2006.
4. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Silicon Press, New Jersey, Second Edition, 2005.



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COURSE OUTCOMES:

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

- Demonstrate the operational concepts of computers and classify instruction set architectures
- Identify the mechanism of control signals generation in Hardwired control and micro programmed control unit
- Apply the various arithmetic operations and discuss the design of ALU
- Evaluate the performance of a pipelined processors
- Analyze the various performance measures for memory and IoT.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	COMPUTER ARCHITECTURE														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2	1	1	2	2	2	2	3	3	3	2	2
CO2		3	3	3	1	1	3	2	3	3	2	1	3	2	2
CO3	2	3	3	3		2	2	1	3	1	2	2	2	2	2
CO4	2	3	3	3	3	1	1	2	3	1	2	3	3	2	2
CO5		2	3	2	2	1	1	1	2	2	2	2	2	2	2

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Instructions and instruction sequencing – Hardware – Software Interface – Translation from a high level language to the Hardware language-Instruction set architecture – Styles and features-Addressing modes – RISC – CISC- Amdhal's law- Performance and metrics.

UNIT II BASIC PROCESSING UNIT 9

Components of the processor-Data path and control- Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control.

UNIT III ARITHMETIC FOR COMPUTERS 9

Signed and Unsigned number representations - Arithmetic operations: Addition and Subtraction – Fast Adders – Binary Multiplication – Booth algorithm-Binary Division – Floating Point Numbers – Representation and operations.



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UNIT IV PIPELINING

9

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

UNIT V MEMORY AND I/O

9

Need for a hierarchical memory system – Types and characteristics of memories – Cache memories – Improving cache performance – Virtual memory – Memory management techniques - Accessing I/O devices – Programmed Input/Output – Interrupts – Direct Memory Access – Need for Standard I/O Interfaces like PCI, SCSI, USB.

TOTAL: 45 hours**TEXT BOOK:**

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2002.

REFERENCES

1. John L. Hennessey and David A. Patterson, “Computer Architecture – A Quantitative Approach”, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 2003.
3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.
4. V.P. Heuring, H.F. Jordan, “Computer Systems Design and Architecture”, Second Edition, Pearson Education

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COURSE OUTCOMES

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

- Identify the core values that mold the ethical behavior of an IT engineer
- Describe the ethical principles that should be followed by all the stake holders of IT
- Analyze the ethical issues related to freedom of expression
- Describe the intellectual property rights and biometric technologies
- Exercise the ethical principles that should be followed while handling advance computer technologies

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	COMPUTER AND INFORMATION ETHICS														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	1	3	1	3	2	2	3	3	2	2	2
CO2	2	3	3	3	1	2	3	3	3	3	3	3	3	3	2
CO3	2	3	3	2	3	2	3	3	3	3	3	3	3	1	2
CO4	2	3	3	1	2	2	3	3	3	3	1	3	3	1	2
CO5	2	3	3	2	1	3	3	3	3	2	3	3	3	1	2

UNIT I INTRODUCTION

9

Introduction - Ethics in the Business World - Including Ethical Considerations in Decision Making - Ethics in Information Technology - IT Security Incidents - Implementing Trustworthy Computing

UNIT II ETHICS IN INFORMATION TECHNOLOGY

9

Ethics for IT Professionals – Ethics for IT Users - Ethics for IT Organizations - The Impact of IT on the Standard of Living and Worker Productivity - The Impact of IT on HealthCare Costs

UNIT III FREEDOM OF EXPRESSION

9

Introduction – Anonymity – Security – Privacy - Ethical and Legal Framework for Information - Social Context of Computing

UNIT IV INTELLECTUAL PROPERTY RIGHTS

9

Introduction – Copyrights – Patents - Trade Secrets - Key Intellectual Property Issues - Biometric Technologies Ethics: Introduction and Definitions - The Biometric Authentication Process - Biometric System Components - Types of Biometric Technologies - Ethical Implications of Biometric Technologies - The Future of Biometrics

UNIT V COMPUTER CRIMES AND NEW FRONTIERS FOR COMPUTER ETHICS

9

Computer Crimes: Introduction - History of Computer Crimes - Types of Computer System Attacks - Motives of Computer Crimes - Costs and Social Consequences - Computer Crime Prevention Strategies - New Frontiers for Computer Ethics: Artificial Intelligence – Cyberspace - Social Network Ecosystems - Mobile Systems

TOTAL HOURS: 45

TEXT BOOKS:

1. George W. Reynolds, "Ethics in Information Technology", Fifth Edition, Cengage Learning, 2014.
2. Joseph Migga Kizza, "Ethical and Social Issues in the Information Age", Fifth Edition, Springer, 2013.

