SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.E- Civil Engineering

CURRICULUM and SYLLABI

[For students admitted in 2021-2022]

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: Civil Engineering

S.No	Course Code	Course Title	L	Т	P	С	Category	Total Contact Hours
		Theory						
1	U19ENG101	English for Engineers - I	2	0	2	3	HS	60
2	U19MAT102A	Linear Algebra and Calculus	3	1	0	4	BS	60
3	U19PHY103A	Physics for Civil Engineering	3	1	0	4	BS	60
4	U19CHE104A	Chemistry for Civil Engineering	3	1	0	4	BS	60
5	U19EGR106	Engineering Graphics	2	0	2	3	ES	60
		Practical						
7	U19PCL108A	Physics and Chemistry Laboratory-I	0	0	3	1.5	BS	45
8	U19WPL112	Workshop Practices Laboratory	0	0	2	1	ES	30
9	U19GE101	Basic Aptitude-I	0	0	2	0	EEC	30
			Tot	al Cr	edits	20.5		
		Optional Language Elec	ctive					
11	U19OLE1101	French						30
12	U19OLE1102	German	0	0	2	1	HS	30
13	U19OLE1103	Japanese			_	.1	113	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	Chairperson, Civil Engineering	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Humanities BoS	BoS	Academic Council	Council & Trincipal
Dr. M. Renuga	Dr. R. Malathy	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

Copy to:-HOD/Civil, First Semester BE Civil Students and Staff, COE

Sona College of Technology, Salem – 636 005 (An Autonomous Institution)

Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)

		Branch: Civil Eng	ineeri	ng		, , ,		
S.N	Course Code	Course Title	L	Т	P	С	Category	Total Contact Hours
		Theo	ry					
1	U19ENG201A	English for Engineers-II	2	0	2	3	HSMC	60 (30L+30P)
2	U19MAT202A	Differential Equations and Vector Calculus	3	1	0	4	BSC	60
3	U19PPR205	Problem Solving Using Python Programming	3	0	0	3	ESC	45
4	U19BEE206	Basics of Electrical and Electronics Engineering	3	0	0	3	ESC	45
5	U19CE201	Basics of Engineering Mechanics	3	1	0	4	ESC	60
		Pract	ical					
6	U19BEE207	Basics of Electrical Engineering Laboratory	0	0	2	1	ESC	30
7	U19PCL208A	Physics and Chemistry Laboratory-II	0	0	3	1.5	BSC	45
8	U19PPL211	Python Programming Laboratory	0	0	2	1	ESC	30
9	U19GE201	Basic Aptitude-II	0	0	2	0	EEC	30
			T	otal C	redits	20.5		
	Optional Langu	age Elective*						
10	U19OLE1201	French						
11	U19OLE1202	German	0	0	2	1	HSMC	30
12	U19OLE1203	Japanese					1101110	30

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

Approved by			/
4.5~	20 May	Mirakman	IN IN
Chairperson, Science and Humanities BoS	Chairperson, Civil Engineering BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. R. Malathy	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kuma

Copy to:-HOD/Civil, Second Semester BE Civil Engineering Students and Staff, COE

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E. / B.Tech. Semester III under Regulations 2019

Branch: Civil Engineering

							Total
S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Contact
							Hours
		Theory					
1	U19MAT301A	Fourier Analysis and Statistics	3	1	0	4	60
2	U19CE301	Mechanics of Fluids	2	1	0	3	45
3	U19CE302	Strength of Materials -I	2	1	0	3	45
4	U19CE303	Construction Materials and Practices	3	0	0	3	45
5	U19CE304	Surveying	3	0	0	3	45
6	U19GE302	Mandatory Courses: Environment and Climate Science	2	0	0	0	30
		Practical					
7	U19CE305	Materials Testing Laboratory	0	0	2	1	30
8	U19CE306	Survey Laboratory	0	0	2	1	30
9	U19ENG301	Communication Skills Laboratory	0	0	2	1	30
10	U19GE301	Soft Skills and Aptitude-I	0	0	2	1	30
				To	tal Credits	20	

Approved By

Chairperson, Civil Engineering BoS Dr.R.Malathy

Member Secretary, Academic Council Dr.R.Shivakumar

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

Copy to:-

HOD/Civil Engineering, Third Semester BE Civil Students and Staff, COE

17.08.2022 Regulations-2019

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E. / B.Tech. Semester IV Regulations 2019

Branch: Civil Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
		Theory					
1	U19CE401	Environmental Engineering	3	0	0	3	45
2	U19CE402	Strength of Materials-II	2	1	0	3	45
3	U19CE403	Transportation Engineering	3	0	0	3	45
4	U19CE404	Concrete Technology	3	0	0	3	45
	U19CE903	Professional Elective - Elements of Building Planning					
5	U19CE904	Professional Elective - Energy Efficiency and Green Building	3	0	0	3	45
6	U19GE403	Mandatory Courses - Essence of Indian Traditional Knowledge	2	0	0	0	30
		Practical					
7	U19CE405	Fluid Mechanics Laboratory	0	0	2	1	30
8	U19CE406	Concrete and Highway Laboratory	0	0	2	1	30
9	U19CE407	Environmental Engineering Laboratory	0	0	2	1	30
10	U19GE401	Soft Skills and Aptitude-II	0	0	2	1	30
				,	Total Credits	19	

Approved By

Chairperson, Civil Engineering BoS Dr.R.Malathy Member Secretary, Academic Council Dr.R.Shivakumar

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

Copy to:-

HOD/Civil Engineering, Fourth Semester BE Civil Students and Staff, COE

06.01.2023 Regulations-2019

Civil

Sona College of Technology, Salem (An Autonomous Institution)

Courses of Study for B.E. / B.Tech. Semester V Regulations 2019

Branch: Civil Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
- dek si - marinda	Land Control Manufacture and Control of the	Theory		Li din wa wa walio	kingania and in desire in the in-	N. San and San	
1	U19CE501	Structural Analysis-I	2 /	1	0	3 🗸	45 /
2	U19CE502	Soil Mechanics	2	1	0	3 🐔	45 /
3	U19CE503	Design of Reinforced Concrete Elements	2 /	1	0	3 🗸	45
4	U19CE907/	Professional Elective - Architecture and Town Planning	3 /	0	0	3 /	45 (
5	noc23-ce92 /	NPTEL - Availability and Management of Groundwater Resources	3	0	0	3	45
	al access in trades in a principal file in trades in a settle file and in	Open Elective					
المعاون فتوقعت المساه والماسات	U19C\$1001	Big Data Analytics					
	U19C\$1002	Cloud Computing					
	U19C\$1003	Internet of Things			70.0		
	U19EC1006	Mobile Technology and Its Applications	3	0	0	3	
6	U19EE1004	Renewable Energy Systems	3			-	45
	U19FT1001	Fundamentals of Fashion Design				3 3	
	U19IT1001 /	Problem Solving Techniques using Java Programming				111111	
	U19MC1004~	Fundamentals of Robotics					
	U19ME1004	Renewable Energy Sources				<u> </u>	المراجعة الم
		Practical		بتوساد المقاد المادية	·		-
7	U19CE504 /	Survey Camp	0	0	2 /	1 ,	30 -
8	U19CE505	Computer Aided Civil Engineering Drawing	0	0	2	1/	30

9	U19CE506	Soil Mechanics Laboratory		0	0	2	1	30 /
10	U19GE501	Soft Skills and Aptitude-III		0	0	2	1	30
					1	Total Credits	22	390

ApprovedBy

Chairperson, Civil Engineering BoS

Dr.R.Malathy

Member Secretary, Academic Council

Dr.R.Shivakumar

Chairperson, Academic Council & Principal

Dr.S.R.R.Senthil Kumar

Copy to:- HOD/CivilEngineering,Fifth Semester BE Civil Students and Staff, CQE

Civil

Sona College of Technology, Salem (An Autonomous Institution)

Courses of Study for B.E. / B.Tech.Semester VI Regulations 2019

Branch: Civil Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
		Theory	·	Maria de la Como de Co			
	U19CE601 /	Water Resources and Irrigation Engineering	3	0	0	3	45/
2	U19CE602 /	Structural Analysis-II	2	1	0	3	45 /
3	U19CE603 /	Foundation Engineering	3	0	0	3	45
4	U19CE604/	Limit State Design of Steel Structures	3	1	0	4	60
5	U19CE916	Professional Elective - Repair and Rehabilitation of Structures	3	0	0	3	45 /
6	U19CE917	Professional Elective - Prefabricated Structures	2	0		3	45 /
	U19CE920	Professional Elective - Traffic Engineering and Management]		•		
		Practical		V			
7	U19CE605 /	Civil Engineering Software Applications Laboratory	0	0	4	2	60 /
8	U19CE606	Innovative Projects	0	0	2	1	30 🗸
9	U19GE602 /	Professional Development Skills	0	0	2	1	30/
Antonio proprieda	arana arang ar			To	otal Credits	23 /	405

ApprovedBy

Chairperson, Civil Engineering BoS

PAP Dr.R.Malathy Copy to:- Member Secretary, Academic Council

Dr.R.Shivakumar

Chairperson, Academic Council & Principal

Dr.S.R.R.Senthil Kumar

HOD/Civi I Engineering, Sixth Semester BE Civil Students and Staff, COE

SONA COLLEGE OF TECHNOLOGY (Autonomous), SALEM-636 005. DEPARTMENT OF CIVIL ENGINEERING CURRICULUM - R2019 LIST OF ELECTIVE COURSE

	PROFESSIONAL ELECTIVE-I (Semester – 4)								
S.No	COURSE CODE	COURSE TITLE	L	T	P	C			
1.	U19CE901	Application of IoT for Civil Engineering	3	0	0	3			
2.	U19CE902	Advanced Surveying	3	0	0	3			
3.	U19CE903	Elements of Building Planning	3	0	0	3			
4.	U19CE904	Energy Efficiency and Green Building	3	0	0	3			

	PROFESS	IONAL ELECTIVE-II & III (Semester – 5)				
S.No	COURSE CODE	COURSE TITLE	L	T	P	C
1.	U19CE905	Remote Sensing and GIS	3	0	0	3
2.	U19CE906	Housing Planning and Management	3	0	0	3
3.	U19CE907	Architecture and Town Planning	3	0	0	3
4.	U19CE908	Building Services and Safety Regulations	3	0	0	3
5.	U19CE909	Construction Practices and Equipments	3	0	0	3
6.	U19CE910	Municipal Solid Waste Management	3	0	0	3
7.	U19CE911	Railway, Airport and Harbour Engineering	3	0	0	3
8.	U19CE912	Air Pollution Management	3	0	0	3

	PROFESS	SIONAL ELECTIVE-IV & V (Semester – 6)				
S.No	COURSE CODE	COURSE TITLE	L	T	P	C
1.	U19CE913	Smart Structures and Smart Materials	3	0	0	3
2.	U19CE914	Design of RC Structures	3	0	0	3
3.	U19CE915	Industrial Waste Water Engineering	3	0	0	3
4.	U19CE916	Repair and Rehabilitation of Structures	3	0	0	3
5.	U19CE917	Prefabricated Structures	3	0	0	3
6.	U19CE918	Ground Improvement Techniques	3	0	0	3
7.	U19CE919	Pavement Engineering	3	0	0	3
8.	U19CE920	Traffic Engineering and Management	3	0	0	3

	PROFESSI	ONAL ELECTIVE-VI & VII (Semester – 7)				
S.No	COURSE CODE	COURSE TITLE	L	T	P	C
1.	U19CE921	Advanced Design of Steel Structures	3	0	0	3
2.	U19CE922	Bridge Engineering	3	0	0	3
3.	U19CE923	Groundwater Hydrology	3	0	0	3
4.	U19CE924	Prestressed Concrete Structures	3	0	0	3
5.	U19CE925	Disaster Management	3	0	0	3
6.	U19CE926	Contracts Laws and regulations	3	0	0	3
7.	U19CE927	Environmental Impact Assessment	3	0	0	3
8.	U19CE928	Structural health Monitoring	3	0	0	3
9.	U19CE929	Project Management for Engineers	3	0	0	3
10.	U19CE930	Formwork Engineering	3	0	0	3
11.	U19CE931	Building Information & Modeling	3	0	0	3

SONA COLLEGE OF TECHNOLOGY, SALEM-5

DEPARTMENT OF CIVIL ENGINEERING

LIST OF PROFESSIONAL ELECTIVES FOR HONORS DEGREE

Date: 11.05.2023

S.No	Vertical 1: ADVANCED SURVEYING	Vertical 2: CONSTRUCTION ENGINEERING AND MANAGEMENT	Vertical 3: ENVIRONMENTAL ENGINEERING	Vertical 4: ENERGY EFFICIENCY AND GREEN BUILDING	Vertical 5: STRUCTURAL ENGINEERING
1.	BASICS OF REMOTE SENSING, GIS, GNSS AND ITS APPLICATIONS *	SCHEDULING METHODS IN CONSTRUCTION	INTEGRATED WATER RESOURCES MANAGEMENT	ENERGY EFFICIENCY ACOUSTICS AND DAYLIGHT IN BUILDING*	BRIDGE ENGINEERING *
2.	DIGITAL LAND SURVEYING AND MAPPING *	MATERIALS MANAGEMENT	APPLIED ENVIRONMENTAL MICROBIOLOGY*	ENERGY RESOURCES, ECONOMICS AND ENVIRONMENT*	STRUCTURAL HEALTH MONITORING
3.	GEOINFORMATICS SYSTEM	RESOURCE MANAGEMENT IN CONSTRUCTION	PLASTIC AND ELECTRONIC DEBRIS MANAGMENT	GREEN BUILDING RATING SYSTEMS	FORMWORK ENGINEERING
4.	DRONE SURVEYING	CONSTRUCTION PROJECT MANAGEMENT	ENVIRONMENTAL MODELLING	ENVIRONMENTAL IMPACT ASSESSMENT	BRICK MASONRY STRUCTURES
5.	ELECTRONIC DISTANCE MEASUREMENT FOR SURVEYING	CONSTRUCTION PERSONNEL MANAGEMENT	NANOTECHNOLOGY FOR ENVIRONMENTAL ENGINEERING	GREEN MATERIALS AND GREEN PRODUCTS	TALL BUILDING STRUCTURES
6.	INTRODUCTION TO QUADCOPTERS	INDUSTRIAL SAFETY ENGINEERING *	GEOENVIRONMENTAL ENGINEERING	ENERGY AND WATER EFFICIENCY IN BUILDINGS	STRUCTURAL DYNAMICS *
7.	ADVANCED REMOTE SENSING	FORMWORK ENGINEERING	ENVIRONMENTAL RESTORATION OF POLLUTED SITES*	GREEN BUILDING AND SUSTAINABLE MATERIALS	EXPERIMENTAL STRESS ANALYSIS
8.	TACHOMETRIC AND MODERN SURVEYING	PROJECT MANAGEMENT FOR MANAGERS *	ENVIRONMENTAL LEGISLATION	GREEN TECHNOLOGIES	MECHANICS OF COMPOSITE MATERIALS
9.	-	VALUATION FOR ENGINEERS	-	-	_

^{*}In each vertical, maximum of two NPTEL courses were identified

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of Civil Engineering

Honours Verticals & Courses

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

Vertical 1: ADVANCED SURVEYING

S.No	Course Code	Course Name	L	T	Р	С
1	NPTEL	BASICS OF REMOTE SENSING, GIS, GNSS AND ITS APPLICATIONS *				
2	NPTEL	DIGITAL LAND SURVEYING AND MAPPING *				
3	U19CE2001	GEOINFORMATICS SYSTEM	3	0	0	3
4	U19CE2002	DRONE SURVEYING	3	0	0	3
5	U19CE2003	ELECTRONIC DISTANCE MEASUREMENT FOR SURVEYING	3	0	0	3
6	U19CE2004	INTRODUCTION TO QUADCOPTERS	3	0	0	3
7	U19CE2005	ADVANCED REMOTE SENSING	3	0	0	3
8	U19CE2006	TACHOMETRIC AND MODERN SURVEYING	3	0	0	3

Vertical 2: CONSTRUCTION ENGINEERING AND MANAGEMENT

S.No	Course Code	Course Name	L	T	Р	С
1	U19CE2007	SCHEDULING METHODS IN CONSTRUCTION	3	0	0	3
2	U19CE2008	MATERIALS MANAGEMENT	3	0	0	3
3	U19CE2009	RESOURCE MANAGEMENT IN CONSTRUCTION	3	0	0	3
4	U19CE2010	CONSTRUCTION PROJECT MANAGEMENT	3	0	0	3
5	U19CE2011	CONSTRUCTION PERSONNEL MANAGEMENT	3	0	0	3
6	NPTEL	INDUSTRIAL SAFETY ENGINEERING *				
7	U19CE930	FORMWORK ENGINEERING	3	0	0	3
8	NPTEL	PROJECT MANAGEMENT FOR MANAGERS *				
9	U19CE2012	VALUATION FOR ENGINEERS	3	0	0	3

Vertical 3: ENVIRONMENTAL ENGINEERING

S.No	Course Code	Course Name	L	Т	Р	С
1	U19CE2013	INTEGRATED WATER RESOURCES MANAGEMENT	3	0	0	3
2	NPTEL	APPLIED ENVIRONMENTAL MICROBIOLOGY*				
3	U19CE2014	PLASTIC AND ELECTRONIC DEBRIS MANAGMENT	3	0	0	3
4	U19CE2015	ENVIRONMENTAL MODELLING	3	0	0	3
5	U19CE2016	NANOTECHNOLOGY FOR ENVIRONMENTAL ENGINEERING	3	0	0	3
6	U19CE2017	GEOENVIRONMENTAL ENGINEERING	3	0	0	3

	7	NPTEL	ENVIRONMENTAL RESTORATION OF POLLUTED SITES*				
ĺ	8	U19CE2018	ENVIRONMENTAL LEGISLATION	3	0	0	3

Vertical 4: ENERGY EFFICIENCY AND GREEN BUILDING

S.No	Course Code	Course Name	L	T	Р	С
1	NPTEL	ENERGY EFFICIENCY ACOUSTICS AND DAYLIGHT IN BUILDING*				
2	NPTEL	ENERGY RESOURCES, ECONOMICS AND ENVIRONMENT*				
3	U19CE2019	GREEN BUILDING RATING SYSTEMS	3	0	0	3
4	U19CE927	ENVIRONMENTAL IMPACT ASSESSMENT	3	0	0	3
5	U19CE2020	GREEN MATERIALS AND GREEN PRODUCTS	3	0	0	3
6	U19CE2021	ENERGY AND WATER EFFICIENCY IN BUILDINGS	3	0	0	3
7	U19CE2022	GREEN BUILDING AND SUSTAINABLE MATERIALS	3	0	0	3
8	U19CE2023	GREEN TECHNOLOGIES	3	0	0	3

Vertical 5: STRUCTURAL ENGINEERING

S.No	Course Code	Course Name	L	Т	Р	С
1	NPTEL	BRIDGE ENGINEERING *				
2	U19CE928	STRUCTURAL HEALTH MONITORING	3	0	0	3
3	U19CE930	FORMWORK ENGINEERING	3	0	0	3
4	U19CE2024	BRICK MASONRY STRUCTURES	3	0	0	3
5	U19CE2025	TALL BUILDING STRUCTURES	3	0	0	3
6	NPTEL	STRUCTURAL DYNAMICS *				
7	U19CE2026	EXPERIMENTAL STRESS ANALYSIS	3	0	0	3
8	U19CE2027	MECHANICS OF COMPOSITE MATERIALS	3	0	0	3