REFERENCE BOOKS:

1. Gerard Ian Prudhomme, "The Handbook of Information and Computer Ethics", First edition, Arcler Education Inc, 2016.
2. Luciano Floridi, "The Cambridge Handbook of Information and Computer Ethics" , First edition, Cambridge University Press, 2010.
3. Kenneth E. Himma and Herman T. Tavani, "The Handbook of Information and Computer Ethics", First Edition, Wiley-Blackwell, 2008.
4. Robert N. Barger, "Computer Ethics: A Case-based Approach", First edition, Cambridge University Press, 2008.
5. Deborah G. Johnson, "Computer Ethics (Occupational Ethics)", Second Edition, PHI, 1993

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COURSE OUTCOMES

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

- Analyze a problem and identify classes, objects and the relationships among them.
- Develop applications using various types of Inheritance and Interfaces.
- Develop applications or programs using polymorphism and multithreading.
- Analyze an application and make use of object oriented concepts for its implementation.
- Develop programs using collections, files and streams in java.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	OBJECT ORIENTED PROGRAMMING														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	1	2	2	3	3	3	3	2	2	3
CO2	3	3	3	3	3	2	2	3	2	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

UNIT I INTRODUCTION

7

Introduction to OOP– Object Oriented Programming Concepts - Java Fundamentals - Characteristics of Java - Data Types, Variables, and Arrays - Operators-Control Statements – Classes – Methods – access specifiers – static members - Constructors- Garbage Collection.

UNIT II INHERITANCE INTERFACES AND EXCEPTION HANDLING

10

Inheritance: Super classes- sub classes –Protected members – constructors in sub classes- the Object class – abstract classes and methods- final methods and classes – Interfaces: Defining an interface, Implementing interface, differences between classes and interfaces and extending interfaces - Exception Handling Fundamentals – Java’s Built-in Exceptions-Creating new Exception subclasses.

UNIT III POLYMORPHISM AND MULTITHREADING IN JAVA

10

Polymorphism- Abstract classes and methods-Overloading-Overriding-final methods and classes – Multithreaded programming –The Thread class and the Runnable Interface-Creating multiple threads-Synchronization.

UNIT IV STRING HANDLING AND COLLECTION FRAMEWORK

11

String Constructors-String Operations-Generic classes and methods-The Collection Framework Collections-List-ArrayList, Linked List, Set-HashSet, Linked HashSet, Queue-PriorityQueue, Map-HashMap, SortedMap, TreeMap.

UNIT V FILES AND STREAMS IN JAVA

7

Files and streams –Byte Stream-I/O Stream, File I/O Stream, ByteArray I/O Stream-Character Stream-File Reader and Writer, CharArrayReader and Writer-Serialization.

TOTAL: 45 HOURS

TEXT BOOKS

1. Herbert Schildt, “Java the Complete Reference”, Ninth edition Tata Mc Graw Hills, 2014.
2. Cay S. Horstmann, Gary Cornell, —Core Java Volume –I Fundamentals, 9th Edition, Prentice Hall, 2013.

REFERENCES

1. Paul Deitel and Harvey Deitel, —”Java How to Program (Early Objects)”, Tenth Edition, Pearson Prentice Hall 2014.
2. Timothy Budd, —”An Introduction to Object-Oriented Programming”, Third Edition, Pearson Education, 2008.
3. E.Balaguruswamy, “Programming with Java”, Second Edition, TMH, 2009

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COURSE OUTCOMES:

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

- Explain basics of communication systems and its working principles.
- Illustrate the generation and detection methods of various AM systems.
- Describe the transmission and demodulation methods of angle modulation systems
- Examine the fundamentals of analog and digital pulse modulation methods.
- Summarize the principles of spread spectrum methods, satellite and cellular mobile communication systems.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	COMMUNICATION SYSTEMS														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	1	2	2	3	3	1	3	2	2	3
CO2	3	3	2	3	3	2	2	3	2	3	3	3	3	2	2
CO3	3	3	3	3	3	1	2	3	3	3	2	3	3	2	2
CO4	3	3	3	3	3	1	1	2	3	1	3	3	3	2	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2

UNIT I FUNDAMENTALS OF COMMUNICATION SYSTEMS

9

Basic elements of a communication systems- Modulation and demodulation- Need for modulation-types of modulation - Radio Communication spectrum-Types of signals-analog and digital- Concept of Frequency spectrum and bandwidth-Channel and noise- Types of noise- SNR-Merits and demerits of analog communication systems.

UNIT II AMPLITUDE MODULATION SYSTEMS

9

Principles of amplitude modulation-waveforms- Modulation index- Bandwidth and Power relations in AM- Types of AM - Generation and detection methods-Comparison of various AM systems- AM Transmitters, super-heterodyne radio receivers.

UNIT III ANGLE MODULATION SYSTEMS

9

Phase and Frequency modulation-waveforms- Frequency analysis of angle modulated waves-Bandwidth requirement of FM-Types of FM- NBFM and WBFM -Direct method and Indirect method of FM generation- FM receivers-Comparison between AM and FM.

UNIT IV PULSE MODULATION SYSTEMS AND DATA TRANSMISSION

9

Digital communication systems-Sampling theorem- Analog pulse modulation: PAM, PWM,PPM- Digital Pulse modulation: PCM, DM, ADM- transmitter and receiver- Pass band data transmission- ASK, FSK, PSK- Generation and detection-Performance comparison between different digital modulation methods.

UNIT V ADVANCED COMMUNICATION SYSTEMS

9

Spread Spectrum Techniques: Pseudo-noise sequence-Direct sequence spread spectrum - Frequency hopping spread spectrum-Satellite Communication systems: Uplink and downlink frequencies-Multiple Access techniques-FDMA,TDMA and CDMA- Mobile communication systems: Cellular concept and its fundamentals- Comparison between various mobile generation standards.

Total: 45 Hours

TEXT BOOKS

1. R.P. Singh and S.D. Sapre, "Communication Systems- Analog and Digital", Tata McGrawHill, 3rd Edition, 2014..
2. Wayne Tomasi, "Electronic Communication Systems", 6th edition, Pearson Education, 2015.

REFERENCES

1. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2016.
2. B.P.Lathi,"Modern Analog and Digital Communication systems", 3/e, Oxford University Press, 2011
3. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, PHI, 2012.
4. Sam Shanmugam "Digital and Analog Communication systems" John Wiley& Sons, 2014.



COURSE OUTCOMES:

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

- Design and develop simple programs using data structures
- Apply non-linear data structures for various real time applications
- Design shortest path algorithm for various real life applications

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	DATA STRUCTURES LABORATORY														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO2	2	3	1	2	3	2	1	3	2	2	1	2	3	2	2
CO3	3	2	3	1	3	1	2	2	2	1	2	1	3	2	3

LIST OF EXPERIMENTS

1. Implementation of Lists ,Stacks and Queues
2. Implementation of Binary Tree and Traversal Techniques
3. Implementation of Binary Search Trees
4. Implementation of AVL Trees
5. Implementation of B-trees
6. Implementation of graphs using BFS and DFS.
7. Implementation of Prim's algorithm.
8. Implementation of Kruskal's algorithm
9. Implementation of Dijkstra's algorithm
10. Implementation of Floyd's algorithm
11. Implementation of Hashing and Collision Resolution Technique.
12. Implementation of Heap
13. Implement the operations on Trie structure


TOTAL : 30 hours

COURSE OUTCOMES:

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

- Design and develop simple programs using OOPS concepts
- Apply thread and collection class for various real time applications
- Develop java program using IO streams and File class

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	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	1	2	2	3	3	3	3	2	2	3
CO2	3	3	3	3	3	2	2	3	2	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3

LIST OF EXPERIMENTS

1. Develop simple programs in java using classes and methods
2. Implement user defined Exception Handling
3. Implement method overloading and method overriding in Java
4. Develop java programs using inheritance and interfaces
5. Create Threads in java using Thread Class and Runnable Interface
6. Create an application using multiple threads
7. Develop programs using inbuilt methods of String class
8. Implement collections like List, Set, Queue, Map in Java
9. Implement Input streams and Output streams in Java
10. Develop java programs to access and perform various operations in file content
11. Implement the given use case/project using various Object oriented concepts in Java

TOTAL : 30 hours



COURSE OUTCOMES

At the end of the course, students 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 than those in BA-I and II in stated areas of quantitative aptitude and logical reasoning
3. Demonstrate higher than BA-I and II levels of verbal aptitude skills in English with regard to specific topics

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

1. Soft Skills

- a. Attitude building
- b. Dealing with criticism
- c. Innovation and creativity
- d. Problem solving and decision making
- e. Public speaking
- f. Group discussions

Solving problems with reference to the following topics:

2. Quantitative Aptitude and Logical Reasoning

- a. **Vedic Maths:** Fast arithmetic, multiplication 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, Allegations, 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

Demonstrating English language skills with reference to the following topics:

3. Verbal Aptitude

- a. Verbal analogy
- b. Tenses
- c. Prepositions
- d. Reading comprehension
- e. Choosing correct / incorrect sentences
- f. Describing pictures
- g. Error spotting

அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்:

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்நோ-சாரோசெனிக் கட்டிடக் கலை.