^{*} These Courses are available in NPTEL

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of Civil Engineering

Minor Degree - Verticals & Courses

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

MINOR VERTICAL: ENERGY EFFICIENCY AND GREEN BUILDING

S.No	Course Code	Course Name	L	T	P	С
1	NPTEL	ENERGY EFFICIENCY ACOUSTICS AND DAYLIGHT IN				
		BUILDING*				
2	NPTEL	ENERGY RESOURCES, ECONOMICS AND				
		ENVIRONMENT*				
3	U19CE2019	GREEN BUILDING RATING SYSTEMS	3	0	0	3
4	U19CE927	ENVIRONMENTAL IMPACT ASSESSMENT	3	0	0	3
5	U19CE2020	GREEN MATERIALS AND GREEN PRODUCTS	3	0	0	3
6	U19CE2021	ENERGY AND WATER EFFICIENCY IN BUILDINGS	3	0	0	3
7	U19CE2022	GREEN BUILDING AND SUSTAINABLE MATERIALS	3	0	0	3
8	U19CE2023	GREEN TECHNOLOGIES	3	0	0	3

^{*} These Courses are available in NPTEL

Sona College of Technology, Salem

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

Branch: Civil Engineering

S.No	Course Code	Course Title		Т	P	С	Category	Total Contact Hours	
		Theory							
1	U19ENG101	English for Engineers - I	2	0	2	3	HS	60	
2	U19MAT102A	Linear Algebra and Calculus	3	1	0	4	BS	60	
3	U19PHY103A	Physics for Civil Engineering	3	1	0	4	BS	60	
4	U19CHE104A	Chemistry for Civil Engineering	3	1	0	4	BS	60	
5	U19EGR106	Engineering Graphics	2	0	2	3	ES	60	
		Practical							
7	U19PCL108A	Physics and Chemistry Laboratory-I	0	0	3	1.5	BS	45	
8	U19WPL112	Workshop Practices Laboratory	0	0	2	1	ES	30	
9	U19GE101	Basic Aptitude-I	0	0	2	0	EEC	30	
	U19ENG101 English for Engineers - I 2 0 2 3 HS								
		Optional Language Elec	ctive						
11	U19OLE1101	French						30	
12	U19OLE1102	German	0	0	2	1	HS	30	
13	U19OLE1103	Japanese			_	.1	113	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	Chairperson, Civil Engineering	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Humanities BoS	BoS	Academic Council	Council & Trincipal
Dr. M. Renuga	Dr. R. Malathy	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

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U19ENG101 - ENGLISH FOR ENGINEERS - I

Common to Civil Engineering

L T P C 2 0 2 3

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
- Develop skills for writing reports and proposals, and for general purpose and technical writing.

S.No	Course outcomes	Programme outcomes													
		1	2	3	4	5	6	7	8	9	10	11	12	Pso1	Pso2
1	Frame sentences correctly with accuracy	2	1	1	1	1	2	3	2	2	3	3	3	3	3
2	Write emails and formal letters	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, detailed project report

UNIT - III

- Prefixes and Suffixes
- Mini presentation in small groups of two or three, on office arrangements, facilities, office functions, sales, purchases, training recruitment, advertising, applying for financial assistance, applying for a job, team work, discussion, presentation.
- 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, drafting circulars

UNIT - V

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

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

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

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

L T P C 3 1 0 4

COURSE OUTCOMES

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

- 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
- apply the concepts of eigen values and eigen vectors of a real matrix and their properties in diagonalization and the reduction of a real symmetric matrix from quadratic form to canonical form
- find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables
- 5. apply appropriate techniques of multiple integrals to find the area and volume.

		(3/2/1 i	ndicate	s stren			SO Ma tion) 3		g, 2-Me	dium, 1	-Weak		
			Progr	ramme	Outco	mes (P	Os) an	d Prog	ramme	Specifi	ic Outco	me (PS	Os)	
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
COI	3	3	2	3	2							2	2	
CO2	3	3	2	3	2							2	2	
CO3	3	3	2	3	2			-				2	2	
CO4	3	3	2	3	2	1			500			2	2	
CO5	3	3	2	3	2						1	2	2	777

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 – Ranknullity 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:

- T. Veerarajan, "Linear Algebra and Partial Differential Equations", McGraw Hill Publishers, 1st Edition, 2018.
- 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.
- E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017
- 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.

U19PHY103A - PHYSICS FOR CIVIL ENGINEERING

(For B.E Civil Engineering)

L T P C 3 1 0 4

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

CO1: Discuss the dual nature of matter and radiation.

CO2: Describe the basic components of lasers.

CO3: Analyse the relation between arrangement of atoms and material properties.

CO4: Evaluate the factors affecting architectural acoustics of buildings.

CO5: Elucidate the different modes of heat transfer.

						ength of		tion) 3-S	trong,		ım, 1-We		_	
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	120	120	-	-		2	-	-	2	2	-	3
CO - 2	3	2	(-0)	-	2-3	-	-	н.	-	-	2	2	-	3
CO - 3	3	2	-	-	-	-		-	-	-	2	2	-	3
CO - 4	3	2	-	7-1		-	-	-	-		2	2	-	3
CO - 5	3	2				-	-	-	-	-	2	2	-	3

UNIT I - QUANTUM PHYSICS

12

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 - Transmission electron microscope-Limitations of electron microscope.

UNIT II - LASERS 12

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

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

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

Applications - Holography - Construction and reconstruction of hologram - Applications of lasers in science and Engineering.

UNIT III - CRYSTAL PHYSICS

12

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.

Crystal Structure – Graphite Structure, Diamond Structure.

UNIT IV - ARCHITECTURAL ACOUSTICS

12

Classification of sound waves: Audible sound waves, Infrasonic waves, Ultrasonic waves- Noise and musical sound-Weber – Fechner law-Loudness level and intensity.

Basic requirements for the acoustically good halls- Reverberation -Sabine's law and its importance (no derivation)-absorption co-efficient-Factors affecting the acoustics and their remedies.

Sound insulation: Noise classification-Transmission loss-Sound insulation between individual rooms.

UNIT V - THERMAL PHYSICS

12

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 insulation in buildings.

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

TOTAL: 60 Hours

TEXT BOOKS

- B. K. Pandey and S. Chaturvedi, "Engineering Physics", Cengage Learning India Pvt. Ltd., Delhi, 2012.
- Dr. B.C. Punmia et al, "Building construction", Laxmi publications Pvt. Ltd., New Delhi 2008.

REFERENCES

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

U19CHE104A - CHEMISTRY FOR CIVIL ENGINEERING

L T P C

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

- **CO1** Analyze the impurities of water, their removal methods and explain the conditioning methods for domestic and industrial uses.
- CO2 Outline the principles, applications of electrochemistry, types of corrosion and its control methods.
- CO3 Compare the types of polymerization reactions, techniques and fabrication methods of polymers.
- **CO4** Analyze the composition, properties and industrial applications of engineering materials.
- CO5 Describe the ingredients, manufacture, properties and applications of construction materials.

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			Progran	nme Ou	tcomes	(POs) ar	nd Progr	amme S	pecific	Outcom	e (PSOs)		o.	
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	3												3
CO-2	3	3												2
CO-3	3	3												3
CO-4	3	3						70						3
CO - 5	3	3												3

UNIT I - WATER TECHNOLOGY

12

Introduction - Characteristics - hardness - estimation of hardness by EDTA method, alkalinity and its estimation - Boiler feed water - requirements - disadvantages of using hard water in boilers - internal conditioning (colloidal, phosphate, calgon and carbonate conditioning methods) - external conditioning - zeolite process, demineralization process, desalination of brackish water by reverse osmosis - Domestic water treatment - screening, sedimentation, coagulation, aeration, sand filtration and disinfection methods - Chlorination, ozonation and UV treatment.

UNIT II - ELECTROCHEMISTRY AND CORROSION

12

Electrode potential – Nernst Equation – derivation and problems based on single electrode potential calculation – reference electrodes – standard hydrogen electrode – calomel electrode – Ion selective electrode – glass electrode – measurement of pH – electrochemical series – significance – electrolytic and electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – potentiometric

titrations (redox – Fe^{2+} vs dichromate) – conductometric titrations (acid-base – HCl vs NaOH) – Corrosion – types – dry and wet corrosion – examples – Corrosion control methods – Sacrificial anode and impressed cathode current method.

UNIT III - POLYMER CHEMISTRY

12

Nomenclature of Polymers - classification of Polymers - functionality - types of polymerization-addition-condensation and copolymerization - Free Radical mechanism of addition Polymerization - Properties of Polymers - glass transition temperature, Tg - Methods of Polymerization-bulk-solution-emulsion and suspension - Plastics - Moulding constituents of plastic - Moulding of plastics into articles-Injection-Compression and Blow moulding - Thermoplastic and Thermosetting resins - Engineering Plastics-Nylon 6,6-Polycarbonate and Polyurethane-preparation-properties and applications - Rubbers-types-applications-vulcanization of rubber.

UNIT IV - CHEMISTRY OF ENGINEERING MATERIALS

12

Refractories — classification — acidic, basic and neutral refractories — properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling). **Abrasives** — natural and synthetic abrasives — quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide. **Lubricants** — mechanism of lubrication, liquid lubricants, - properties — (viscosity index, flash and fire points, cloud and pour points, oiliness) — solid lubricants — graphite and molybdenum sulphide. **Composites** — definition, constituents of composites — composition, properties and applications of various fibre reinforced polymer (FRP) composites.

UNIT V - CHEMISTRY OF BUILDING MATERIALS

12

Lime – classification – manufacture and properties of lime – Cement – classification – Portland cement – chemical composition – manufacture of Portland cement by wet method – setting and hardening – analysis of cement – concretes – hot and cold weathering of concrete, cement and its prevention methods – special cements - gypsum – plaster of Paris – Glass - manufacture, types, properties and uses – Recent trends in construction materials – special paints and their applications in construction sector.

TOTAL: 60 hours

TEXT BOOKS

- P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi, 17th Edition, 2018.
- S. Kalaiarasan et al, "Chemistry For Civil Engineering" Sonaversity, Sona College of Technology, Salem, 2019.

REFERENCE BOOKS

- O G Palana, Engineering Chemistry", Tata McGraw Hill Education (India) Private Limited, Chennai, Second Edition, 2017.
- B. Sivasankar, "Engineering Chemistry", Tata McGraw-Hill Pub. Co. Ltd., New Delhi (2008).
- B.K. Sharma, "Engineering Chemistry", Krishna Prakasan Media (P) Ltd., Meerut (2001).
- N. Krishnamurthy, K. Jeyasubramanian and P. Vallinayagam, "Applied Chemistry", Tata McGraw-Hill Publishing Company Limited, New Delhi (1999).

U19EGR106 - 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.
- 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.

					trength		relation) 3-Str	ong, 2-		, 1-Weak me (PSO			
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	2	1	1	1	1	1	3	2	2	3	2	2
CO 2	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO 3	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO 4	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO 5	3	2	2	1	1	1	1	1	3	2	2	3	2	2

CONCEPTS AND CONVENTIONS (Not for Examination)

L3

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

COMPUTER AIDED DRAFTING (Not for Examination)

L3

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

UNIT I - PLANE CURVES (Manual drafting)

L 6

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 L 12 (CAD Software)

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

L 12

(CAD Software)

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 L 12 (CAD Software)

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 L 12

(Manual drafting)

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

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

REFERENCE BOOKS

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

U19PCL108A - PHYSICS CHEMISTRY LABORATORY - I PHYSICS PART

(FOR B.E. CIVIL ENGINEERING)

L T P C 0 0 3 1.5

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

- **CO1:** Apply the principles of Optics, Thermal Physics 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 thickness 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, Spectrometer, able to handle burette and pipette

				(3/2	/1 indic	ates stre		/PO, PS correla			Medium, 1-	Weak		
				Prog	ramme	Outcom	es (POs) and P	rogram	me Specif	ic Outcome	(PSOs)		
COs	PO 1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3			1		1					1			2
CO2	3			1		1					1			2
CO3	3			1		1					1			2

List of Experiments (PHYSICS PART)

- 1. Determination of the thickness of a thin wire by forming interference fringes using air wedge apparatus.
- 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 velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
- 5. Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.
- 6. Determination of the Young's modulus of the given material by non-uniform bending method.

List of Experiments (CHEMISTRY PART)

- 1. Estimation of hardness of water sample by EDTA method.
- 2. Estimation of alkalinity of water sample by indicator method.
- 3. Estimation of HCl by pH metry.
- 4. Estimation of HCl by conductometry. (HCl vs NaOH)
- 5. Estimation of ferrous ion by potentiometric titration.
- 6. Evaluate the iron content of the water by spectrophotometry.

Total: 30 Hours

U19WPL112 - 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.

		(3.	/2/1 ind	icates s		O / PO				Medium	, 1-Weak			
											me (PSO			
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

U19GE101 - BASIC APTITUDE - I

(Common to All Departments)

L T P C 0 0 2 0

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

CO1: Solve fundamental problems in specific areas of quantitative aptitude

CO2: Solve basic problems in stated areas of logical reasoning

CO3: Demonstrate rudimentary verbal aptitude skills in English with regard to specific topics

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		(3)	/2/1 ind	icates s	trength	of cor	relation) 3-Str	ong, 2-	Medium	, 1-Weak			
		Pro	gramm	e Outco	omes (P	Os) an	d Progr	ramme	Specif	ic Outco	me (PSO	s)		
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	1	2	2	2	1	3	3	3	3	1	1	3	2	2
CO 2	3	3	1	1	2	3	2	3	3	2	2	3	3	3
CO 3	1	2	1	2	1	1	1	3	3	3	1	3	3	3

1. Quantitative Aptitude and Logical Reasoning

Solving simple problems with reference to the following topics:

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

2. Verbal Aptitude

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

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

TOTAL: 24 hours

Sona College of Technology, Salem – 636 005 (An Autonomous Institution)

Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)

S.N	Course Code	Course Title	L	Т	P	С	Category	Total Contact Hours
		Theo	ry					
1	U19ENG201A	English for Engineers-II	2	0	2	3	HSMC	60 (30L+30P)
2	U19MAT202A	Differential Equations and Vector Calculus	3	1	0	4	BSC	60
3	U19PPR205	Problem Solving Using Python Programming	3	0	0	3	ESC	45
4	U19BEE206	Basics of Electrical and Electronics Engineering	3	0	0	3	ESC	45
5	U19CE201	Basics of Engineering Mechanics	3	1	0	4	ESC	60
		Practi	ical					
6	U19BEE207	Basics of Electrical Engineering Laboratory	0	0	2	1	ESC	30
7	U19PCL208A	Physics and Chemistry Laboratory-II	0	0	3	1.5	BSC	45
8	U19PPL211	Python Programming Laboratory	0	0	2	1	ESC	30
9	U19GE201	Basic Aptitude-II	0	0	2	0	EEC	30
			T	otal C	redits	20.5		
	Optional Langua	age Elective*						
10	U19OLE1201	French						
11	U19OLE1202	German	0	0	2	1	HSMC	30
12	U19OLE1203	Japanese					ANDINE	30

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

Approved by			/
4.5~	20 May	Mirakman	IN IN
Chairperson, Science and Humanities BoS	Chairperson, Civil Engineering BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. R. Malathy	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kuma

Copy to:-HOD/Civil, Second Semester BE Civil Engineering Students and Staff, COE

U19ENG201A-English for Engineers – II

Common to Civil Branch

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

UNIT -I

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

UNIT – II

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

UNIT – III

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

UNIT - IV

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

UNIT - V

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

TOTAL: 45 hours

The listening test will be conducted for 20 marks and reading for 20 marks internally and evaluated along with 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.

B. E. / CIVIL ENGINEERING

SEMESTER - II	DIFFERENTIAL EQUATIONS AND	L	T	P	C
U19MAT202A	VECTOR CALCULUS	3	1	0	4

COURSE OUTCOMES

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

- 1. apply the classical methods to solve linear ordinary differential equations.
- 2. apply the appropriate numerical methods to solve ordinary differential equations.
- 3. apply the Laplace transforms technique to solve ordinary differential equations.
- 4. apply the classical method to solve partial differential equations.
- apply the concepts of vector differentiation and integration to determine the line, surface and volume integrals.

		(3/2/1 i	ndicate	es stren			SO Ma tion) 3			dium, 1	-Weak		
100			Progr	ramme	Outco	mes (P	Os) an	d Prog	ramme	e Specifi	ic Outco	me (PS	Os)	
-	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
COI	3	3	2	3	2							2	2	
CO2	3	3	2	3	2							2	2	
CO3	3	3	2	3	2							2	2	
CO4	3	3	2	3	2				200			2	2	200
CO5	3	3	2	3	2				17.50			2	2	

UNIT-I ORDINARY DIFFERENTIAL EQUATIONS

12

Linear higher order ordinary differential equations with constant coefficients - Cauchy's and Legendre's homogeneous linear ordinary differential equations - Method of variation of parameters.

UNIT - II NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL 12 EQUATIONS

Single Step Methods: Taylor's series – Euler and Modified Euler methods – Fourth order Runge – Kutta method for solving first and second order ordinary differential equations.

Multi Step Methods: Milne's and Adam's predictor-corrector methods.

UNIT - III LAPLACE TRANSFORMS

12

Laplace transform: Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse function – Initial and final value theorems – Transform of periodic functions.

Inverse Laplace transform: Standard results – Statement of convolution theorem and its applications – Solution of linear second order ordinary differential equations with constant coefficients using Laplace transform.

UNIT-IV PARTIAL DIFFERENTIAL EQUATIONS

12

Formation of partial differential equations - Lagrange's linear equation - Solution of standard types of first order partial differential equations - Linear partial differential equations of second and higher order with constant coefficients.

UNIT-V VECTOR CALCULUS

12

Vector differentiation: Scalar and vector valued functions - Gradient, directional derivative, divergence and curl - Scalar potential.

Vector integration: Line, surface and volume integrals - Statements of Green's, Stoke's and Gauss divergence theorem - Simple applications involving squares, rectangles, cubes and rectangular parallelopiped.

Theory: 45 Hours

Tutorial: 15 Hours

Total: 60 Hours

TEXT BOOKS:

- 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:

- J. Stewart, "Calculus", Cengage Publishers, 8th Edition, 2016.
- 2. C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1st Edition,
- 3. E. Kreyszig., "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint,
- B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2018.
- B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.

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 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															
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)															
COs	PO1															
001	-	2	_	-									2	2		
CO1	3	3	3	3									3	3		
CO2	2	3	3	3	3								3	2		
CO3	2	3	3	3	3								3	2		
CO4	2	3	3	3	3								3	2		
CO5	2	3	3	3	3								3	2		

UNIT I ALGORITHMIC PROBLEM SOLVING

9

Need for computer languages, Generation and Classification of computers - Basic organization of a computer, 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 and global scope, recursion, lambda functions. Files -Text files, reading and writing files.