அலகு III உற்பத்தித் தொழில் நுட்பம்:

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்:

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுவித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணிணித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, TamilNadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.

HOD

Dr. M. RENUGA,
Professor & Head,

Department of Humanities & Languages,
Anna College of Technology
SALEM - 636

UNIT I WEAVING AND CERAMIC TECHNOLOGY

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY

3

Designing and Structural construction House & Designs in household materials during Sangam Age -Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY

3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads - Shell beads/ bone beads - Archeological evidences - Gem stone types described inSilappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoempu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.


UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries –Sorkuvai Project.

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணிணித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநடை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
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8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
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12. Journey of Civilization Indus to Vaigai (R.Ramakrishna) (Published by: RMRL) – Reference Book.


HOD 19/12/23

Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Anna College of Technology,
SALEM - 631

COURSE CODE U19GE302

L T P C

COURSE NAME MANDATORY COURSE:**ENVIRONMENT AND CLIMATE SCIENCE**

2 0 0 0

Course outcome:

Upon completion of this course the students will be able to

- CO1** Describe the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.
- CO2** Illustrate the concepts of an ecosystem and provide an overview of biodiversity and its conservation.
- CO3** Analyze the causes, effects of various environmental pollution and their appropriate remedial measures.
- CO4** Provide solutions to combat environmental issues like global warming, acid Rain, ozone layer depletion.
- CO5** Analyze the effect of climate change in various sectors and their remedial measures.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO - 1	3	2				2	2							-
CO - 2	2	-												-
CO - 3	3	2				2	2							2
CO - 4	3	2				2	2							2
CO - 5	3	2				2	2							2

Unit I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES L 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

L 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

L 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.

Unit IV FUNDAMENTALS OF CLIMATE CHANGE

L 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

L 6

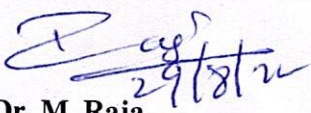
Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments,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

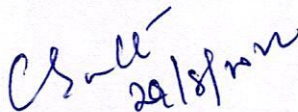
Total Number of hours: 30**Learning Resources****Text Book:**

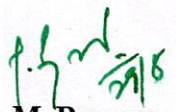
1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018
2. Anubha Kaushik and Kaushik,
"Environmental Science and Engineering" New Age International Publication, 4th Multicolour Edition, New Delhi, 2014.

Reference Books:

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.


Dr. M. Raja
Course Coordinator / Sciences


Dr. C. Shanthi
HOD / Sciences


Dr. M. Renuga
Chairperson BOS,
Science and Humanities

Semester-III	U19GE301-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 good vocabulary skills, analyse comprehension and critical reasoning passages, spot errors and utilize language skills to describe pictures effectively.		
1.Soft Skills	Demonstrating soft-skill capabilities with reference to the following topics: <ol style="list-style-type: none"> Attitude building Dealing with criticism Innovation and creativity Problem solving and decision making Public speaking Group discussions 	
2. Quantitative Aptitude and Logical Reasoning	Solving problems with reference to the following topics: <ol style="list-style-type: none"> Vedic Maths: Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. Numbers: Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, Tens digit, highest power. Averages: Basics of averages and weighted average. Percentages: Basics of percentage and Successive percentages. Ratio and proportion: Basics of R & P, Alligations, Mixture and Partnership. Profit, Loss and Discount: Basic & Advanced PLD Data Interpretation: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Case lets, Mixed varieties, Network diagram and other forms of data interpretation. 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: <ol style="list-style-type: none"> Verbal analogy Tenses Prepositions Reading comprehension Choosing correct / incorrect sentences Describing pictures Error spotting 	

S. Anita
31/4/2023
Dr.S.Anita

Head/Training

Dr. S. ANITA

Professor and Head

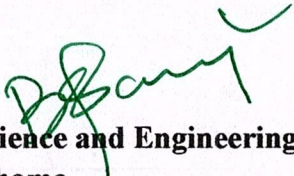
Department of Training,

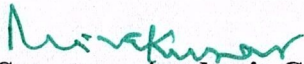
SONA COLLEGE OF TECHNOLOGY,
SALEM-636 005.

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

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact hours
Theory							
1	U19MAT401A	Numerical and Regression Analysis	3	1	0	4	60
2	U19CS401	Operating Systems	3	0	0	3	45
3	U19CS402	Database Management Systems	3	0	0	3	45
4	U19CS403	Design and Analysis of Algorithms	3	0	0	3	45
5	U19GE405	Principles of Management	3	0	0	3	45
6	U19GE403	Mandatory Course: Essence of Indian Traditional knowledge	2	0	0	0	30
Practical							
7	U19CS404	Operating Systems Laboratory	0	0	4	2	60
8	U19CS405	Database Management Systems Laboratory	0	0	4	2	60
9	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
Total Credits						21	

Approved By


Chairperson, Computer Science and Engineering BoS
Dr.B.Sathiyabhama


Member Secretary, Academic Council
Dr.R.Shivakumar


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

Copy to:- HOD/Computer Science and Engineering, Fourth Semester BE CSE Students and Staff, COE

B. E / COMPUTER SCIENCE AND ENGINEERING

SEMESTER – IV	NUMERICAL AND REGRESSION ANALYSIS	L	T	P	C
U19MAT401A		3	1	0	4

COURSE OUTCOMES

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

1. solve algebraic, transcendental and linear system of equations using appropriate numerical techniques.
2. apply the Newton's forward, backward, divided difference formulae and Lagrange's formula to obtain the polynomial interpolation and their derivatives at desired point.
3. apply the Trapezoidal rule, Simpson's rule, Romberg's method and Gaussian quadrature formula to evaluate definite integrals.
4. solve the linear and nonlinear ordinary differential equations of first order by single and multi-step methods.
5. compute simple and partial correlation coefficients and analyse regression equations for estimation and prediction purposes.

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	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3		3	2							2	2		2
CO2	3	3		3	2							2	2		2
CO3	3	3		3	2							2	2		2
CO4	3	3		3	2							2	2		2
CO5	3	3		3	2							2	2		2

UNIT – I SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS 12

Solution of algebraic and transcendental equations: Regula-Falsi method – Fixed point theorem (statement only) – Fixed point iteration method – Newton Raphson method – **Solution of linear system of equations:** Cholesky decomposition method – **Eigen values of a matrix:** Power method.

UNIT – II INTERPOLATION AND NUMERICAL DIFFERENTIATION 12

Newton's forward and backward difference formulae – Newton's divided difference interpolation – Lagrange's interpolation – Inverse Lagrange's interpolation – Approximation of derivatives using interpolation polynomials.

UNIT – III NUMERICAL INTEGRATION 12

Trapezoidal rule – Simpson's $1/3^{rd}$ and $3/8^{th}$ rules – Romberg's method – Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rules.

UNIT – IV INITIAL VALUE PROBLEMS – ORDINARY DIFFERENTIAL EQUATIONS 12

Single step methods: Taylor series method – Euler's method – fourth order Runge – Kutta method for solving first order ordinary differential equations. **Multi step methods:** Milne's and Adams – Bash forth predictor and corrector methods for solving first order ordinary differential equations.

UNIT – V REGRESSION ANALYSIS**12**

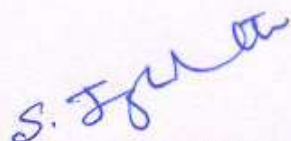
Multiple and partial correlation – linear regression – relationship between correlation and regression – multiple and partial regressions.

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

1. R. L. Burden and J. D. Faires, "Numerical Analysis" Cengage Publishers, 9th Edition, 2016.
2. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.

REFERENCE BOOKS:

1. T. Veerarajan and T. Ramachandran, "Numerical Methods with programs in C", McGraw Hill Publishers, 2nd Edition, Reprint, 2019.
2. C. F. Gerald and P. O. Wheatly, "Applied Numerical Analysis", Pearson Publishers, 7th Edition, 2004.
3. B. S. Grewal, "Numerical Methods in Engineering & Science with Programs in C, C++ & MATLAB", Khanna Publishers, 11th Edition, 2013.
4. K. Sankar Rao, "Numerical Methods for Scientists and Engineers", Prentice Hall Publishers, 4th Edition, 2018.
5. P. Kandasamy, K. Thilagavathy and K. Gunavathy, "Numerical Methods", S. Chand Publishers, 5th Edition, 2013.