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

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.

U19BEE206 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

L T P C 3 0 0 3

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

- 1. analyze the various DC & AC circuits and find the circuit parameters.
- 2. discuss the construction and working principle of DC machines.
- 3. discuss the construction and working principle of Transformer & AC machines.
- 4. describe the various types of measuring techniques.
- 5. discuss the electrical systems in buildings and electrical standards for various devices.

			(3/2/1 i	indicate	es stren			SO Map tion) 3-		, 2-Med	ium, 1-V	Veak			
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 P09 PO10 PO11 PO12 PS01 PS02														
CO1	2	2	1	2	1	1	1	2	-	-	1	1	1	1	
CO2	2	2	1	1	1	1	1	-	-	-	1	1	1	1	
CO3	2	2	1	1	1	1	1	-	-	-	1	1	1	1	
CO4	2	2	1	1	1	1	1	-	-	-	1	1	1	1	
CO5	2	2	1	2	1	1	1	2	-	-	1	1	1	1	

UNIT I - DC & AC CIRCUITS

9

DC circuits: Definition of voltage, Current, Electromotive force, Resistance, Power & Energy, Ohms law and Kirchhoff's Law & its applications - Series and Parallel circuits- Star-delta transformation.

AC Circuits: Generation of alternating emf - RMS value, Average value, Peak factor and Form factor for sinusoidal AC waveform - Series RLC circuits - Introduction to three-phase system.

UNIT II - DC MACHINES

9

DC Generator: Construction of DC generator – Working principle of DC generator – EMF equation – Types of DC generator- Applications.

DC Motor: Working principle of DC motor – Back EMF- Types of DC motor- Applications.

UNIT III - TRANSFORMER & AC MACHINES

9

Transformer: Construction and working principle of transformer – EMF equation – Types of transformers-Transformation ratio.

AC machines: Construction and working principle of single phase & three phase induction motor-Applications.

UNIT IV - MEASURING TECHNIQUES

9

Strain measuring techniques using electrical strain gauges- Measurement of Resistance, Inductance and Capacitance using Wheatstone, Anderson and Schering bridges- Measurement of energy using single phase induction type energy meter –Load cells.

UNIT V - ELECTRICAL SYSTEMS IN BUILDINGS

9

Protective devices in electrical installations- Earthing for safety- Types of earthing- ISI specifications-Types of wires, wiring systems and selection criteria - Planning electrical wiring for building- Main and distribution boards- Layout of a substation.

TOTAL: 45 Hours

TEXT BOOKS

- 1. B.L. Theraja, "Fundamentals of Electrical Engineering & Electronics", S. Chand & Co Ltd, 2015.
- 2. S. Padma, "Basic Electrical and Electronics Engineering", Sonaversity, Revised edition 2016.

REFERENCES

- 1. S.K. Bhattacharya, "Electrical Machines", Tata MC Graw Hill Publishing company ltd., 3rd Edition, 2009.
- 2. Muthusubramanian R, Salivahanan S, "Basic Electrical and Electronics Engineering", 3rd Edition 2007, Tata McGraw-Hill publishing company limited.
- 3. A.K.Sawheny, "A course in Electrical and Electronics Measurement & Instrumentation", DhanpatRai and Co, 9th Edition, 2012

U19CE201 - BASICS OF ENGINEERING MECHANICS

L T P C 3 1 0 4

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

- 1. apply the various methods to determine the resultant forces and its equilibrium acting on a particle in 2d and 3d.
- 2. apply the concept of reaction forces (non-concurrent coplanar and noncoplanar forces) and moment of various support systems with rigid bodies in 2d equilibrium. reducing the force, moment, and couple to an equivalent force couple system acting on rigid bodies in 2d.
- 3. apply the concepts of locating centroids / center of gravity of various sections/ volumes and to find out area moments of inertia for the sections and mass moment of inertia of solids.
- 4. apply the concepts of frictional forces at the contact surfaces of various engineering systems.
- 5. apply the various methods of evaluating kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.

UNIT I - STATICS OF PARTICLES

9+3

Fundamental Concepts and Principles, Systems of Units, Method of Problem Solutions, Statics of Particles -Forces in a Plane, Resultant of Forces, Resolution of a Force into Components, Rectangular Components of a Force, Unit Vectors. Equilibrium of a Particle- Newton's First Law of Motion, Space and Free-Body Diagrams, Forces in Space, Equilibrium of a Particle in Space.

UNIT II - EQUILIBRIUM OF RIGID BODIES 9+3

Principle of Transmissibility, Equivalent Forces, Vector Product of Two Vectors, Moment of a Force about a Point, Varignon's Theorem, Rectangular Components of the Moment of a Force, Scalar Product of Two Vectors, Mixed Triple Product of Three Vectors, Moment of a Force about an Axis, Couple - Moment of a Couple-Further Reduction of a System of Forces, Equilibrium in Two - Reactions at Supports and Connections.

UNIT III - PROPERTIES OF SURFACES AND SOLIDS 9+3

Determination of Areas and Volumes – First moment of area and the Centroid of sections – Rectangle, circle, triangle from integration – T section, I section, Hollow section by using standard formula Second and product moments of plane area –

Rectangle, triangle, circle from integration – T section, I section by using standard formula – Parallel axis theorem and perpendicular axis theorem – Polar moment of inertia – Principal moments of inertia of plane areas – Principal axes of inertia.

UNIT IV - FRICTION

9+3

Frictional force – Laws of Coulomb friction – Angle of friction – cone of friction – Equilibrium of bodies on inclined plane – Ladder friction.

UNIT V - DYNAMICS OF PARTICLES

9+3

Kinematics - Rectilinear Motion and Curvilinear Motion of Particles. Kinetics- Newton's Second Law of Motion - Equations of Motions, Dynamic Equilibrium, Energy and Momentum Methods - Work of a Force, Kinetic Energy of a Particle, Principle of Work and Energy, Principle of Impulse and Momentum, Impact.

TOTAL: 60 Hours

TEXT BOOKS

- Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, SanjeevSanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education., 11th Edition, 2017.
- 2. Hibbeler, R.C., "Engineering Mechanics", Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., (2017).
- 3. Vela Murali, "Engineering Mechanics-Statics and Dynamics", Oxford University Press, 2018.

REFERENCES

- 1. K.L. Kumar, "Engineering Mechanics" Tata McGraw-hill, 2017, 4th Edition
- 2. S.S. Bhavikatti, "Engineering Mechanics", New Age International Publishers, 2006
- 3. R. S. Khurmi, "Engineering Mechanics", S. Chand Publishers, 2018.
- 4. Dr. N. Kotteswaran, "Engineering Mechanics Statics & Dynamics", SriBalaji Publications 2004.

U19BEE207 BASIC OF ELECTRICAL ENGINEERING LABORATORY

L T P C 0 0 2 1

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

- 1. apply basic circuit laws for calculating electric parameters of DC & AC circuits.
- 2. determine and draw the mechanical, electrical and performance characteristics of electrical machines.
- 3. determine the value of Resistance, Inductance and Capacitance using various bridges.

	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)															
COS	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 P09 PO10 PO11 PO12 PSO1 PSO2														
CO1	2	2	1	2	1	1	1	2	-	-	1	1	1	1		
CO2	2	2 2 1 1 1 1 1 1 1 1 1														
CO3	2	2 2 1 1 1 1 1 1 1 1 1														

List of Experiments

- 1. Verification of Ohm's law
- 2. Verification of Kirchhoff's laws
- 3. Measurement of power and power factor for series RLC circuit
- 4. Load characteristics of DC shunt motor
- 5. Speed control of DC shunt motor
- 6. Load test on single phase transformer
- 7. Speed control of three phase induction motor
- 8. Measurement of DC resistance by Wheatstone bridge.
- 9. Measurement of inductance using Anderson bridge
- 10. Measurement of capacitance using Schering bridge
- 11. Measurement of earth pit resistance using megger

TOTAL: 30 Hours

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CO										ed for ho						
D	determine the amount of pH of house hold water sample and suggest the remedial measures. e-requisite: Capable of using Screw guage, Vernier calliper, Travelling microscope, Spectrometer,															
	to handle burette and pipette															
						(CO/PO	, PSO	Mapı	ping						
	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	PO	PO	РО	РО	РО	PO	РО	РО	PO	PO	PO	PO	F	PSO		PSO
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CO2	2 3 1 1 2															
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List o	f Expe	erimen	ts (Ph	ysics	part)											
1	Dete	rminati	on of 1	rigidit	y mod	ulus of	the m	aterial	of wir	e using	torsion	penduli	ım.			
2	Dete	rminati	on of s	specif	ic resis	stance	of a giv	ven wi	re usin	ng Carey	Foster	's bridg	e.			
3	Dete	rminati	on of	coeffic	cient o	f visco	sity of	liquid	by Po	iseuille'	's metho	od.				
4	Dete	rminati	on of	wavel	ength o	of pron	ninent	colors	in me	rcury sp	ectrum	using a	spec	ctror	nete	r.
5	Dete	rminati	on of 1	the Yo	oung's	modul	lus of t	he give	en mat	erial by	uniforn	n bendi	ng m	etho	od.	
6	Dete	rminati	on of l	bandg	ap of a	semic	conduc	tor dio	de.							
List o	f Expo	erimen	ts (Ch	emist	ry par	rt)										
7		nation o					•									
8	8 Estimation of alkalinity of water sample by indicator method.															
	9 Estimation of HCl by pH metry.															
9 10_ 11	Estin	nation o	of HC	l by co	onducto	y. ometry			OH)							

valuate the iron content of the water by spe	Total Hours: 45 Hrs
	2000 220 0000 10 2210

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

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

U19GE201 - BASIC APTITUDE - II

L T P C 0 0 2 0

Course Outcomes: At the end of the course, the students will be able to CO1

solve more elaborate problems than those in BA-I in specific areas of

quantitative aptitude.

CO2 solve problems of greater intricacy than those in BA-I in stated areas of logicalreasoning.CO3 demonstrate higher than BA-I level verbal aptitude skills in English with regardto specific topics.

List of Experiments

1. QUANTITATIVE APTITUDE AND LOGICAL REASONING

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

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

2. VERBAL APTITUDE

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

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

TOTAL: 24 Hours

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E. / B.Tech. Semester III under Regulations 2019

Branch: Civil Engineering

							Total
S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Contact
							Hours
		Theory					
1	U19MAT301A	Fourier Analysis and Statistics	3	1	0	4	60
2	U19CE301	Mechanics of Fluids	2	1	0	3	45
3	U19CE302	Strength of Materials -I	2	1	0	3	45
4	U19CE303	Construction Materials and Practices	3	0	0	3	45
5	U19CE304	Surveying	3	0	0	3	45
6	U19GE302	Mandatory Courses: Environment and Climate Science	2	0	0	0	30
		Practical					
7	U19CE305	Materials Testing Laboratory	0	0	2	1	30
8	U19CE306	Survey Laboratory	0	0	2	1	30
9	U19ENG301	Communication Skills Laboratory	0	0	2	1	30
10	U19GE301	Soft Skills and Aptitude-I	0	0	2	1	30
				To	tal Credits	20	

Approved By

Chairperson, Civil Engineering BoS Dr.R.Malathy

Member Secretary, Academic Council Dr.R.Shivakumar

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

Copy to:-

HOD/Civil Engineering, Third Semester BE Civil Students and Staff, COE

COURS	SE CODE	COURSE NAME	L	Т	P	C			
	CE301	MECHANICS OF FLUIDS	2	1	0	3			
Course	Objective (s): The Purpose of learning this course is to:							
1.	Measure t	he basic properties of fluid.							
2.	Understan	nd the concepts of statics and dynamics of fluid flow.							
3.	Compute	the major and minor losses occurring in pipe flow.							
4.	Understan	nd the concepts of boundary layer problem.							
5.	Physical 1	aws in addressing problems in hydraulics.							
Course (Outcome (s) (COs): At the end of this course, the students will be able to:							
CO1	Describe t	the fundamental and physical properties of a fluid (K2)							
CO2	Imbibe ba	sic laws and equations used for analysis of static and dynamic fluids (K	(2)						
CO3	Evaluate the fluid velocity considering major and minor losses; and also understand the application of Equations of motion & Conservation of momentum to different fluids (K3)								
CO4	1	Boundary layer concept for different fluid flow types (K3)							

Knowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:

Apply the similitude concept and set up the relation between a model and a prototype (K4)

CO - PO Mapping

CO		Pos												Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS
CO1	3	1	3	1	1	1	3	1	1	-	-	2	1	2
CO2	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO3	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO4	1	2	3	2	2	2	3	3	2	-	-	2	2	2
CO5	1	3	3	2	2	2	3	1	2	-	-	2	2	2
CO (Avg)	2.2	2	3	1.4	1.8	1.4	3	1	1.4	-	-	2	1.4	2

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

UNIT-I FLUID PROPERTIES AND FLUID STATICS

9 Hours

Definitions-Fluid and fluid mechanics-Dimensions and units-Fluid properties: Density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapour pressure, capillarity and surface tension-Continuum concept of system and control volume. Fluid statics: concept of fluid static pressure, absolute, gauge, atmosphere and vacuum pressures - Measurements of pressure. Hydrostatic forces on surfaces -forces on planes – centre of pressure.

UNIT-II FLUID KINEMATICS AND DYNAMICS

9 Hours

Fluid Kinematics: Classification and types of flow - continuity equation (one dimensional differential forms)- velocity field and acceleration- Velocity potential function and stream function-Equipotential line- Flow net. Fluid Dynamics: Equations of motion -Euler's equation of motion-Bernoulli's equation: Applications:- Venturi meter- Orifice meter and Velocity measurement (Pitot tube, Current meter, Hot wire and hot film anemometer, Float technique, Laser Doppler velocimetry)-linear momentum equation and its application to pipe bend.

UNIT - III FLOW THROUGH PIPES AND CHANNEL

9 Hours

Flow through Orifices and Mouth pieces. Reynold's experiment -Laminar flow through circular pipe (Hagen poiseulle's). Flow through pipes -Losses of energy in pipes- Major Energy losses (Darcy - Weisbach's and Chezy's Formula)- Minor Energy losses-Hydraulic gradient and total energy line-Flow through compound: Pipes in series and in parallel-Power transmission through pipes-. Measurement of flow through notches and weir

UNIT-IV BOUNDARY LAYER

9 Hours

Boundary layer - Definition- boundary layer on a flat plate - Laminar and turbulent boundary layer- Displacement, energy and momentum thickness - Momentum integral equation-Boundary layer separation and control - Drag on flat plate.

UNIT-V DIMENSIONAL ANALYSIS AND MODEL STUDIES

9 Hours

Fundamental dimensions - Dimensional homogeneity- Method of dimensional analysis: Rayleigh's method and Buckingham π - theorem-Model analysis-Similitude- Types of similarities-Types of forces acting in moving fluid-Dimensionless numbers-Model Laws-Classification of models: Undistorted and distorted models.

TOTAL (L:30+T:15): 45 PERIODS

TEXT E	BOOKS:
1.	Bansal R.K., "Fluid Mechanics and Hydraulic Machines", Laxmi Publications, New Delhi, 2017.
2.	Rajput R.K., "Fluid Mechanics and Hydraulic Machines", S. Chand Publishing Ltd, New Delhi, 2013.
REFER	ENCES:
1.	Kumar K.L, "Engineering Fluid Mechanics", Eurasia Publishing House Pvt. Ltd, New Delhi, 1995.
2.	Modi P.N and Seth, "Hydraulics and Fluid Mechanics including Hydraulic Machines", Standard Book House New Delhi. 2004.
3.	Subramanya K, "Fluid Mechanics and Hydraulic Machines-Problems and Solutions", Tata McGraw Hill
J.	Education, New Delhi, 2010.

COURS	E CODE	COURSE NAME	L	T	P	C					
U190	CE302	Strength of Materials -I	2	1	0	3					
Course (Objective (s): The Purpose of learning this course is to:										
1.	Inculcate	the basic knowledge on the stress-strain and its application in civil engi	neering s	tructures							
2.	Develop t	he ability of students to carry out analysis of complex state of stress.									
3.	Analyse a	nd understand different internal forces and stresses induced due to repre	sentative	loads or	structura	al					
	elements.					ļ					
4.		e student about different types of stresses induced in beams and shafts d	ueto ben	ding and	twisting						
	moments	respectively									
5.	Evaluate t	he behaviour of torsional member and application in springs.									
Course (Outcome (s) (COs): At the end of this course, the students will be able to:									
CO1	Comprehe	end the state of stresses and strains in various structural components und	der all typ	es of for	ces.(K2)						
CO2	Determine	e principal stresses and planes for an element in two and three dimensio	nal state	of stress.	(K4)						
CO3	Draw the Shearing force and bending moment diagrams for beams subjected to all the types of loading. (K3)										
CO4	Calculate bending and shearing stresses of beam under flexure and shear.(K4)										
CO5	Ideas of to	orsional stresses and how to evaluate it in circular sections and its applications	cations in	spring a	nalysis.(1	K4)					

Knowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:

CO – PO Mapping

COs						I	Pos						PS	Os
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS2
CO1	3	1	3	1	1	1	3	1	1	-	-	2	1	2
CO2	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO3	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO4	1	2	3	2	2	2	3	3	2	-	-	2	2	2
CO5	1	3	3	2	2	2	3	1	2	-	-	2	2	2
СО	2.2	2	3	1.4	1.8	1.4	3	1	1.4	-	-	2	1.4	2
	14. 1			1 (1) 1 4	(T.)			3.6.1	. 01.1			2 2 1	1 (1)	

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

SIMPLE STRESSES

9 Hours

Simple Stresses and strains -Elastic constants -Volumetric strain- Relationship between elastic constants-Stress Strain diagram for ductile and brittle materials-Analysis of axially loaded members-Composite Bars-Thermal Stresses.

UNIT-II **COMPLEX STRESSES**

9 Hours

State of Stress in two dimensions-Stresses on inclined planes-Principal Stresses and Principal Planes-Maximum shear stress -Mohr's circle method. State of stress in three dimensions-Stress invariants - Determination of principal stresses and principal planes.

UNIT-III SHEARING FORCE AND BENDING MOMENT

9 Hours

Types of loads, supports, beams-Concept of shearing force and bending moment - Relationship between intensity of load, Shearing Force and Bending moment - Shearing Force and Bending Moment Diagrams for Cantilever, simply supported and overhanging beams with concentrated load, uniformly distributed load, uniformly varying load and concentrated moment.

STRESSES IN BEAMS

9 Hours

Theory of simple bending-Assumptions and derivation of simple bending equation-Flexural rigidity- Bending and shearing stress distribution diagrams- Composite beams.

UNIT-V **TORSION**

9 Hours

Theory of Torsion- Assumptions and derivation of torsional equation-Power transmitted-Stresses and Deformations in Solid and Hollow Circular Shafts- Compound shaft- Combined bending and torsion of shafts- Shaft in series and parallel. Open and Closed coiled helical springs- laminated springs - Springs in series and parallel. Design of buffer springs.