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BoS - Chairperson
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COURSE OUTCOMES

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

- Compare the different operating system structures
- Evaluate the various process scheduling algorithms
- Design algorithms for achieving process synchronization
- Evaluate the various memory management techniques
- Analyze the effectiveness of a file 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	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	1	1	2	2	1	3	2	2	3
CO2	3	3	3	2	1	1	1	1	1	1	1	3	1	3	3
CO3	3	3	3	3	1	1	2	1	2	3	1	3	1	3	3
CO4	3	3	3	2	2	1	2	1	1	2	1	3	1	3	3
CO5	3	3	3	3	3	2	2	1	3	1	1	3	2	3	3

UNIT I INTRODUCTION AND OPERATING SYSTEM STRUCTURES**9**

Introduction - Mainframe Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs – System Structure – Virtual Machines – System Design and Implementation.

UNIT II PROCESS MANAGEMENT**9**

Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication- Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - Case study – Linux Scheduling.

UNIT III PROCESS SYNCHRONIZATION AND DEADLOCKS**9**

Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors. System Model – Deadlock Characterization – Methods for

handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks.

UNIT IV STORAGE MANAGEMENT AND FILE SYSTEM INTERFACE 9

Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging - Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – Protection. Case study – Linux memory management

UNIT V FILE SYSTEM IMPLEMENTATION AND MASS STORAGE STRUCTURE 9

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management - Case study – Linux file system.

Total: 45 hours

TEXT BOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 9th Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2012.

REFERENCES

1. Harvey M. Deitel, P.J.Deitel and D.R.Choffines, “Operating Systems”, 3rd Edition, Pearson Education Pvt. Ltd, 2004.
2. Andrew S. Tanenbaum and Herbert Bos, “Modern Operating Systems”, Pearson Education Pvt. Ltd, 4th Edition, 2016
3. William Stallings, “Operating System Internals and Design Principles”, Pearson Education Pvt. Ltd, 9th Edition, 2018

COURSE OUTCOMES

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

- Demonstrate the need, background, architecture and evolution of database management system and to introduce the concepts of ER model
- Design and develop relational models with an emphasis on how to organize, maintain, retrieve and secure information efficiently and effectively from a RDBMS
- Design and evaluate the normality of a logical data model, and correct any anomalies and identify the requirements of data storage and indexing techniques
- Implement query processing methodologies using various operators
- Design and develop methods for multiple transactions are managed concurrently and recovered efficiently during failures

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	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1	1	1	2	2	1	3	2	3	3
CO2	3	3	3	2	2	2	1	1	1	1	1	3	1	3	3
CO3	3	3	3	3	2	2	2	1	2	1	1	3	1	3	3
CO4	3	3	3	3	3	3	2	2	2	2	2	3	1	3	3
CO5	3	3	3	3	3	2	3	2	3	1	2	3	2	3	3

UNIT I INTRODUCTION**9**

Database and Database Users: Characteristics of database approach- Advantages of using the DBMS Approach-Database Applications.

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

UNIT II RELATIONAL MODEL**9**

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

SQL: Data definition and Data type- specifying SQL constraints- Basic queries-insert-delete- update-complex queries- views- assertions and triggers- 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 Device-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 BOOKS

1. Abraham Silberschatz, Henry F. Korth and Sudarshan. S, "Database System Concepts", Sixth Edition, McGrawHill, 2010
2. Ramez Elmasri and Shamkant Navathe, "Fundamentals of Database Systems ", 6th Edition, Addison-Wesley, 2011

REFERENCES

1. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003
2. Date. C. J, Kannan. A, Swamynathan. S, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006
3. Rajesh Narang, "Database Management systems", PHI Learning pvt. Ltd, New Delhi, 2006

COURSE OUTCOMES

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

- Analyze the algorithms that are used to solve various problems.
- Generate and solve the recurrences for divide and conquer techniques.
- Solve the problems using greedy and dynamic programming paradigms.
- Design the algorithms for solving the backtracking and transform and conquer methodologies.
- Apply the branch and bound technique to solve various problems.