TOTAL: 45 Hours

TEXT E	BOOKS:
1.	Rajput R.K, "Strength of Materials", S.Chand and Co, New Delhi, 2014.
2.	Bansal R.K, "Strength of Materials", Laxmi Publications, New Delhi, 2017.
REFER	ENCES:
1.	Chandramouli P.N, "Fundamentals of Strength of Materials", PHI Learning Private Limited, New Delhi, 2013.
2.	Subramanian R, "Strength of Materials", Oxford University Press, New Delhi, 2010.
3.	Bhavikatti. S., "Solid Mechanics", Vikas publishing house Pvt. Ltd, New Delhi, 2010.
4.	Timoshenko.S.B. and Gere.J.M, "Mechanics of Materials", Van NosReinbhold, New Delhi1995.
5.	S.S. Rattan "Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013)

COURS	SE CODE	COURSE NAME		L	T	P	С			
U190	CE303	CONSTRUCTION MATERIALS AND PRACT	TICES	3	0	0	3			
Course (se Objective (s): The Purpose of learning this course is to:									
1.	Impart the	e basic knowledge about building construction and types	of buildings wi	ith requir	ements					
2.	Acquaint	the various building materials								
3.	Expound	the concrete making materials with its desirable propertie	·s							
4.	Elucidate	the various construction practices								
5.	Explicate	the function and classification of various building compo	nents and form	n works						
Course	Outcome (s) (COs): At the end of this course, the students will be	able to:							
CO1	Familiariz	te the Building components and its function.(K2)								
CO2	Choose ef	fective brick, timber, roofing materials in the field.(K2)								
CO3	Select sui	table type of concrete making materials.(K2)								
CO4	Practice v	arious construction techniques in the field.(K3)								
CO5	5 Understand the Function and location of doors, windows and stair case.(K2)									
Knowled	nowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:									
CO – PO	PO Manning									

COs	Pos											PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS
CO1	3	1	3	1	1	1	3	1	1	-	-	2	1	2
CO2	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO3	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO4	1	2	3	2	2	2	3	3	2	-	-	2	2	2
CO5	1	3	3	2	2	2	3	1	2	-	-	2	2	2
CO	2.2	2	3	1.4	1.8	1.4	3	1	1.4	-	-	2	1.4	2

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

UNIT-I INTRODUCTION TO BUILDING CONSTRUCTION

9 Hours

General: Definition of Civil Engineering-Function of Civil Engineer-Division of Civil Engineering- Types of structure : Load Bearing Structure - Framed Structure. Components of building and its function. Site planning: Precaution in selection of sites- Situations and surrounding of site for various types of building-Procedure for site analysis. Sub structure: Functional requirement of a foundation-Bearing capacity of soil- Types of foundation and their construction-Suitability.

BUILDING MATERIALS

Bricks- Manufacturing process-Classification-Testing- Bricks for special use-Refractory bricks. Stone as building material-Criteria for selection-Tests on stones-Application. Timber- Market forms and Industrial forms-Properties-Seasoning and Preservative treatment - Structural steel-Shapes-Applications. Flooring and roofing: Materials-Suitability-Types. Pipes: Types-Sizes-Application. Paints - Varnishes - Distempers - Bitumens. Concrete blocks - Lightweight concrete blocks.

UNIT-III CONCRETE MAKING MATERIALS

9 Hours

Lime - Preparation of lime mortar. Cement - Ingredients - Manufacturing process - Types and Grades - Properties of cement and Cement mortar - Hydration - Compressive strength - Tensile strength - Fineness- Soundness and consistency - Setting time- Storage of cement. Aggregate: Classification-Fine aggregates - River sand - Artificial sand - Properties - Bulking of sand-Fineness modulus. Coarse Aggregates - Crushing strength - Impact strength - Flakiness Index - Elongation Index -Abrasion Resistance- Grading.

CONSTRUCTION PRACTICES

Introduction about NBC-Specifications, details and sequence of activities and construction co-ordination - Site Clearance -Marking - Earthwork - Masonry: Bonds - Brick masonry-Stone masonry - concrete hollow block masonry - Flooring -Damp proof courses - Construction joints - Movement and expansion joints - Pre cast pavements - Fabrication and erection of steel trusses - Frames - Braced domes - Laying brick -Weather and water proof - Rroof finishes - Acoustic and fire protection.

-	
Lintel:	Functions of lintel and sunshade-Types of lintel; Arches: Construction-Elements-Classification. Doors and
Window	vs: Technical terms-Types and their suitability. Stair and stair cases:Terminology-Location and classification of
	equirement of good stair. Form works: Centering and shuttering - Scaffoldings, shoring and underpinning - Slip
	equirement of good stair. Form works: Centering and shuttering - Scarfoldings, shoring and underplinning - Sup
forms.	
	TOTAL: 45 Hours
TEXT	BOOKS:
1.	Rajput R K., "Engineering Materials", S Chand and Company Ltd, 2014.
2.	Arora S.P and Bindra S.P, "Building Construction", DhanpatRai Publications (P) Ltd, 2015.
REFER	RENCES:
1.	Shetty M.S, "Concrete Technology Theory and Practice", S. Chand and Company Ltd, New Delhi, 2014.
2.	Punmia B.C, "Building Construction", Laxmi Publication, New Delhi, 2016.
2.	Tulinia B.C., Building Constitution, Lumini Luminiani, 11011 Bolini, 2010.
3.	Sahu G.C., Joygopal Jena., "Building Materials and Construction", McGraw Hill Education (India) Private
5.	
4	Limited. New Delhi. 2015.
4.	William H.Severns and Julian R.Fellows, "Air-conditioning and Refrigeration", John Wiley and Sons, London,
	1988.
5.	A.F.C. Sherratt, "Air-conditioning and Energy Conservation", The Architectural Press, London, 2007.

BUILDING COMPONENTS AND FORMWORKS

9 Hours

UNIT-V

RSE CODE COURSE NAME L T									
CE304	3	0	0	3					
Objective (s): The Purpose of learning this course is to:									
Study the	basics of linear/angular measurement methods like Chain surveying,Co	mpass su	ırveying						
Know the	basics of levelling and theodolite survey in elevation and angular measure	urements	3						
understan	d tacheometric surveying in distance and height measurements								
Know the	setting out of simple curves by linear and instrument method								
study the	total station surveying								
Outcome (s	(COs): At the end of this course, the students will be able to:								
	• • • •	measure	differen	ce in elev	ation				
•									
Describe t	the methods of Tacheometric surveying and contouring. (K1)								
Describe t	the methods of setting out curves in the field and to determine the area	and volur	ne of stru	ictures.(I	K1)				
	_	ents.Cond	luct the g	lobal					
positioning system for determining geographical location of the site.(K2)									
edge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:									
O Mapping									
	Pos			PS	Os				
	Study the Know the understand Know the study the Study the Conduct I Determine and produ Describe t Handle to positionin Ige Level: I	SURVEYING Objective (s): The Purpose of learning this course is to: Study the basics of linear/angular measurement methods like Chain surveying, Course is to: Know the basics of levelling and theodolite survey in elevation and angular measurements and tacheometric surveying in distance and height measurements Know the setting out of simple curves by linear and instrument method study the total station surveying Outcome (s) (COs): At the end of this course, the students will be able to: Conduct linear and angular measurement survey with the help of chain, tape and Determine the horizontal and vertical distance by traversing using theodolite and and produce reduced level of the given points.(K3) Describe the methods of Tacheometric surveying and contouring. (K1) Describe the methods of setting out curves in the field and to determine the area and Handle total station instrument for making the horizontal and vertical measurement positioning system for determining geographical location of the site.(K2) Ige Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: OMapping	SURVEYING Study the basics of linear/angular measurement methods like Chain surveying, Compass so Know the basics of levelling and theodolite survey in elevation and angular measurements understand tacheometric surveying in distance and height measurements Know the setting out of simple curves by linear and instrument method study the total station surveying Outcome (s) (COs): At the end of this course, the students will be able to: Conduct linear and angular measurement survey with the help of chain, tape and compass. Determine the horizontal and vertical distance by traversing using theodolite and measure and produce reduced level of the given points.(K3) Describe the methods of Tacheometric surveying and contouring. (K1) Describe the methods of setting out curves in the field and to determine the area and volur Handle total station instrument for making the horizontal and vertical measurements. Cond positioning system for determining geographical location of the site.(K2) Ige Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Ev. Mapping	SURVEYING SURVEYING SURVEYING Study the basics of linear/angular measurement methods like Chain surveying, Compass surveying Know the basics of levelling and theodolite survey in elevation and angular measurements understand tacheometric surveying in distance and height measurements Know the setting out of simple curves by linear and instrument method study the total station surveying Outcome (s) (COs): At the end of this course, the students will be able to: Conduct linear and angular measurement survey with the help of chain, tape and compass.(K1) Determine the horizontal and vertical distance by traversing using theodolite and measure different and produce reduced level of the given points.(K3) Describe the methods of Tacheometric surveying and contouring. (K1) Describe the methods of setting out curves in the field and to determine the area and volume of structure of the station instrument for making the horizontal and vertical measurements. Conduct the gpositioning system for determining geographical location of the site.(K2) Ige Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate: Mapping	SURVEYING SURVEYING Study the basics of linear/angular measurement methods like Chain surveying, Compass surveying Know the basics of levelling and theodolite survey in elevation and angular measurements understand tacheometric surveying in distance and height measurements Know the setting out of simple curves by linear and instrument method study the total station surveying Outcome (s) (COs): At the end of this course, the students will be able to: Conduct linear and angular measurement survey with the help of chain, tape and compass.(K1) Determine the horizontal and vertical distance by traversing using theodolite and measure difference in elevand produce reduced level of the given points.(K3) Describe the methods of Tacheometric surveying and contouring. (K1) Describe the methods of setting out curves in the field and to determine the area and volume of structures.(I Handle total station instrument for making the horizontal and vertical measurements. Conduct the global positioning system for determining geographical location of the site.(K2) Ige Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:				

COs		Pos									PS	Os		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS
CO1	3	2	3	1	1	3	3	2	1	-	-	2	3	2
CO2	3	3	2	2	2	3	2	1	1	-	-	3	1	2
CO3	3	2	2	2	2	2	3	-	1	-	-	2	1	2
CO4	2	2	3	2	2	2	3	3	2	-	-	2	2	2
CO5	2	3	3	2	2	2	3	1	2	-	-	2	2	2
СО	3.2	2.4	2.6	1.8	1.8	2.4	2.8	1.4	1.4			2.2	1.8	2

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

UNIT-I FUNDAMENTALS OF CONVENTIONAL SURVEYING AND LEVELLING 9 Hours

Classifications and basic principles of surveying - Equipment and accessories for ranging and chaining - Methods of ranging - Compass - Types of Compass - Bearing - Types - True Bearing - Magnetic Bearing - Levelling- Principles and theory of Levelling - Datum- Bench Marks - Temporary and Permanent Adjustments- Methods of Levelling- Booking - Reduction - Sources of errors in Levelling - Curvature and refraction.

UNIT-II THEODOLITE AND TRIGNOMETRIC LEVELLING

9 Hours

Introduction- Classification of theodolite- Temporary and permanent adjustments –Measurements of horizontal and vertical angles- Theodolite traversing-Traversing computation-Balancing of traversing-Introduction to omitted measurements. Trignometrical levelling: Heights and distances - Base of the object accessible and inaccessible.

UNIT-III TACHEOMETRIC SURVEYING AND CONTOURS

9 Hours

Introduction-Instruments-Different systems of tachometric measurements- Tacheometer -Stadia Constants - Analytic Lens - Tangential and Stadia Tacheometry surveying-Substense method: Vertical and horizontal measurements. Contour - Contouring - Characteristics of contours - Methods of contouring- Direct method-Indirect method- Contour gradient -Uses of contour plan and map- Measurements of area and volume.

UNIT-IV CURVESAND TRIANGULATION

9 Hours

Curves-Classifications-Elements of curves-Designation of curves-Setting out of simple curves: Linear and instrument method. Triangulation- Classification-Basic systems-Operation-Signals and towers-Satellite station.

	sensing: Classification-principles- Resolution-Sensors-Methods of remote sensing-Inton-Remote sensing in India. Geographic Information Systems: Scope- Purposes- Hardware									
	ositioning Systems: GPS elements- Application and uses- Advantages. Introduction about Drog	* *								
		TOTAL: 45 Hours								
TEXT B	OOKS:									
1.	Punmia B.C, "Surveying, Vol. I and II", Laxmi Publications, 2016.									
2.	Basak N.N, "Surveying and Levelling", Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2014.									
3.	Kumar S., "Basics of Remote Sensing and GIS", Laxmi Publication (P) Ltd,2015									
REFER	ENCES:									
1.	Arora K. R, "Surveying Vol. I and II", Standard Book House, 2015.									
2.	Duggal S.K, "Surveying Vol. I and II", Tata McGraw Hill, New Delhi, 2013.									
3.	Kanetkar T.P, "Surveying and Levelling Vols. I and II", United Book Corporation, Pune, 201	4.								

Total station: Features-Recording-Advantages-Fields procedure. Photogrammetry: Aerial photogrammetry-Application.

9 Hours

ADVANCED SURVEYING

COURSE CODE U19GE302 L T P C

COURSE NAME MANDATORY COURSE:

ENVIRONMENT AND CLIMATE SCIENCE 2 0 0 0

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.

СО-РО	PO -	PO -	PO -	PO -	PO -	PO -	PO -	PO -	PO -	PO -	PO -	PO -
Mappin	1	2	3	4	5	6	7	8	9	10	11	12
g												
CO - 1	√	$\sqrt{}$				√	V					
CO - 2	$\sqrt{}$											
CO - 3	V	$\sqrt{}$				√	1					
CO - 4	√	$\sqrt{}$				√	V					
CO - 5	V	$\sqrt{}$				V	√					

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 measuresMontreal 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

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

Text Book:

- 1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018 2. Anubha Kaushik and Kaushik,
- 2. "Environmental Science and Engineering" New Age International Publication, 4thMulticolour 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.

COURS	SE CODE	COURSE NAME	L	T	P	C			
U190	CE305	MATERIAL TESTING LABORATORY	0	0	2	1			
Course	Objective (s): The Purpose of learning this course is to:			-				
1.	Provide b	asic knowledge on properties of various construction materials.							
2.	Acquaint	with the experimental methods to determine the mechanical properties	of materi	als.					
3.	Provide k	nowledge in design of concrete structures, soil subgrade and pavements	١.						
Course	Outcome (s	(COs): At the end of this course, the students will be able to:							
CO1	Determine	the physical properties of given cement, fine aggregates coarse aggreg	gates and	wooden	sample. (K4)			
CO2	Evaluate 1	Modulus of elasticity, torsional strength, hardness and tensile strength of	f given s	pecimen	s. (K5)				
CO3	Apply the technical concepts and ways to solve engineering problems through conducting experiments. (K3)								
Knowled	ledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:								
CO DO	Monning								

CO - PO Mapping

COs		Pos										PS	Os	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS
CO1	3	1	1	1	1	1	1	2	1	-	-	2	1	2
CO2	3	2	3	1	2	1	1	2	1	-	-	2	1	2
CO3	3	3	3	3	2	2	2	3	2	1	1	3	1	2
CO	3	2	2.3	1.7	1.7	1.3	1.3	2.3	1.3	0.3	0.3	2.3	1	2
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Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

COURSE CONTENT

Brick/Building blocks: Shape and Size-Efflorescence-Compressive strength-Water absorption- Field test.

Wood: Compressive strength.

Cement: Specific gravity test- Fineness -Consistency test- Setting time- Soundness -Compressive strength of cement mortar cubes- Field test.

 $\textbf{Fine aggregate:} \ \ \textbf{Specific gravity test-Bulking of sand-Sieve Analysis-Fineness modulus}.$

Coarse aggregate: Specific gravity test-Crushing strength-Impact strength-Shape test-Water absorption- Sieve Analysis-Fineness modulus.

Steel: Stress-strain characteristics - Modulus of elasticity -Hardness -Impact strength-Shear strength.

Evaluation of Stiffness on helical spring.

Stiffness and modulus of rigidity of the specimen using torsion testing machine.

Deflection test on cantilever and simply supported beam.

		TOTAL: 30 Hours
REFER	ENCES:	
1.	M. S. Shetty, "Concrete Technology - Theory and Practice", S. Chand Publications, 2006	
2.	IS 4031 (Part 1) – 1996 – Indian Standard Method for determination of fineness by dry sievir	ıg.
3.	IS 2386 (Part 1 to Part 6) – 1963 – Indian Standard methods for test for aggregate for concre	te
4.	IS 383–1970 Indian Standard specification for coarse and fine aggregates from natural source	es for concrete.
5.	IS 456-2000 Code of Practice is an Indian Standard code for Plain and Reinforced Concrete	

COURS	SE CODE COURSE NAME L T P									
U190	CE306	SURVEY LABORATORY	0	0	2	1				
Course	Objective (s): The Purpose of learning this course is to:								
1.	To train th	ne students in taking field observations pertaining to some of the real w	orld prob	lems suc	n as					
		ion, contouring, Total Station, Drones etc								
2.	To train th	ne students in all the related calculations and in the preparation of the re	quired m	iaps.						
3.	To impart	intensive training in the use of surveying instruments								
4.	To train th	ne students to appreciate practical difficulties in surveying on the field.								
5.	Providing	an opportunity to the students to develop team spirit.								
Course	Outcome (s) (COs): At the end of this course, the students will be able to:								
CO1	Use conve	entional surveying tools such as chain/tape, compass, dumpy level, theo	dolite in	the field	of civil					
	engineerii	ng applications such as structural plotting and highway profiling.								
CO2	Use modern surveying instruments like total station and GPS.									
CO3	Apply the	technical concepts and ways to solve engineering problems by conduct	ting expe	riments.						
Knowled	dge I evel·	K1 – Remember: K2 – Understand: K3 – Apply: K4 – Apalyze:	K5 _ Fv	aluate						

Knowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:

CO - PO Mapping

COs	Pos												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS	
CO1	3	3		2		2		2	3	3	2	2	2	2	
CO2	3	3		2		2		2	3	3	2	2	2	2	
CO3	3	3		2		2		2	3	3	2	2	2	2	
CO	3	3		2		2		2	3	3	2	2	2	2	

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

TOTAL: 30 Hours

COURSE CONTENT S

Chain Survey

1. Study of chains and its accessories, Aligning, Ranging, Chaining and Marking Perpendicular offset

Compass Survey

2. Compass Traversing - Measuring Bearings & arriving included angles

Levelling - Study of levels and levelling staff

3. Reduction of levels (Check and Fly leveling) - Height of collimation and Rise and Fall method.

Theodolite - Study of Theodolite

- 4. Measurements of horizontal angles by reiteration and repetition and vertical angles
- 5. Determination of elevation of an object using single plane method when base is accessible/inaccessible

Tacheometry - Tangential system - Stadia system

6. Measurement of height and distance using stadia and tangential system of tachometry.

Curve Setting

7. Setting out of a simple curve using linear method.

Total Station - Study of Total Station, Measuring Horizontal and vertical angles

- 8. Measurement of angles and height
- 9. Traverse using Total station and Area of Traverse
- 10. Determination of distance and difference in elevation between two inaccessible points using Total station

Global Positioning Systems

11. Calculation of latitude and longitude using GPS.

Drones

12. Advance surveying using Drones

Setting out works

Centre line marking for single Room and Double Room

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\mathbf{REF}	TER	HIN	$CES \cdot$

KEFEK	EICES.
1.	Arora K. R, "Surveying Vol. I and II", Standard Book House, 2015.
2.	Duggal S.K, "Surveying Vol. I and II", Tata McGraw Hill, New Delhi, 2013.
3.	Kanetkar T.P, "Surveying and Levelling Vols. I and II", United Book Corporation, Pune, 2014.

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

S. Aux

Department of Placement Training Sona College of Technology. Salem-636 005. 1

MANDATORY COURSES

Sona College of Technology, Salem

Department of Sciences (Chemistry)

COURSE CODE

U19GE第02

LTPC

COURSE NAME

MANDATORY COURSE:

ENVIRONMENT AND CLIMATE SCIENCE

2000

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.

					C	0 / PO	, PSO N	Mappin	g		A Partie			77 150
		(3/2/1)	indica	tes str	ength	of cor	relation) 3-St	rong,	2-Med	ium, 1-	Weak		
		Progran	nme C	utcom	nes (PC	Os) and	d Progr	amme	Spec	ific Out	come (PSOs)	W-1	
COs, POs PSOs Mapping	PO1	PO2	PO3	P04	P05	P06	P07	PO8	PO9	PO10	P011	P012	PS01	PSO2
CO - 1	3	2				2	2							
CO - 2	2	-	Res -				200							-
CO - 3	3	2				2	2							-
CO - 4	3	2				2	2						- W. 18-4 - M	2
CO - 5	3	2				2	2							2

Unit IINTRODUCTION 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

L6

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

29.08.2022

B.E. / B.Tech. Regulations 2019

Sona College of Technology, Salem

Department of Sciences (Chemistry)

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.
- 2. "Environmental Science and Engineering" New Age International Publication, 4thMulticolour 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 / Sciences

Dr. C. Shanthi

HOD / Sciences

Chairperson BOS, Science and Humanities

29.08.2022

B.E. / B.Tech. Regulations 2019

MATHEMATICS COURSE- SYLLABUS **CIVIL**

Sona College of Technology

Department of Mathematics

B. E. CIVIL ENGINEERING

SEMESTER - III		T	T	n	-
U19MAT301A	FOURIER ANALYSIS AND STATISTICS	L	1	P	C
O I MILITAGE A		3	1	0	4

COURSE OUTCOMES

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

- express a periodic signal as an infinite sum of sine and cosine wave components using Fourier
- apply the Fourier transform techniques to convert the signal in terms of the frequencies of the 2.
- 3 represent the data in the form of diagram and graph and analyze them.
- 4. apply the concepts of measures of central tendency and dispersion to the given data and analyze the results.
- apply the concepts of correlation and regression to the given data and analyze the result. 5.

		(3/2/1 in	ndicate	s streng	CO /	PO, PS correlat	SO Map tion) 3-	pping Stron	g, 2-Me	dium, 1-	Weak		
COs			Progra	amme	Outcon	nes (Po	Os) and	Progr	amme	Specific	e Outcor	me (PSC)e)	
cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO
CO1	3	3	2	3	2							-		1002
CO2	3	3	2	3	2							2	2	
CO3	3	3	2	3	2							2	2	
CO4	3	3	2	3	2							2	2	
CO5	3	3	2	3	2							2	2	
	-		- 4	3	de							2	2	

UNIT-I FOURIER SERIES

12

General Fourier series - Dirichlet's conditions - Change of intervals - Odd and even functions - Half range sine and cosine series - Root mean square - Parseval's identity - Harmonic analysis.

UNIT-II FOURIER TRANSFORMS

Fourier transform pair - Properties - Fourier sine and cosine transforms pair - Properties - Transforms of simple functions - Parseval's identity.

UNIT-III COLLECTION AND REPRESENTATION OF DATA

Collection of data - Primary and secondary data - Diagrammatic representation - Simple, subdivided and multiple bar diagrams - Pie diagram - Pictograph - Graphs of frequency distribution - Histogram -Frequency polygon - Frequency curve - Cumulative frequency curve.

20, 05, 2020

B. E. / B. Tech. Regulations 2019

Sona College of Technology

Department of Mathematics

IIT - IV MEASURES OF CENTRAL TENDENCY AND DISPERSION

12

Measures of central tendency (Simple arithmetic mean, median and mode) - Quartiles - Measures of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation and coefficient of variation).

UNIT - V CORRELATION AND REGRESSION

12

Simple and rank correlations - Multiple and partial correlations - Linear regression - Curve fitting (straight line and parabola).

Theory: 45 Hours

Tutorial: 15 Hours

Total: 60 Hours

TEXT BOOKS:

- T. Veerarajan, "Transforms and Partial Differential Equations", McGraw Hill Publishers, 3rd Edition, 2016.
- 2. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.

REFERENCE BOOKS:

- E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017.
- 2. B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.
- S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
- R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th 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

20, 05, 2020

B. E. / B. Tech. Regulations 2019

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E. / B.Tech. Semester IV Regulations 2019

Branch: Civil Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
		Theory					
1	U19CE401	Environmental Engineering	3	0	0	3	45
2	U19CE402	Strength of Materials-II	2	1	0	3	45
3	U19CE403	Transportation Engineering	3	0	0	3	45
4	U19CE404	Concrete Technology	3	0	0	3	45
	U19CE903	Professional Elective - Elements of Building Planning					
5	U19CE904	Professional Elective - Energy Efficiency and Green Building	3	0	0	3	45
6	U19GE403	Mandatory Courses - Essence of Indian Traditional Knowledge	2	0	0	0	30
		Practical					
7	U19CE405	Fluid Mechanics Laboratory	0	0	2	1	30
8	U19CE406	Concrete and Highway Laboratory	0	0	2	1	30
9	U19CE407	Environmental Engineering Laboratory	0	0	2	1	30
10	U19GE401	Soft Skills and Aptitude-II	0	0	2	1	30
				,	Total Credits	19	

Approved By

Chairperson, Civil Engineering BoS Dr.R.Malathy Member Secretary, Academic Council Dr.R.Shivakumar

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

Copy to:-

HOD/Civil Engineering, Fourth Semester BE Civil Students and Staff, COE

COUR	SE COD	E			C	OURSE	NAME	,			L	T	P	С
U19	CE401			ENVI	RONM	ENTAI	L ENGI	NEERI	NG		3	0	0	3
Course	e Objective (s): The Purpose of learning this course is to:													
1.	Understand the various characteristics of Water so that its effective usage for various purposes can be obtained.													
2.	Apply the various design criteria for the development of diverse unit operators and processes to have an effective													
			t system											
3.										g and the		ve dispos	al.	
4.										r treatmei				
5.										s per disp	osal norn	ns.		
Course	Outcome													
CO1	-	_	-		y of wate	er from	various	sources	and the p	processes	involved	l in the w	ater	
CO2			tems.(K		nit opera	tions an	d nroces	sees for	water tro	atment.(I	72)			
CO2										on system				
CO4				treatmen				wage iia	11811118810	ni system	3.(K 2)			
CO5								intor one	1 wester	ater treat	mont (K	5)		
										ılyze: K5				
	O Mappi		Kemem	Jei. K2	z – Oliuc	erstand.	K3 – A _I	opiy. r	4 – Alla	ilyze. K3	- Evalua			
CO I		11 ₅				1	Pos						PS	SOs
COs	DO1	DO2	DO2	DO4	DO5			DOG	DOG	DO10	DO11	DO12		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	1	1	2	1	-	-	-	-	2	1
CO2	3	3	2	2	1	2	2	2	-	-	-	-	1	1
CO3	3	3	2	2	1	2	2	2	-	-	-	-	2	1
CO4	3	3	2	1	1	1	2	2	-	-	-	-	1	1
CO5	3	3	2	2	1	2	1	2	-	-	-	-	2	2
CO	3	3	2	1.6	1	1.6	1.8	1.8	_	_	_	_	1.6	1.2
(Avg)														
Corr	elation I	_evel:		1:Sligh	t (Low)			2:Mode	rate (Me	dium)		3:Sub	stantial (I	High)
	UNIT-I WATER SUPPLY SYSTEM - SOURCE AND CONVEYANCE 9 Hours ectives- Design period - Population forecasting-Water demand -Sources of water and their Characteristics - Selection of													
			-			_								
	ource- D	rınkıng	water q	uanty st	andards-			s. Conv	•	Layıng, j	ointing &	testing (or pipes-	selection
			1		D'4 '1			c	1					
of pum	p and pip						•		11.				0.77	-
of pum UN		D	ESIGN	PRINC	IPLES (OF WA	TER TI	REATM	IENT	floccul		sedimenta		ltration,

Objectives-Selection of unit operations and process-Principles of screening, flocculation, sedimentation, filtration, disinfection – water softening-miscellaneous water treatments (Aeration-Iron & Manganese removal- Defluoridation)-Operation and maintenance aspects.

UNIT-III SEWERAGE SYSTEM: COLLECTION AND TRANSMISSION

9 Hours

Common terms used in sanitary engineering- wastewater characteristics -Quantity of sanitary sewage: Sources of wastewater. Quantity of storm sewage: factors affecting storm sewage - Quantity of storm-water. Design of sewers - laying, jointing, and testing of sewers-sewer appurtenances- sewer materials and joints.

UNIT-IV SEWAGE TREATMENT AND DESIGN PRINCIPLES

9 Hours

Objectives-types of treatments and processes- layout of sewage treatment plants -Design principles of screen chamber, grit chamber, primary sedimentation tank, activated sludge process-Modified activated sludge process-miscellaneous water treatments (oxidation ditch- chlorination-oxidation ponds-aerated lagoons)

UNIT-V SEWAGE DISPOSAL AND RURAL SANITATION

9 Hours

Wastewater disposal methods -Sewage farming - Oxygen sag curve-Streeter Phelps model-Role of IoT in Wastewater reclamation -Sanitary fittings: one pipe and two pipes system-general layout of house drainage connection.

TOTAL: 45 Hours

TEXTE	SOOKS:
1.	Garg S.K, "Environmental Engineering Vol.I& II", Khanna Publishers, New Delhi, 2010 & 2015.
2.	Punmia, B.C., Ashok Jain, and Arun Jain, "Water Supply Engineering", Laxmi Publications (P) Ltd., New Delhi, 2010.
3.	Birdie G.S, Birdie J.S, "Water Supply & Sanitary Engineering", Dhanpat Rai Publishing Company (P) Ltd. New Delhi. 2013.
4.	Duggal K.N., "Elements of Environmental Engineering" S.Chand and Co. Ltd., New Delhi, 2014.
REFER	ENCES:
1.	Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 2013.
2.	Syed R. Qasim and Edward M. Motley Guang Zhu, Water Works Engineering Planning, Design and Operation, Prentice Hall of India Learning Private Limited. New Delhi. 2009.
3.	Metcalf and Eddy- Wastewater Engineering-Treatment and Reuse, Tata Mc.Graw-Hill Company, New Delhi, 2010.

COUR	SE COD	E			C	OURSE	NAME				L	T	P	C
U19	OCE402			ST	RENGT	TH OF N	MATER	IALS I	I		2	1	0	3
Course	Objectiv	Objective (s): The Purpose of learning this course is to:												
1.	Determ	ine the	deflectio	n of the	beam ba	ased on	the vario	ous meth	ods.					
2.	Analysi	is of the	truss co	mponen	ts using	the met	hod of jo	oints, se	ction, an	d tension	coefficie	ent.		
3.	Apply k	cnowled	lge and o	design co	olumns 1	or axial	and ben	ding.						
4.	Calcula	tion of	Principa	l stress a	nd strai	n for thi	n and co	mpound	cylinde	r				
5.	Determ	ining th	e stresse	s in uns	ymmetri	cal and	curved l	eams.						
Course	Outcome	Determining the stresses in unsymmetrical and curved beams. Attorne (s) (COs): At the end of this course, the students will be able to:												
CO1	Establis	Establish the slope and deflection in beams by using various methods. (K2)												
CO2	Determ	Determine the forces in plane truss members(K3)												
CO3	Familiarize the behavior of columns under axial and eccentric loads.(K3)													
CO4	Examin	e the pr	oblems	related t	o thin ar	d thick	cylinder	s subjec	ted to flu	uid pressu	ire and st	tudy the v	arious th	eories
CO4	of failu													
CO5				due to th	ie Unsyi	nmetrica	al bendi	ng of be	ams, loc	ate the sh	ear cente	er, and fir	id the stre	esses in
Knowlo	curved dge Leve			oor: K) _ Unde	retand:	K 3 _ Λr	nlv. k	$74 - \Lambda na$	duza. K5	_ Evalua	ıta:		
	O Mappi		Kemem)C1. K2	z – Olide	istana.	K3 – A _I	pry. r	- Alla	ilyze. Ko	- Evalua			
CO-1	<u> Маррі</u>	ng					Pos						DG	SOs
COs			1				08					1	10	108
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	1	1	0	0	0	0	2	2	3	3
CO2	3	3	3	3	1	1	0	0	0	0	2	3	2	2
CO3	2	3	3	2	1	1	0	0	0	0	2	3	3	2
CO4	2	2	2	1	1	1	0	0	0	0	2	2	2	2
CO5	2	3	2	2	1	1	0	0	0	0	2	2	1	1

UNIT-I DEFLECTION OF DETERMINATE BEAMS

1:Slight (Low)

1.8

6+3 = 9 Hours

2

2.2

3:Substantial (High)

2

2.4

Elastic curve – Governing differential equation - Double integration method - Macaulay's method - Area moment method - conjugate beam method for computation of slope and deflection of determinant beams.

0

2:Moderate (Medium)

UNIT-II ANALYSIS OF TRUSSES

2.4

6+3 = 9 Hours

Determinate and indeterminate trusses - Analysis of pin-jointed plane determinate trusses by method of joints, method of sections, and tension coefficient method - Analysis of Space trusses by tension coefficient method.

UNIT-III COLUMNS

2.8

CO

(Avg)

2.4

Correlation Level:

6+3 = 9 Hours

Euler's column theory – critical load for prismatic columns with different end conditions – Effective length – limitations - Rankine-Gordon formula - Eccentrically loaded columns – middle third rule - Middle fourth rule. - Core of a section. Combined axial and bending stresses.

UNIT-IV CYLINDERS AND THEORIES OF FAILURES

6+3 = 9 Hours

Thin cylindrical and spherical shells – stresses, change in dimensions and volume -Thick cylinders – lame's theory – Compound cylinders – shrinking on stresses. Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Total Strain energy theory – Maximum distortion energy theory – Application problems.

UNIT-V ADVANCED TOPICS

6+3 = 9 Hours

Unsymmetrical bending of beams of symmetrical and unsymmetrical sections – Shear Centre - curved beams – Winkler Bach formula – Stresses in hooks.

TOTAL: 30+15= 45

TEXTB	OOKS:
1.	Rajput R.K. "Strength of Materials", S.Chand and Co, New Delhi, 2014.
2.	Bansal R.K, "Strength of Materials", Laxmi Publications, New Delhi, 2017.
3.	Ratan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011.
REFER	ENCES:
1.	Chandramouli P.N, "Fundamentals of Strength of Materials", PHI Learning Private Limited, New Delhi, 2013.
2.	Subramanian R, "Strength of Materials", Oxford University Press, New Delhi, 2010.

COURSE CODE		COURSE NAME	L	T	P	C				
U19CE403		TRANSPORTATION ENGINEERING	3	0	0	3				
Course Objective (s): The Purpose of learning this course is to:										
1.	Understand the concept of highway development and different cross-sectional elements in the highway.									
2.	Capability to know about the highway materials and design of pavements as per IS code.									
3.	Apply knowledge and be able to design the pavements using IRC standards.									
4.	Associate the concepts of railway planning and be able to design the permanent way.									
5.	Able to locate the plan and also design the airport components.									
Course Outcome (s) (COs): At the end of this course, the students will be able to:										
CO1	Explain the various highway development and design cross-section elements. (K1)									
CO2	Determine the characteristics of pavement materials and design of pavement as per IRC.(K2)									
CO3	Design of pavement as per IRC.(K3)									
CO4	Apply the concepts of railway planning while designing the permanent way. (K4)									

Knowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:

Plan the locations and design of the airport components. (K5)

CO – PO Mapping

CO₅

COs	Pos											PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	3	1	1	1	3	3	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2	3	2
CO3	-	-	3	-	-	-	-	-	2	-	-	-	3	2
CO4	3	1	1	1	1	1	1	2	2	1	2	2	3	2
CO5	3	3	3	2	3	1	1	1	3	1	1	2	3	2
CO (Avg)	3	2.5	2.6	1.75	2.25	1.25	1	1.25	2.6	1.75	2.25	2.25	3	2.2
						2:Moderate (Medium) 3:Sub				stantial (High)				

UNIT-I INTRODUCTION TO HIGHWAY

9 Hours

Introduction to Highway, classification of roads, highway planning-Road cross section-Camber, gradient, superelevation-Sight distance: PIEV theory-Stopping sight distance-Over taking sight distance-Intermediate sight distance. Horizontal curves: Super elevation-Widening of pavements –Introduction to Vertical curves and Transition curves. Types of gradients - grade compensation on curves.

UNIT-II HIGHWAY MATERIALS

9 Hours

Pavement Materials: Desirable properties and testing of highway materials-Soil: California bearing ratio test, Benkelman Beam test, field density test; Aggregate: Crushing, abrasion, impact, water absorption, flakiness, and elongation indices and stone polishing value test; Bitumen: Penetration, ductility, viscosity, and softening point test.

UNIT-III PAVEMENT DESIGN

9 Hours

Pavement Design: Rigid and flexible pavements- Components and their functions- Factors affecting the design of pavements; Design practice for flexible pavements (IRC method and recommendations-problems)-Design practice for rigid pavements (IRC recommendations - concepts only). Types of road constructions: Water Bound Macadam, bituminous, Granular based Macadam, and cement concrete road.

UNIT-IV RAILWAY ENGINEERING

9 Hours

Recent Trends in Indian railways for national development- Permanent way, its components, and function: Rails, sleepers, and ballast- types of rails, rail fastenings, Gauges, coning of wheels, creeps, and kinks. A geometric design of railway tracks-Gradients and grade compensation, super-elevation, widening of gauges in curves (Concepts only) - Points and crossings - Railway stations and yards - Signalling and interlocking, Railway Tunnels

UNIT-V AIRPORT ENGINEERING

9 Hours

Introduction to air transport –Site selection- Airport obstructions and zoning. Components of the airport- Runway: Orientation-Wind rose diagrams (theory only)-Runway length-Runway configuration and drainage-Preventive measures in runway, Taxiway -Aircraft parking configuration and parking system - Visual aids.

TOTAL: 45 Hours

TEXT I	BOOKS:
1.	Khanna K, and Justo C E G, "Highway Engineering", 10 th Edition, Khanna Publishers, Roorkee, 2018.
2.	SaxenaSubhash C, and Satyapal Arora, "A Course in Railway Engineering", Dhanpat Rai and Sons, Delhi, 2020.
3.	Khanna S K, Arora M G, and Jain S S, "Airport Planning and Design", Revised 10 th edition, Nemchand and Brothers. Roorkee, 2015.
REFER	ENCES:
1.	Kadiyali L.R, "Principles and Practice of Highway Engineering", Khanna Technical Publications, New Delhi, 2013.
2.	Rangwala, "Railway Engineering", Charotar Publishing House, 2017.
3.	Rangwala, "Airport Engineering", Charotar Publishing House, 2017.