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	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	2	1	1	2	2	1	3	2	3	3
CO2	3	3	3	2	2	2	1	1	1	1	1	3	2	3	3
CO3	3	3	3	3	2	3	2	1	2	1	1	3	2	2	3
CO4	3	3	3	2	2	2	2	1	1	2	2	3	2	1	3
CO5	3	3	3	3	2	2	2	1	2	1	1	3	2	3	3

UNIT I FUNDAMENTALS OF ALGORITHM ANALYSIS**9**

Introduction - Problem solving techniques-Analysis framework – Time space tradeoff – Asymptotic notations – Conditional asymptotic notation – Properties of Big-Oh notation – Recurrence equations – Mathematical Analysis of Non-recursive algorithms - Mathematical analysis of recursive Algorithms – Analysis of linear search - Empirical analysis - Algorithm visualization

UNIT II BRUTE FORCE AND DIVIDE AND CONQUER STRATEGIES**9**

Brute Force: Selection Sort - Bubble Sort – String matching - Exhaustive Search: Travelling Sales- man problem - Divide and Conquer: General Method – Binary Search – Closest-pair problem – Merge Sort- Quick Sort.

UNIT III GREEDY AND DYNAMIC PROGRAMMING PARADIGMS**9**

Greedy Algorithms: General Method – Container Loading – Huffman code – Knapsack problem - Dynamic Programming: General Method – Knapsack Problem – Warshall Algorithm - Multistage Graphs – Optimal binary search trees.

UNIT IV BACKTRACKING AND TRANSFORM AND CONQUER METHODOLOGIES 9

Backtracking: General Method – N-Queen’s problem – Sum of subsets – Graph coloring – Hamiltonian problem. Transform and conquer : Presorting – Gaussian elimination.

UNIT V GRAPH AND BRANCH AND BOUND STRATEGIES 9

Graph: Connected Components – Bi-connected components – Branch and Bound: General Method (FIFO and LC) – Job assignment problem - 0/1 Knapsack problem – Introduction to NP-Hard and NP-Completeness.

Total: 45 hours

TEXT BOOKS

1. Anany Levitin “Introduction to the design and Analysis of Algorithms”, Pearson Education, Second Edition, 2014.

REFERENCES

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Third Edition, Prentice Hall of India Pvt. Ltd, 2009.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.
3. Ellis Horowitz, Sartaj Sahnii and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2008.
4. K.S. Easwarakumar, “ Object Oriented Data Structures Using C++”, Vikas Publication House Pvt Ltd, First Edition, 2000.

COURSE OUTCOMES

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

- Identify the organizational factors and roles of Management
- Apply planning, forecasting and decision making in real time applications
- Apply the concepts of organizing in an organization
- Analyze the concepts of delegation of authority and Organization culture.
- Apply the concepts of controlling in an organization

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	PSO3
CO1	3	2	2	3	1	3	2	2	1	2	2	3	2	3	3
CO2	3	3	3	3	2	3	2	2	3	2	1	3	1	3	3
CO3	2	3	2	1	2	2	2	3	2	2	1	3	1	3	3
CO4	2	3	3	2	1	2	2	3	2	2	3	3	1	3	3
CO5	3	3	3	3	1	3	3	2	2	3	3	3	2	3	3

UNIT I INTRODUCTION

9

Definitions of Management-Scope of Management-Levels of Management-Functions and Roles of a manager-Evolution of Management thought-Organisation and Environmental Factors-Forms of Business Organizations-Corporate Social Responsibility-recent trends and challenges in global management scenario.

UNIT II PLANNING

9

Definition of Planning-Nature and purpose of planning-Planning process-Types of plans-Objectives-Management of objective(MBO)-Management by exception-Types of strategies-Decision Making: definition and process-Types of managerial decision-group decision making techniques-Decision making under different conditions-forecasting and its techniques.

UNIT III ORGANISING

9

Definition of organizing-Nature and purpose of organizing-Formal and informal organizations-organization charts-Organization structures-Span of control-factors determining effective span-line and staff authority-Departmentation-Centralization and Decentralization-Delegation of authority-staffing-selection and recruitment-Orientation-Training and development-Performance Appraisal-organization change-Staffing

UNIT IV DIRECTING

9

Directing: nature and purpose-Motivation and Satisfaction-Motivation theories-job enrichment-definition of leadership-elements of leadership-Leadership styles-leadership theories-Communication-process and barriers to effective communication-Organization culture-Elements and types of culture-Managing cultural diversity.