COUI	RSE CODE	COURSE NAME	L	T	P	С					
U1	9CE404	CONCRETE TECHNOLOGY	3	0	0	3					
Course	urse Objective (s): The Purpose of learning this course is to:										
1.	Acquire and a	apply fundamental knowledge in the fresh and hardened properties of	of concre	te.							
2.	Outline the in	nportance of adding admixtures and their properties.									
3.	Design a cond	crete mix thatfulfils the required properties for fresh and hardened c	oncrete.								
4.	Summarise th	e concepts of conventional concrete and its differences with special	concrete	es.							
5.	Demonstrate	techniques of measuring the Non-Destructive Testing of the concret	e structu	re.							
Course	Outcome (s) (COs): At the end of this course, the students will be able to:									
CO1	Determine the properties of fresh and hardened concrete. (K2)										
CO2	Apply a suitable admixture in the required field conditions.(K4)										
CO3	Design the concrete mix using ACI and IS code methods.(K3)										
CO4	Evaluate the properties and applications of special concretes.(K1)										

the properties and applications of special concretes. (K1)

CO₅ Diagnose the strength and durability of concrete structures with different testing methods. (K5)

Knowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:

CO - PO Mapping

]	Pos						PSOs	
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	2	2	2	3	1	2	1	-	2	-	2
CO2	3	2	2	2	2	2	3	1	2	1	-	2	-	2
CO3	3	2	3	2	2	2	3	1	2	1	-	2	-	2
CO4	3	2	2	2	2	2	3	1	2	1	-	2	-	2
CO5	3	2	2	2	2	2	3	1	2	1	-	2	-	2
CO (Avg)	3	2	2	2	2	2	3	1	2	1	-	2	-	2
	olotion I	oxol		1.Clich	t (Low)	,		2·Modes	roto (Ma	dium)	,	2.Cub	stantial (High)

2:Moderate (Medium) 3:Substantial (High) Correlation Level:

UNIT-I FRESH AND HARDENED CONCRETE

9 Hours

Fresh concrete: Mechanism of hydration-Water-Cement ratio-Factors affecting the strength of the concrete-Workability -Concepts and tests as per Indian codal specifications. Concrete manufacturing stages: Batching - Mixing -Transportation -Placing of concrete -Curing of concrete. Water: Quality of water for mixing and curing - Use of seawater for mixing Concrete. Hardened concrete: Properties and tests-Strength of concrete - Temperature effects - Creep of concrete - Thermal properties of concrete - Micro cracking of the concrete

UNIT-II **ADMIXTURES**

9 Hours

Admixtures -Necessity-Types-Chemical admixtures with specific properties - Accelerators - Retarders -Plasticizers and super plasticizers - Air entraining admixtures-Water proofers -Colouring agent. Mineral admixtures-Fly ash-Slag-Metakaolin-Rice husk ash-Micro and nano silica-Mineral additives and fillers.

MIX DESIGN

9 Hours

Mix Design-Factors influencing mix proportion-Variability in test results -Quality control -Sampling and acceptance criteria- Design Mix and Nominal Mix- Mix design by ACI method and IS method using IS 10262-2019.

SPECIAL CONCRETES AND CONCRETING METHODS

9 Hours

Special concretes: Lightweight concrete - Recycled aggregate concrete - Fibre-reinforced concrete - Polymer concrete -Ferrocement - Ready mix concrete - Self-compacting concrete - High strength concrete - Geopolymer concrete - Highperformance concrete-Pervious concrete - Self-curing concrete-Bio and bacterial concrete - Smart concrete; Concrete methods: Extreme weather concreting - Vacuum concrete - Underwater concreting - Guniting and shotcreting

NON-DESTRUCTIVE TEST AND DURABILITY OF CONCRETE

9 Hours

Non-destructive tests: Rebound hammer-Ultra sonic pulse velocity test. The durability of concrete-Mechanism of corrosion - Causes and effects-Permeability of concrete-Shrinkage-Plastic shrinkage -Drying shrinkage-Chemical attack-Sulfate attack of concrete structures - chloride attack- Remedial measures Application of IoT in smart curing system for concrete.

TOTAL: 45 Hours

TEXT I	BOOKS:
1.	Shetty, M.S., "Concrete Technology", Theory & Practice, S.Chand and Co, 2019.
2.	Bhavikatti S S, "Concrete Technology", I.K. International Publishing House Pvt. Limited, 2015.
3.	Gupta.B.L., Amit Gupta, Concrete Technology, Jain Book Agency, 2010.
REFER	ENCES:
1.	Shetty, M.S., "Concrete Technology", Theory & Practice, S.Chand and Co, 2019.
2.	Bhavikatti S S, "Concrete Technology", I.K. International Publishing House Pvt. Limited, 2015.
3.	Gupta.B.L., Amit Gupta, Concrete Technology, Jain Book Agency, 2010.
4.	Shetty, M.S., "Concrete Technology", Theory & Practice, S.Chand and Co, 2019.
5.	Bhavikatti S S, "Concrete Technology", I.K. International Publishing House Pvt. Limited, 2015.

COURSE CODE COURSE NAME L T P C U19CE405 Fluids Mechanics Laboratory 0 0 2 1												C		
U19	OCE405			I	Fluids M	Iechani	cs Labo	ratory			0	0	2	1
Course	Objective	e (s): T	he Purp	ose of le	earning	this cou	ırse is to) :						
1.	To prov	ide prac	ctical kn	owledge	in the v	erificati	ion of pr	rinciples	of fluid	flow.				
2.	To gain	knowle	edge in p	erforma	nce testi	ing of H	ydraulic	Turbine	es and H	ydraulic	Pumps.			
3.	To impa	art knov	vledge ii	n measu	ring pres	sure, di	scharge,	and vel	ocity of	fluid flov	v.			
Course	Outcome	(s) (CO	Os): At	the end	of this c	ourse, t	the stud	ents wil	l be able	e to:				
CO1	Measur	e the flo	w, discl	narge, ar	nd energ	y loss in	pipes a	nd open	channel	s.(K2)				
CO2	Demons	strate th	e charac	teristics	curves	of pump	s and tu	rbines.(1	K3)					
CO3	Apply t	Apply the technical concepts and ways to solve engineering problems by conducting experiments.(K5)												
Knowle	dge Leve	l: K1 – l	Rememb	oer: K2	2 – Unde	erstand:	K3 – Ap	pply: K	(4 – Ana	ılyze: K5	– Evalua	ite:		
CO – Po	O Mappi	ng												
	Pos												PS	SOs
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	1	2	1	1	1	1	2	1	2	2
CO2	2	3	3	3	2	2	2	1	1	1	2	2	2	2
CO3	2	3	2	2	2	2	2	1	1	1	3	3	2	2
CO	2	2.6	2.6	2.6	1.6	2	1.6	1	1	1	2.3	2	2	2
(Avg)			2.0								2.3			
Cori	relation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)													
List of e	experime													
	1. Flow													
							s experir	nent						
				, mouth										
	4. Deter					in pipes								
				nor losse										
								onstant s	peed / V	ariable s	peed)			
	7. Perfo						pump							
	8. Char					ne								
	9. Char													
	10. Characteristics of Kaplan turbine 11. Study of the impact of jet on a flat plate (normal/inclined)													
	11. Study	or the	ımpact (or jet on	a flat pl	ate (nor	mai/incl	mea)				Т	OTAL: 3	О Нопр
REFER	ENCES:											1'	JIAL: 3	o mour
1.	1		Seth, S.	M., Hyd	raulics a	ınd Fluid	d Mecha	nics, Sta	andard B	ook Hou	se, Delhi	, 2010		
	Dr. R. K. Bansal, A Text book of Fluid Mechanics and Hydraulic Machines, Laxmi Publications Pvt Ltd, Ninth													

Edition, 2015.

COUR	SE CODE	COURSE NAME	L	T	P	C					
U19	9CE406	CONCRETE AND HIGHWAY LABORATORY	0	0	2	1					
Course	rse Objective (s): The Purpose of learning this course is to:										
1.	To impart knowledge in studying the behaviour of concrete in fresh and hardened conditions.										
2.	To gain knowledge on the characteristics of aggregates.										
3.	To understand the performance of bitumen by conducting various tests.										
Course	Outcome (s)	(COs): At the end of this course, the students will be able to:									
CO1	Analyze the various properties of concrete.(K3)										
CO2	Characterize the aggregate and bitumen used for road construction.(K2)										
CO3	Apply the technical concepts and ways to solve engineering problems by conducting experiments.(K4)										
Knowle	owledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:										

CO – PO Mapping

]	Pos						PSOs	
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	1	2	1	1	1	1	2	1	2	2
CO2	2	3	3	3	2	2	2	1	1	1	2	2	2	2
CO3	2	3	2	2	2	2	2	1	1	1	3	3	2	2
CO (Avg)	2	2.6	2.6	2.6	1.6	2	1.6	1	1	1	2.3	2	2	2

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

TESTS ON FRESH CONCRETE

- a) IS methods (10262-2019)
- b) Slump cone test
- c) Compaction factor test
- d) Self-compacting concrete test

TESTS ON HARDENED CONCRETE

- a) Compressive Strength test
- b) Split tensile strength test
- c) Flexural strength test
- d) Modulus of Elasticity test
- e) Rebound hammer (Demonstration)
- f) UPV test (Demonstration)

TEST ON AGGREGATES

a) Los Angeles Abrasion Test

TEST ON BITUMEN

- a) Specific Gravity of Bitumen
- b) Penetration Test
- c) Viscosity Test
- d) Softening Point Test
- e) Ductility Test

c) Ductii	my rest	
		TOTAL: 30 Hours
REFER	ENCES:	
1.	1. Shetty, M.S., "Concrete Technology", Theory & Practice, S.Chand and Co, 2019.	
2.	2. S. K. Khanna, C. E. G. Justo., "Highway Engineering", Nem Chand & Bros, New Delhi, Edition	2018,Revised 10th
3.	3. IS 10262 : 2019, Concrete Mix Proportioning — Guidelines (Second Revision), January	2019.
4.	4. Concrete Mix Design ACI 211.1-91	

COUR	COURSE CODE COURSE NAME L										T	P	C	
U19	CE407			Envir	onment	al Engir	neering	Labora	tory		0	0	2	1
Course	Objectiv	e (s): T	he Purp	ose of lo	earning	this cou	ırse is to):				L		
1.	Underst	tand the	charact	eristic d	ifference	betwee	n Water	and Wa	stewate	r as per Iı	ndian Sta	ndards.		
2.										es accusto				
3.					edicting	the solu	tion thro	ough the	conduct	tion of ex	periment	s over wa	ater and	
Course	wastew Outcome				of this o	course, t	he stud	ents wil	l be able	e to:				
CO1	Test the	water a	and was	tewater a	and their	differe	nt charac	cteristics	as per s	standard.(K2)			
CO2	Recom	Recommend the degree of treatment required for the water and wastewater.(K4)												
CO3	Apply t	he techi	nical cor	ncepts ar	nd ways	to solve	enginee	ering pro	blems b	y conduc	ting the e	xperime	nt(K5)	
	dge Leve		Rememl	oer: K	2 – Unde	erstand:	K3 – Ap	pply: K	K4 – Ana	alyze: K5	– Evalua	ite:		
CO – P	O Mappi	ng												
CO	Pos											T	PS	SOs
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	1	-	1	1	-	-	-	-	1	1
CO2	2	2	1	1	2	-	2	1	-	-	-	-	1	2
CO3	1	1	1	1	1	-	1	1	-	-	-	-	1	1
CO	1.3	1.3	1	1	1.3	-	1.3	1	-	_	-	_	1	1.3
(Avg)	elation I	oval:		1.Sligh	t (Low)			2:Mode	rata (Ma	dium)		3.Sub	stantial (H	Jigh)
COII	ciation i	20101.		1.51151	it (LOW)			2.171000	iate (171e	diuiii)		3.540	stantiai (1	11511)
List of e	experime	nts												
1. S	ampling	and pres	servatio	n method	ds and si	gnifican	ce of ch	aracteriz	zation of	water an	d wastev	vater(Stud	ly experi	ment).
2. г	Determina	tion of j	pH,TDS	, and EC	2									
3. г	Determina	tion of	Chloride	es										
4. E	D etermina	tion of	Hardnes	S										
5. D	Determina	tion of	Total S	olids, Su	spended	l solids,	Volatile	and Fix	ed solid	S				
6. I	D etermina	tion of	Optimuı	n Coagu	lant Do	sage								
	Determina	tion of l	Residua	l Chlorir	ne & Det	terminat	ion of A	vailable	Chlorin	e in Blea	ching po	wder		
8. D	Determina	tion of	Dissolve	ed Oxyg	en									
9. D	Determina	tion of	B.O.D.											
10. E	Determination of C.O.D.													
11. I	ntroduction	on to Ba	cteriolo	gical An	alysis (S	Study ex	perimen	ıt).						
DEFE	ENCEC											T	OTAL: 3	0 Hour
KEFER	FERENCES:													
1.	Standar 2017.	Standard methods for the examination of water and wastewater, APHA, 23rd Edition, Washington, 2017.												
2.	Garg S.	K., "En	vironme	ental Eng	gineering	g Vol. I	& II", K	hanna P	ublisher	s, New D	elhi, 37tl	n Edition	2019.	
	ì													

06.01.2023 Regulations-2019

Modi P.N., "Environmental Engineering Vol. I & II", Standard Book House, Delhi-6, 16th Edition 2018.

3.

COUR	SE CODE	COURSE NAME	L	T	P	С					
U19	OCE903	ELEMENTS OF BUILDING PLANNING	3	0	0	3					
Course	e Objective (s): The Purpose of learning this course is to:										
1.	Understand	the concept of Building drawing and approval procedures.									
2.	Analyze the	e requirements of Building with their standards.									
3.	Signify the	various types of structures with desired purposes.									
4.	Understand	the concept of Green building with the evaluation procedure.									
5.	Prepare the	documents of the building to sanction authorities.									
Course	Outcome (s)	(COs): At the end of this course, the students will be able to:									
CO1	Plan the res	Plan the residential building as per function requirements.(K1)									
CO2	Design various elements of the building(K3)										
CO3	Comprehend the provisions and standards of housing elements.(K4)										
CO4	Explain the different green building rating systems with real-time examples(K5)										
CO5	Formulate and design the housing layouts by various standards of the building(K3)										

Knowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:

CO – PO Mapping

]	Pos						PSOs	
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	3	1	2	1	3	1	1	-	-	3	2	2
CO2	3	1	3	1	2	1	3	1	1	-	-	3	2	2
CO3	3	1	3	1	1	1	3	1	1	-	-	2	2	2
CO4	2	2	3	1	1	1	3	2	1	-	-	2	2	1
CO5	2	2	3	1	1	1	3	2	1	-	-	2	2	1
CO (Avg)	2.6	1.4	3	1	1.4	1	3	1.4	1	-	-	2.4	2	1.6

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

UNIT-I BUILDING FUNCTIONAL ELEMENTS

9 Hours

Introduction-Nomenclature of building planning and construction classification of building-Site selection for residential building; Elements of climate-Directions and their characteristics-Orientation of buildings -Factors affecting orientation. Building Bye-Laws - Guidelines for planning and drawing of buildings.

UNIT-II REQUIREMENTS OF BUILDING

9 Hours

Principles of planning of buildings: Aspect-Prospect-Privacy- Sizes of the Rooms-Roominess-Grouping-Circulation-Sanitation-Elegance- Economy, Principles on minimum plot sizes and building frontage. Minimum standard dimensions of building elements-Provisions for lighting, ventilation, fire, means of access, and parking.

UNIT-III PLANNING OF RESIDENTIAL BUILDING

9 Hours

Introduction-House-Home-Rooms meant for the various activities: Purposes and requirements; Economical measures in building construction- Types of Structural frames - Load bearing structures-Framed structures-Prefabricated structures. Introduction to the intelligent building. Fixing the position of various building components and justification.

UNIT-IV GREEN BUILDING

9 Hours

Principles- Design criteria-Site sustainability-Efficiency: Water use- Energy-Indoor environmental quality- Green building materials-Cost of construction- Comparisons of green building with conventional building- Assessment and evaluation of green building- Green building certification-Green buildings in India.

UNIT-V BUILDING DRAWING

9 Hours

Introduction to building drawing-Preparation of drawing-Working drawing. Building plans approval procedure as per NBC.-Documents to be submitted for approval of proposed building to the sanctioning authority. Conventional symbols-Preparation of the site plan, plan, elevation, and sectional drawing-Interpretation of Structural, Architectural, and services drawings.

TOTAL: 45 Hours

TEXTE	TEXTBOOKS:										
1.	Kumara Swamy N. "Building Planning and Drawing", Charator Publishing House Pvt.Ltd, 8 th edition 2015.										
2.	Sahu G.C, Joygopal Jena, "Building Material's and Construction", McGraw Hill Education (India) Pvt. Ltd, New Delhi, 2015.										
REFER	RENCES:										
1.	Shah M.G. Kalec. M. and Patki SY, "Building Drawing", Tata Mcgraw Hill, New Delhi, 2012.										

COLI	RSE COI)E				OTIDGI	E NAMI	ת			L	Т	P	С
)E												
U1	9CE904		EN	ERGY I	EFFICI	ENCY A	AND GI	REEN B	BUILDI	NG	3	0	0	3
Course	Objective	e (s): T	he Purp	ose of le	earning	this cou	ırse is to):						
1.			_							servation	for susta	inability	goals.	
2.	_		-		adopted									
3.	Gain kn	owledg	e about	the use o	of constr	ruction r	naterials	based o	n emboo	died energ	gy values	i.		
4.	_				lding rat									
5.	Create a	awarene	ess about	clean d	evelopm	nent med	chanisms	and the	role of	UNFCCC	c in susta	inability.		
Course	Outcome	e (s) (CO	Os): At	the end	of this c	course, t	the stud	ents wil	l be able	e to:				
CO1	Acquire	a basic	underst	anding	of the gr	een buil	ding cor	ncept and	d associa	ated resou	irces. (K	1)		
CO2	Analyze	e the var	rious me	thods to	design	green bu	ıilding p	aramete	rs. (K3)					
CO3	Underst	and the	availab	ility of c	onstruct	ion mat	erials for	r energy	-efficien	t constru	ction (K4	1)		
CO4	Aware o	of the va	arious g	reen buil	lding rat	ing syst	ems prev	ail in th	e countr	y(K3)				
CO5	Underst	and the	role of	UNFCC	C and ki	now abo	ut clean	develop	ment m	echanism	(K2)			
Knowle	dge Leve	Understand the role of UNFCCC and know about clean development mechanism (K2) ge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:												
CO – Po	O Mappi	ng												
CC		Pos PSOs									SOs			
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
COs CO1	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1 2	PSO2
		PO2									PO11 -			
CO1	1	-	2	1	2	2	3	3	1	-	PO11 - -	1	2	1
CO1	1 2	- 1	2 3	1 2	2	2	3	3	1 1	-	-	1 1	2 2	1
CO1 CO2 CO3	1 2 1	- 1 2	2 3 3	1 2 2	2 1 3	2 1 2	3 1 2	3 1 1	1 1 1		-	1 1 2	2 2 2	1 1 1
CO1 CO2 CO3 CO4	1 2 1 1	- 1 2	2 3 3 2	1 2 2 3	2 1 3 2	2 1 2 2	3 1 2 3	3 1 1 2	1 1 1 1	- - -	- - -	1 1 2 2	2 2 2 1	1 1 1 2
CO1 CO2 CO3 CO4 CO5	1 2 1 1 1 1.2	1 2 1 3 1.8	2 3 3 2 3	1 2 2 3 2 2.0	2 1 3 2 2 2.0	2 1 2 2 2 1.8	3 1 2 3 1 2.0	3 1 1 2 1 1.6	1 1 1 1 1.0	- - - -	- - - -	1 1 2 2 2 2 1.6	2 2 2 1 1 1.6	1 1 1 2 2 2 1.4
CO1 CO2 CO3 CO4 CO5	1 2 1 1	1 2 1 3 1.8	2 3 3 2 3	1 2 2 3 2 2.0	2 1 3 2 2	2 1 2 2 2 1.8	3 1 2 3 1 2.0	3 1 1 2 1	1 1 1 1 1.0	- - - -	- - - -	1 1 2 2 2 2 1.6	2 2 2 1	1 1 1 2 2 2 1.4
CO1 CO2 CO3 CO4 CO5 CO	1 2 1 1 1 1.2	1 2 1 3 1.8	2 3 3 2 3 2.6	1 2 2 3 2 2.0	2 1 3 2 2 2.0 at (Low)	2 1 2 2 2 1.8	3 1 2 3 1 2.0	3 1 1 2 1 1.6	1 1 1 1 1.0	- - - -	- - - -	1 1 2 2 2 2 1.6	2 2 2 1 1 1.6	1 1 1 2 2 2 1.4
CO1 CO2 CO3 CO4 CO5 CO	1 2 1 1 1 1 1.2 relation I	1 2 1 3 1.8	2 3 3 2 3 2.6	1 2 2 3 2 2.0 1:Sligh	2 1 3 2 2 2.0 tt (Low)	2 1 2 2 2 1.8	3 1 2 3 1 2.0	3 1 1 2 1 1.6	1 1 1 1 1 1.0	- - - - - -	- - - -	1 1 2 2 2 2 1.6	2 2 2 1 1 1.6 stantial (I	1 1 2 2 2 1.4 High)
CO1 CO2 CO3 CO4 CO5 CO Corr	1 2 1 1 1 1 1.2 relation I	- 1 2 1 3 1.8 Level:	2 3 3 2 3 2.6 INTR(1 2 2 3 2 2.0 1:Slight	2 1 3 2 2 2.0 at (Low)	2 1 2 2 2 1.8	3 1 2 3 1 2.0	3 1 1 2 1 1.6 2:Moder	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	dium)		1	2 2 2 1 1 1.6 stantial (I	1 1 2 2 1.4 High)
CO1 CO2 CO3 CO4 CO5 CO Corr	1 2 1 1 1 1 1 1.2 relation I	1 2 1 3 1.8 Level:	2 3 3 2 3 2.6 INTRO	1 2 2 3 2 2.0 1:Slight	2 1 3 2 2 2.0 at (Low)	2 1 2 2 2 1.8	3 1 2 3 1 2.0	3 1 1 2 1 1.6 2:Moder	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	dium)		1	2 2 2 1 1 1.6 stantial (I	1 1 2 2 1.4 High)
CO1 CO2 CO3 CO4 CO5 CO Corr Definit heat gas electric	1 2 1 1 1 1 1.2 relation I	1 2 1 3 1.8 Level:	2 3 3 2 3 2.6 INTRO S, Energy thermal vation.	1 2 2 3 2 2.0 1:Slight	2 1 3 2 2 2 2.0 at (Low)	2 1 2 2 2 1.8 resourcement in	3 1 2 3 1 2.0 ee - Critimethods	3 1 1 2 1 1.6 2:Moder	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	dium)		1	2 2 1 1 1 1.6 stantial (I	1 1 2 2 1.4 High)
CO1 CO2 CO3 CO4 CO5 CO Corr Definit heat ga electric	1 2 1 1 1 1.2 relation I NIT-I ion and can be in in builties all energy	1 2 1 3 1.8 Level:	2 3 3 2 3 2.6 INTRO S, Energy thermal vation. ENERG	1 2 2 3 2 2.0 1:Slight ODUCT y and was comforted EY-EFF	2 1 3 2 2 2.0 at (Low) ION ater as a timprov	2 1 2 2 2 1.8	3 1 2 3 1 2.0 ee - Critinethods	3 1 1 2 1 1.6 2:Moder	1 1 1 1 1 1 1.0 rate (Me			1 2 2 2 1.6 3:Sub	2 2 1 1 1 1.6 stantial (I 9 H ity requir	1 1 2 2 1.4 High) ours loss and ements -
CO1 CO2 CO3 CO4 CO5 CO Corr U Definit heat gas electric U Zero E	1 2 1 1 1 1 1.2 relation I VNIT-I ion and comin in builted energy NIT-II	1 2 1 3 1.8 Level:	2 3 3 2 3 2.6 INTRO s, Energy thermal vation. ENERG (ZEB)	1 2 2 3 2 2.0 1:Sligh DDUCT y and was comford Y-EFF	2 1 3 2 2 2.0 at (Low) ION ater as a t improv	2 1 2 2 2 1.8 resourcement in Energy	3 1 2 3 1 2.0 ee - Critimethods DINGS Buildin	3 1 1 2 1 1.6 2:Moder	1 1 1 1 1 1 1 1.0 rate (Me	dium)	ds of moor	1 2 2 2 1.6 3:Sub	2 2 2 1 1 1.6 stantial (I 9 H ng - Heat ity requir 9 H	1 1 2 2 1.4 High) fours loss and ements -

wa4stewater treatment and reuse - process water strategies - adoption to sustainable resources, process and technologies-Energy Conservation Opportunities in Public and Private Buildings.

CONSTRUCTION MATERIALS AND PRACTICES

9 Hours

Construction materials - Embodied energy, carbon content, and emission of CO2, SO2, and NOx of building materials, elements, and construction process- Current practice and low environmental impact alternatives

BUILDING ASSESSMENT SCHEMES

9 Hours

Energy efficiency ratings & ECBC - 2007 - Various energy efficiency rating systems for buildings - LEED, BEE, & GRIHA - case studies -Introduction to BIM.

UNIT-V CLEAN DEVELOPMENT MECHANISM

9 Hours

Clean Development Mechanism - CDM Benefits for energy conservation methodology and procedure - Eligibility Criteria -UNFCCC - the role of UNFCCC and Government of India - Energy analysis using Equest software, daylight analysis, insulation materials, sun path, and grid analysis - calculation of embodied energy for residential building as a case study.

TOTAL: 45 Hours

TEXT	BOOKS:
1.	Sustainable Building, Design Manual: Published by The Energy and Resources Institute, Darbari Seth block, IHC
	Complex, Lodhi Road, New Delhi-110003.
2.	KILBERT, Charles , (2016) Sustainable construction : Green Building Design and Delivery John Wiley and Sons.
3.	BROWN, G.Z. and DEKAY, Mark, 2001. Sun, Wind & Light - Architectural Design Strategies, Second Edition,
	John Wiley & sons, Inc.
REFEI	RENCES:
1.	ECBC Code 2007 (Edition 2008) published by Bureau of Energy Efficiency, New Delhi
2.	Bureau of Energy Efficiency Publications - rating System, TERI PUBLICATIONS .
3.	GRIHA Rating System, LEED Publications

Semester – IV	U19GE401-SOFT SKILLS AND APTITUDE - II	L 0	T 0	P 2	C	Marks 100
Course Outcomes						100
At the end of the c	ourse the student will be able to:					
	pabilities in additional soft-skill areas using hands-on and					
	of increasing difficulty than those in SSA-I in given aroning and score 65-70% marks in company-specific inter-			ntit	ativ	e aptitud
3. Demonstrate grand score 65-70	eater than SSA-I level of verbal aptitude skills in English % marks in company-specific internal tests	with	rega	rd to	gi gi	ven topio
	Demonstrating soft-skill capabilities with reference	to the	e foll	owi	ng t	opics:
	a. SWOT					
	b. Goal setting					
1.Soft Skills	c. Time management					
	d. Stress management					
	e. Interpersonal skills and Intrapersonal skills					
	f. Presentation skills					
	g. Group discussions					
	Solving problems with reference to the following top	ics:		THE ST		
	a. Equations: Basics of equations, Linear, Quadratic I	Fanat	ions	of		
2. Quantitative	Higher Degree and Problem on ages.	Squar	10115	01		
Autitudo	b. Logarithms, Inequalities and Modulus					
Aptitude	c. Sequence and Series: Arithmetic Progression, Geon	netric	Pro	res	sion	
and	Harmonic Progression, and Special Series.		110	5100	3101	,
Logical	d. Time and Work: Pipes & Cistern and Work Equival	ence				
Reasoning	e. Time, Speed and Distance: Average Speed, Relative			oats	8	
	Streams, Races and Circular tracks and Escalators.					
	f. Arithmetic and Critical Reasoning: Arrangement, S	equer	ncing			
	Scheduling, Network Diagram, Binary Logic, and I				ctio	n
	g. Binary Number System Binary to decimal, Octal, H					
	Demonstrating English language skills with reference		No.		win	g topics:
	a Crisical assessing					
	a. Critical reasoning					
3. Verbal	b. Theme detection					
Aptitude	c. Verbal analogy d. Prepositions					
	e. Articles					
	f. Cloze test					
	g. Company specific aptitude questions					

Dr.S.Anita

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

SEMESTER - IV

MANDATORY COURSE

U19GE403 - ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

(Common for EEE, CIVIL, MECH and CSE)

L T P C 2 0 0 0

Conne	e Outcomes			
	end of the course, the students will be able to,	na iti		
At the	understand, connect up and explain basics of Indian traditional knowledge	e in mo	derr	1
1.	scientific perspective.	,		
2	show an ability to comment critically on curriculum proposals that aim to	promo	ote	
۷.	science citizenship/scientific literacy	Promi		
3	communicate using common medical and psychological terminology, inc	luding	the s	kill
5.	to discuss commonly used medications, supplements, and surgical process	lures		
4	use effective oral and written language skills to communicate scientific d	ata and	idea	is
	describe the fundamentals of yoga and its importance			
	(Consider to Link Civil, Applit Call (MK)			
Unit I				
	Introduction to Vedas	1 4	54	6
•	Traditional methodology of Veda - Sat Angas	3		10
	Types of Vedas and their application	-	2.0	14
	Sub Veda – Ayurveda - their modern day application			
1 4-11-	A PARCHITE			
Unit I	real of the largest the statement will be oblive.		1	
	Basics of Applied Vedic Science			6
	Modern day application of Vedas and procedure			
	Ancient Indian Scientific thoughts			
	Introduction to the Vedic language "Sanskrit"		Na.	
	The control of the co			4000
UNIT	- III- Modern science			6
•	Introduction - modern science			0.5
	Objectives - modern science			
1.16.	Architecture in ancient India	<i>f</i> ()		
				- 15
UNIT	- IV Technology			
•	India's contribution to science and technology (from ancient to modern)			6
•	Nobel laureates of Indian origin and their contribution	1		
•	India in space			
Lan's I	Latest achievement from Jan – 2017			
				6
	Alabaman and a said Very and amendment			35
	and the first title of the first			227
23.01.	B.E. / B.Tech. Regu	ılations	201	9

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

References

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

Total: 30 HOURS

6

Dr. M. Raja

Course Coordinator / Sciences

HOD / Sciences

Dr. M. Renuga

Chairperson BOS,

Science and Humanities

Tetal T. E.S. ES

Dr. M. Person

23.01.2021

B.E. / B.Tech. Regulations 2019

Civil

Sona College of Technology, Salem (An Autonomous Institution)

Courses of Study for B.E. / B.Tech. Semester V Regulations 2019

Branch: Civil Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
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2	U19CE502	Soil Mechanics	2	1	0	3 🐔	45 /
3	U19CE503	Design of Reinforced Concrete Elements	2 /	1	0	3 🗸	45
4	U19CE907/	Professional Elective - Architecture and Town Planning	3 /	0	0	3 /	45 (
5	noc23-ce92 /	NPTEL - Availability and Management of Groundwater Resources	3	0	0	3	45
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	U19C\$1002	Cloud Computing				***	
	U19C\$1003	Internet of Things			70 K		
	U19EC1006	Mobile Technology and Its Applications	3	0	0	3	
6	U19EE1004	Renewable Energy Systems	3			-	45
	U19FT1001	Fundamentals of Fashion Design					
	U19IT1001 /	Problem Solving Techniques using Java Programming				111111	
	U19MC1004~	Fundamentals of Robotics					
	U19ME1004	Renewable Energy Sources				<u> </u>	المراجعة الم
		Practical		بتوساد المقاد المادية	·		-
7	U19CE504 /	Survey Camp	0	0	2 /	1 ,	30 -
8	U19CE505	Computer Aided Civil Engineering Drawing	0	0	2	1/	30

9	U19CE506	Soil Mechanics Laboratory		0	0	2	1	30 /
10	U19GE501	Soft Skills and Aptitude-III		0	0	2	1	30
					1	Total Credits	22	390

ApprovedBy

Chairperson, Civil Engineering BoS

Dr.R.Malathy

Member Secretary, Academic Council

Dr.R.Shivakumar

Chairperson, Academic Council & Principal

Dr.S.R.R.Senthil Kumar

Copy to:- HOD/CivilEngineering,Fifth Semester BE Civil Students and Staff, CQE

Fifth Semester V

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1.	Bhavikatti, S.S., Structural Analysis, Vol. 1 & 2, Vikas Publishing House Pvt. Ltd., New Delhi-4, 2014.
2.	Vazrani.V.N And Ratwani, M.M., Analysis of Structures, Vol.II, Khanna Publisers, 2015.
REFEI	ENCES:
I.	Negi L.S. &Jangid R.S., "Structural Analysis", Tata McGraw Hill Publications, New Delhi, 2003.
2.	Punmia B.C, Ashok Kumar Jain and Arun Kumar Jain, "Theory of structures", Laxmi Publications Pvt. Ltd., New Delhi, 13th Edition 2017.
3.	Bhavikatti, S.S, Structural Analysis, Vol. 1 & 2, Vikas Publishing House Pvt. Ltd., New Delhi-4, 2014.



P.JEY

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CO4	3	2	-	-	-	2	-	-	-	-	2	-	2	3
CO5	3	3	-	-	1	-	-	-	-	-	2	2	2	3
CO (Avg)	2.6	1.6	-	-	3	5	0.4	0.2	0.8	-	1.2	0.4	2	3
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2. Munthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers Distribution I. 2015 REFERENCES: 1. Coduto, D.P., "Geotechnical Engineering – Principles and Practices", Prentice Hall of India Pvt.Ltd. New Delhi, 2017. 2. Das, B.M., "Principles of Geotechnical Engineering". Brooks / Coles / Thompson Learning	9.
Coduto, D.P., "Geotechnical Engineering – Principles and Practices", Prentice Hall of India Pvt.Ltd. New Delhi, 2017. Des R.M. "Principles of Geotechnical Engineering" Proche/Geles / Therese L. L.	d., New Delhi.
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3. McCarthy, D.F., "Essentials of Soil Mechanics and Foundations". Prentice-Hall, 2006.	



J. Jay

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1.	Provide	knowle	edge on	the basi	e design	princip	les and c	lesign pl	nilosoph	y of RC	sections.			
2.	Impart t										2,2,0		June 10 Company of the State of	
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CO5	2	3	2	3	1	-	-	3	2	2	3	3	3	3
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1.	Gambhir	M.L,"F	undame	ntals of	Reinfor	ced Con	crete De	esign", F	Prentice !	Hall of Ir	ndia Pvt.	Ltd, New	Delhi 20	11
2.	SinhaS.N	,"Rein	forced (Concrete	Design	", Tata N	McGraw	-Hill Pu	blishing	Compan	y Ltd, Ne	ew Delhi	2002	

REFE	UENCES:
1.	VargheseP.C."Limit State Design of Reinforced Concrete", Prentice Hall of India Pvt. Ltd, New Delhi 2010
2.	UnnikrishnaPillaiS,DevdasMenon, "Reinforced Concrete Design", Tata McGraw-Hill Publishing Company Ltd,New Delhi 2009
3.	Ashok Kumar Jain, "Reinforced Concrete Limit State Design", Nem Chand Brothers, 2012
4.	Krishna Raju N, Pranesh R N, "Design of Reinforced Concrete Structures", CBS Publishers & Distributors, New Delhi 2018





COURSE CODE	COURSE NAME	L	T	P	C
U19CE504	SURVEY CAMP	0	0	2	1

Course Objective (s): The Purpose of learning this course is to:

- To train the students in taking field observations pertaining to some of the real world problems such as triangulation, contouring, Total Station, Drones etc.,
- 2. To train the students to appreciate practical difficulties in surveying on the field.
- 3. Providing an opportunity to the students to develop team spirit.

Course Outcome (s) (COs): At the end of this course, the students will be able to:

- CO1 | Calculate the horizontal, vertical angles by triangulation and trilateration method. (K3)
- CO2 Determine the Reduced levels and area by theodolite and total station (K5)
- CO3 Draw the contour maps and preparing the maps using drones. (K2)

Knowledge Level: K1 - Remember: K2 - Understand: K3 - Apply: K4 - Analyze: K5 - Evaluate:

CO-PO Mapping

mo.	1	Pas												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO	PSO2
COI	3	-	-	-	-	3	2	3	3	3	3	3	3	•
CO2	3	-	-	-	3	3	2	3	3	3	3	3	3	3
C03	3	-	_	_	3	3	2	3	3	3	3	3	3	3
CO (Avg)	3	-	-	1	2	3	2	3	3	3	3	3	3	2

Correlation Level: 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

LIST OF EXPERIMENTS:

Theodolite Surveying

- Triangulation
- Trilateration

Levelling

- Block contouring
- Longitudinal and cross section

Total Station

Calculation of Area using Total Station

Drone Surveying

Preparation of Topography Map using Drones

TEXT BOOKS:

1. Punmia B.C, "Surveying, Vol. I and II", Laxmi Publications, 2016.

2. Basak N.N, "Surveying and Levelling", Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2014

3. Kumar S., "Basics of Remote Sensing and GIS", Laxmi Publication (P) Ltd,2015

REFERENCES:

1. Arora K. R, "Surveying Vol. I and II", Standard Book House, 2015

2. Duggal S.K, "Surveying Vol. I and II", Tata McGraw Hill, New Delhi, 2013.

3. Kanetkar T.P, "Surveying and Levelling Vols. I and II", United Book Corporation, Pune, 2014

Department of Civil Engineering, Sona College of Technology, Salem - 5.