UNIT V CONTROLLING

9

Process of controlling-Types of control-Budgetary and non-budgetary control techniques- MIS-Managing productivity-Constant control-purchase control- Maintenance control-quality control-planning operations-performance standards-Measurement of performance-Remedial actions-Recent Trends in Management

Total :45 hours

TEXT BOOKS

1. Stephen P. Robbins & Mary Coulter, "Management", Prentice Hall (India) Pvt. Ltd., 14th Edition, 2017.
2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

REFERENCES

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" Pearson Education, 9th Edition, 2016.
2. Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.
3. Harold Koontz & Heinz Weihrich "Essentials of management" Tata McGraw Hill,2006.
4. Tripathy PC & Reddy PN, "Principles of Management", Tata Mcgraw Hill, 2012

COURSE OUTCOMES

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

- Simulate various Unix commands using shell scripts
- Design, develop and demonstrate various page replacement policies and memory management techniques
- Design and develop an deadlock avoidance algorithm

CO / PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
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CO1	2	2	3	3	2	2	2	2	1	3	2	2	3	2	3
CO2	3	3	3	2	2	1	2	2	1	3	2	2	3	2	3
CO3	3	3	3	3	2	2	2	2	3	3	3	2	3	3	3

(Implement the following on LINUX platform. Use C for high level language implementation)

LIST OF EXPERIMENTS

1. UNIX - Basic Commands.
2. Shell programming (Using looping, control constructs etc.,)
3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Implementation of CPU scheduling algorithms: FCFS, SJF, Round Robin & Priority Scheduling.
7. Implementation of the Producer – Consumer problem using Semaphores.
8. Implementation of Banker's algorithm.
9. Implementation of memory management schemes (First fit, Best fit & Worst fit)
10. Implement page replacement algorithms (FIFO & LRU)

Total: 60 hours

COURSE OUTCOMES

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

- Design schema for the given database by creating appropriate tables and write SQL queries using DDL and DML statements to retrieve information out of it.
- Create views and triggers that automatically indicate the updating of data in the tables
- Apply the concept of databases to the real time application 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)														
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CO2	3	3	3	3	2	2	2	2	1	3	2	2	3	2	3
CO3	3	3	3	3	2	2	2	2	3	3	3	2	3	3	3

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. Working with triggers
7. Use of front end tools to manipulate the database
8. Menu Design
9. Generate reports using a reporting tool
10. Database Design and implementation of an application system. (Suggested Mini Project)

Total: 60 hours

Course Outcomes

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

1. Analyze the basics of Indian traditional knowledge in modern scientific perspectives.
2. Explain the basics of Vedic science and its applications in modern days.
3. Discuss the introduction and objectives of modern science.
4. Describe the contribution of Noble laureates for India's achievements in Science and Technology.
5. Analyze the various traditional practices for holistic health care of human beings.

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)														
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CO2	2	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO4	3	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO5	2	2	2	-	-	2	-	-	-	-	-	-	-	-	2

Unit I

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

6

Unit II

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

6

UNIT – III- Modern Science

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

6

UNIT – IV Technology

- 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

6

UNIT – V- Yoga and Holistic Health Care

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

6

Reference Books

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. ISBN13: 9780143066385
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049

Total: 30 hours

Shanthi
22/12/2023

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M. Renuga
22/12/23

Dr. M. RENUGA,
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Semester – IV	U19GE401 - 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: <ol style="list-style-type: none"> SWOT Goal setting Time management Stress management Interpersonal skills and Intrapersonal skills Presentation skills Group discussions 					
2. Quantitative Aptitude and Logical Reasoning	Solving problems with reference to the following topics: <ol style="list-style-type: none"> Equations: Basics of equations, Linear, Quadratic Equations of Higher Degree and Problem on ages. Logarithms, Inequalities and Modulus Sequence and Series: Arithmetic Progression, Geometric Progression, Harmonic Progression, and Special Series. Time and Work: Pipes & Cistern and Work Equivalence. Time, Speed and Distance: Average Speed, Relative Speed, Boats & Streams, Races and Circular tracks and Escalators. Arithmetic and Critical Reasoning: Arrangement, Sequencing, Scheduling, Network Diagram, Binary Logic, and Logical Connection. Binary Number System.- Binary to decimal, Octal, Hexadecimal 					
3. Verbal Aptitude	Demonstrating English language skills with reference to the following topics: <ol style="list-style-type: none"> Critical reasoning Theme detection Verbal analogy Prepositions Articles Cloze test Company specific aptitude questions 					

Total: 30 Hours

S. Anita
18/12/2023

Dr.S.Anita
Professor and Head
Department of Training

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Department of Training,
SONA COLLEGE OF TECHNOLOGY,
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