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COURS	RSE CODE COURSE NAME L T P (C	
U19	CE505		COM	PUTE		ED CI		NGIN	EERII	NG .	0	0	2	1
Course	Objectiv	e (s): Tl	ie Purp	ose of la	arning	this cou	use is to		ali ye sa saken ye ayana	agreed of specification		Properties and the first to		
1.	Practic	e the stu	dents to	draft th	e plan, e	levation	and sec	tional v	iews of l	ouildings				
2.	Incorpo	orate the	engine	ering in	developi	ing and	satisfyin	g orienta	ation and	f function	nal requir	ements a	s per Nat	ional
3.	Provide	orienta	tion on	recent to	chnolog	ies and	industry	practice	es.	AND THE OWNER	the state of the state of the state of		en e	No record that a particular
Course	Outcome	The state of the s		and the second second			-	-		to:			in the transfer of contract	Postovanje i
CO1				plannin										
CO2	Draw p	lan, elev	ration a	nd section	n for va	rious ty	pes of b	aildings.	(K5)					
C03	Analyz	e the pro	oblems a	and prov	ide solu	tions wi	th engin	eering c	oncepts	and emer	ging tech	mologies	.(K4)	1
Knowle	dge Leve	l:K1 – F	lememb	er: K2	-Unde	rstand: l	K3 – Ap	olv: K	4 – Ana	lvze: K5	– Evalua	fe:		
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COs			9 A 1922 A				Pos		CO GOO-JOST LA SCOTT TO SCOTT CONTRACTO				PS	Os
e.us	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS
CO1	3	1	3	1	1	1	3	1	1	-	-	2	1	2
CO2	3	2	3	1	2	1	3	-	1	-	-	2	1	2
COe3	3	2	3	1	2	1	2	-	1	-	-	1	1	2
€O (Avg)	3	1.67	3	1	1.67	1	2.67	0.33	1	-	-	1.6	1	2
Corre	lation L	evel:		1:Slight	(Low)		2	:Modera	te (Med	ium)		3:Subst	antial (H	ioh)

LIST OF EXPERIMENTS:

Preparation of line sketches in accordance with functional requirements and rules for the following types of building as per National Building Code.

Draw the plan, elevation, sectional view of superstructure and substructure and other details for

- a. Introduction to AutoCAD and its tools
- b. Principles of planning, orientation and complete joinery details
- c. Buildings with load bearing walls
- d. Buildings with sloping roof
- e. R.C.C. framed structures.
- f. Industrial buildings North light roof structures
- g. Prefabricated Industrial Building
- h. Plumbing and electric working drawing for residential building.
- Rain water harvesting and septic Tank
- Creation of 3D BIM model of a residential building.

TOTAL: 30 Hours TEXT BOOKS: 1. Verma.B.P., "Civil Engineering Drawing and House Planning", Khanna Publishers, 1989. Dr.N.Kumaraswamy, A KameswaraRoa, "Building planning and drawing" 9th Revision, Charotor Publishing 2 house pvt ltd. 2019. REFERENCES: L Sikka V. B., A Course in Civil Engineering Drawing, 4th Edition, S.K. Kataria and Sons, 1998. 2. George Omura, "Mastering in AUTOCAD 2002", BPB Publications, 2002 Shah.M.G., Kale. C.M. and Patki. S.Y., "Building Drawing with an Integrated Approach to Built Environment", 3. Tata McGraw Hill Publishers Limited, 2004. Marimuthu V.M., Murugesan R. and Padmini S., "Civil Engineering Drawing-1", Pratheeba Publishers, 2008. 4.

Department of Civil Engineering, Sona College of Technology, Salem - 5.

	E CODE				CC	URSE	NAME				L	T	P	C
	CE506			SOIL	MECH	IANICS	LABO	RATOR	RY.		0	0	2	1
Course	Objectiv	e (s): T	he Purp	ose of le	arning	this cou	rse is to							
1.	Students	will ab	le to ide	ntify phy	sical an	d mecha	nical pr	operties	of soil i	n the fiel	d and lab	oratory s	ettings.	
2.	Preparin writing to	g soil sa	amples i	for testin	ng, perfo	orming t	he test,	collectin	ng and a	nalysing	data, int	erpreting	the resu	ilts an
3.	Student		THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE OW	THE RESERVE THE PERSON NAMED IN	oratory 1	test stand	dards an	d proced	lures bas	sed on IS	Codes.		A CONTRACTOR OF THE CONTRACTOR	
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	Outcome	(s) (C)	Js): At 1	ne end	of this c	ourse, t	he stud	ents will	be able	to:				
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-	Experime Determin		2	a nrone	rties and	t chear c	trength	of soils ((V5)	China yan yan tan	· · · · · · · · · · · · · · · · · · ·	. 4.		
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CO1	2	3	-		-	3	-	-	-	-	-	_	1	3
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COURS	SE CODE	<u> </u>			CO	URSE	NAME				L	T	P	С
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Course	Objective	e (s): Tl	ie Purp	ose of le	arning	this cou	rse is to	•						
1.	Provide	knowle	edge on	the arch	itectural	design :	and tern	es.						
2.	Impart	the basi	c knowl	edge in t	he Build	ding bye	-laws ar	nd site p	lanning.	ante universal businesses				
3.	Provide	the bas	ic know	ledge of	types o	f buildir	ng and it	s design	princip	les.				
4.	Aware	the stud	ents abo	utclima	e and er	ivironm	ental res	ponsive	design	in the bui	lding.			
5.	Provide	basic k	nowled	ge in the	town pl	lanning a	and urba	n renew	al for th	e buildin	gs.	,		
Course	Outcome	(s) (CE)s): At t	he end	of this c	ourse, t	he stude	ents will	be able	to:	ervan zavistana Alemantaria	erept weeting buy	10 30 Feb 2002	ensproved solvers
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CO2	Explair	about	site plan	ning, su	vey, site	e analysi	is and la	yout. (K	(2)				and a second second	
CO3	Identify	the var	ious rul	es and re	gulation	of tow	n planni	ng and d	levelopn	nent auth	ority (K3	3)	mana birak in 1946 - 1950 (1944 (1944 (1944	Statistical Control
CO4			us aspec		vironme	ent and	climate	in civil	enginee	ering proj	ects& il	lustrate t	he princi	ples
CO5	Evaluat	e the co	ncepts 1	elated to	town p	lanning	and Urb	an renev	wal (K5))				
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REFE	BNCSE
1.	Rangwala S.C, "Town Planning" Charotar Publishing House, Anand, 2016
2.	Francis D.K.Ching, "Architecture: Form, Space and Order", John Wiley & Sons, Inc. 2007.
3.	Arvind Krishnan, Nick Baker, Simos Yannas, and Szokolay S.V, "Climate Responsive Architecture- A Design Hand Book for Energy Efficient Building", Tata McGraw Hill Publishing Company Ltd, New Delhi, 2007.
4.	National Building Code of India, SP7 (Group 1) Bureau of Indian Standards, New Delhi, 2005
5.	A.F.C. Sherratt, "Air-conditioning and Energy Conservation", The Architectural Press, London, 2007.





U19GE501	SOFT SKILLS AND APTITUDE - III	L	T O	P 2	C N	Marks 100	
Course Outcomes At the end of the co	urse the student will be able to:	V					
 Demonstrate ca case-study appro 	pabilities in supplementaryareas of soft-skills and job-related selection paches	n process	es u	sing	hand	ls-on a	nd/o
	of advancedlevels than those in SSA-II in specified areas of quantitative arks in company-specific internal tests	aptitude	and]	logi	cal re	asonin	g an
	ater than SSA-II level of verbal aptitude skills in English with regard by-specific internal tests	to given	topic	s a	nd sc	core 70	-75%
	a. Career planning: Importance; Exploring various career option management; Process, benefits and limitations of career planning career planning; Self-evaluation b. Resume writing: Build credentials and resume, Positioning your Video resume, Relevant resume phrases and components; Cover Social media cover	g; Mappin rself and r letter; F	your Portfo	car	Γ and eer, J mana	D map	LS to
	 c. Group discussion: Skills needed for GD; Frequently Asked top Various framework and tools to handle GD: Practice and assessmed. d. Teamwork: Definition and importance of team-building; Stages 	ent					-
1.SOFT SKILLS	within a team; Various styles of teams and their analysis; Activitie e. Leadership skills: Role of a leader; Difference between a Leadership styles; Compelling qualities of a leader; Famous lead Self-assessment	manage	r and	d a	lead	er, Va	
	f. Interview skills: Process and types of interview; Appearance a	and groo	ming	eti	quette	e; Do's	ar

- f. Interview skills: Process and types of interview; Appearance and grooming etiquette; Do's and Don'ts (Before During interview); Brainstorming interview possible questions; Hot seat;
- Transactional Analysis for effective communication and handling interviewers; mock interviews and assessment parameters discussion
- g. Mock interviews: Frequently Asked Questions practice and assessment; Discussion and demonstrations on Stress and Technical interviews; Group interview
- h. Mock GDs: Frequently Asked Topics Practice; Assessment and feedback

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

Total: 45 Hours



noc23-ce92 - Availability and Management of Groundwater Resources

Course layout

3 0 0 3

- Week 1: Introduction of hydrological cycle, need for conservation of groundwater resources
- Week 2: Geologic formations as aquifers
- Week 3: Vadose and saturated zones
- Week 4: Confined and unconfined aquifers and their parameters
- Week 5: Porosity, permeability, transmissivity and storage coefficient
- Week 6: Law of groundwater movement, Darcy's law and applications
- Week 7: Estimation of Subsurface runoff, Types of wells, Well Hydraulics
- Week 8: Measurement of rainfall, Index of wetness, Infiltration rate
- Week 9: Estimation of Total Annual Replenish able Natural Groundwater Recharge
- Week 10: Groundwater resources planning and management
- Week 11: Rainwater harvesting and artificial groundwater recharge
- Week 12: Impact of climate change on water resources

Books and references

- 1. Textbook of Geology-P. K. Mukerjee.
- 2. Textbook of Engineering & General Geology-Parbin Singh.
- 3. Groundwater- H. M. Raghunath
- 4. Hydrology and Water Resources Engineering S.K. Garg

Total: 45 Hours



COURSE OUTCOMES:

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

- · Compare and analyze different types of digital data characteristics of Big Data
- Implement programs using Hadoop open source software framework
- Design and develop programs using NoSQL Databases like Mongo DB and Cassandra
- Apply MapReduce programming for various big data based problems
- Implement programs using Hive and Pig Databases

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5			(3/2	2/1 indic	cates stre	ength of	correlat	ion) 3-9	Strong,	2-Mediur	n, 1-Wea	k		
		Programme Outcomes (POs) and Programme Specific Outcome (PSOs)												
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CO1	3	2	1	2	1	2	0	1	0	2	1	2	2	2
CO2	2	1	2	2	3	2	0	1	1	2	2	2	2	2
CO3	2	1	2	3	3	2	1	1	1	2	3	2	2	3
CO4	3	1	2	3	3	2	0	1	0	2	3	2	2	3
CO5	2	2	3	3	3	1	0	1	0	2	3	2	3	3

UNIT I INTRODUCTION TO BIG DATA

9

Types of Digital Data: Classification of Digital Data Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, Characteristics of Big Data, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment.

UNIT II BIG DATA ANALYTICS

9

Introduction -Big Data Analytics, Classification of Analytics, Challenges in Big Data, Technologies to handle Challenges Posed by Big Data- Data Science- Data Scientist, Terminologies Used in Big Data Environments, Basically Available Soft State Eventual Consistency (BASE), Few Top Analytics Tools.

UNIT III HADOOP

9

Introduction Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Use Case of Hadoop, Hadoop Distributors, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator), Interacting with Hadoop Ecosystem, MapReduce Programming - Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression

05.07.2023

Regulation 2019

B. SATHIYABHA - CELUTROMPAU.

SONA COLLEGE OF TECHNOLOGY
SALEM-636 005

UNIT IV NO SQL DATABASES

9

Cassandra :Apache Cassandra - An Introduction , Features of Cassandra, CQL Data types, CQLSH, Keyspaces, CRUD (Create, Read, Update and Delete) Operations, Collections, Using a Counter, Time to Live (TTL), Alter Commands, Import and Export, Querying System Tables, Practice Examples- MongoDB, Terms Used in RDBMS and MongoDB, Data Types in MongoDB , MongoDB Query Language

UNIT V HIVE AND PIG

9

Hive: Introduction to Hive, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL), RCFile Implementation, SerDe, User-defined Function(UDF).

Pig: Introduction to Pig, The Anatomy of Pig, Pig on Hadoop, Pig Philosophy, Use Case for Pig: ETL Processing, Pig Latin Overview, Data Types in Pig, Running Pig, Execution Modes of Pig, HDFS Commands, Relational Operators, Eval Function, Complex Data Types

,Piggy Bank, User-Defined Functions (UDF) ,Parameter Substitution , Diagnostic Operator , Word Count Example using Pig,Pig versus Hive

Total: 45 hours

TEXT BOOKS:

1. **Big Data and Analytics**, Seema Acharya, Subhashini Chellappan, Infosys Limited, Publication: Wiley India Private Limited,1st Edition 2015(Chapters 1,2,3,4,5,6,7,8,9,10)

REFERENCE BOOKS:

- Hadoop in Practice, Alex Holmes, Manning Publications Co., September 2014, Second Edition.
- 2. Programming Pig, Alan Gates, O'Reilly, Kindle Publication.
- 3. Programming Hive, Dean Wampler, O'Reilly, Kindle Publication.

Dr. B. SATHIYABHAMA, B.E., M. Tech., Ph.U.

PROFESSOR & HEAD,
Dept. of Computer Science and Engineering
SONA COLLEGE OF TECHNOLOGY

SALEM-636 005

PREAMBLE

The "Internet of Things" (IoT) is the network of physical objects or "things" embedded with sensors, actuators, software, electronics and network connectivity to enable it to achieve greater value and service by exchanging data between the physical world and computer systems over existing network infrastructure. By connecting everyday real world objects such as transports, buildings and industrial equipments, IoT guarantees to revolutionize how we live and work. In the year 2020, it is estimated that approximately 30 billion devices will be connected in IoT. IoT will drive new consumer and business behavior that will demand increasingly intelligent industry solutions. It can also help various industries like agriculture, health services, energy, security, disaster management etc., which need to automate solutions to problems faced through remotely connected devices.

The Internet of Things involves three distinct stages:

- 1. The sensors which collect data (including identification and addressing the sensor/device)
- 2. An application which collects and analyzes this data for further consolidation
- 3. Decision making and the transmission of data to the decision-making server. Analytical engines, actuators and Big data may be used for the decision making process.

After completing the course the students will attain the following,

- > Ability to build real time IoT applications by interfacing the sensors with minimal programming.
- Ability to associate sensor networks and communication modules for building IoT systems.

Dr.B. SATHIYABHAMA, B.E., M. Tech., Ph.U.

PROFESSOR & HEAD, Dept. of Computer Science and Engineering

SONA COLLEGE OF TECHNOLOGY SALEM-636 005

COURSE OUTCOMES:

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

- Recall characteristics, physical and logical designs, domains.
- Differentiate IoT and M2M and explain IoT design methodology.
- Describe the various IoT components.
- Design a portable IoT system using Arduino/Raspberry Pi.
- Discuss the various applications of IoT.

UNIT I FUNDAMENTALS OF IOT

9

Introduction-Definition and Characteristics of IoT- Physical design- IoT Protocols-Logical design - IoT communication models, Iot Communication APIs- Enabling technologies - Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates - Domain specific IoTs.

UNIT II M2M AND IOT DESIGN METHODOLOGY

9

IoT and M2M- difference between IoT and M2M - Software defined networks, network function virtualization—Needs- IoT design methodology

UNIT III IOT COMPONENTS

9

Sensors and actuators - Communication modules - Zigbee- RFID-Wi-Fi-Power sources.

UNIT IV BUILDING IOT WITH HARDWARE PLATFORMS

Platform - Arduino/Raspberry Pi- Physical devices - Interfaces - Programming - APIs/Packages

UNIT V CASE STUDY

0

Various Real time applications of IoT- Home automation-Automatic lighting-Home intrusion detection- Cities-Smart parking-Environment-Weather monitoring system- Agriculture-Smart irrigation.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things-A hands-on approach", Universities Press, 2015.

REFERENCES:

- 1. Manoel Carlos Ramon, —Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmersl, Apress, 2014.
- 2. Marco Schwartz, —Internet of Things with the Arduino Yunl, Packt Publishing, 2014.
- 3. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley Publications, 2012.
- 4. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things: Key applications and Protocols", Wiley Publications 2nd edition, 2013.

05.07.2023

Regulation 2019

Or.B. SATHIYABHAMA, B.E.,M.Tech.,Ph.U. PROFESSOR & HEAD.

Dept. of Computer Science and Engineering

SONA COLLEGE OF TECHNOLOGY SALEM-636 005

COURSE OUTCOMES:

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

- 1. Provide an overview of cloud computing
- 2. Explain the various tasks in developing cloud services
- 3. Analyze the provision of cloud computing services to different users
- 4. Configure the various cloud services according to the environment.
- 5. Analyze various ways to collaborate online

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CO2	2	1	2	3	3	2	0	1	1	2	2	3	3	3
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CO5	2	2	3	3	3	1	0	1	0	2	3	2	3	3

UNIT I Understanding Cloud Computing

6

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II Developing Cloud Services

10

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon – Google App Engine – IBM Clouds

UNIT III Cloud Computing for Everyone

10

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV Using Cloud Services

10

Collaborating on Calendars, Schedules and Task Management – Exploring Online Calendar Applications- Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Spread sheets- Collaborating on Databases – Storing and Sharing Files

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Regulation 2019

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PROFESSOR & HEAD,

Dept. of Computer Science and Engineering

SONA COLLEGE OF TECHNOLOGY

SALEM-636 005

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

Total:45 hours

TEXT BOOK:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

REFERENCE BOOK:

 Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Dr. B. SATHIYABHAMA, B.E., M. Toch., Ph.U.
PROFESSOR & HEAD,
Dept. of Computer Science and Engineering
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SALEM-636 005

Course Outcomes

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

- 1) Analyze the 1G and 2G Technologies.
- 2) Explain the 2.5G evolutions
- 3) Analyze the principles of 3G and UMTS
- 4) Analyze the evolutions of 4G.
- 5) Summarize the various wireless security applications and solve the mobile phone faults.

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CO5	3	3	3	3	3	3		1		1	1	3		

Unit I 1G and 2G

9

First Generation (IG): IG Systems - General IG System Architecture - Generic MTSO Configuration - Generic Cell Site Configuration - Call Setup Scenarios - Handoff - Frequency Reuse - Spectrum Allocation - Channel Band Plan Second generation (2G): Enhancements over 1G Systems - Integration with Existing 1G Systems - GSM - iDEN - CDPD

Unit II 2.5G Generation

9

Enhancements over 2G – Technology Platforms – General Packet Radio Service (GPRS) – Enhanced Data Rates for Global Evolution (EDGE) – High-Speed Circuit Switched Data (HSCSD) – CDMA2000 (1XRTT) – WAP-Migration Path from 2G to 2.5G to 3G..

05.07.2023

Dr.R.S.SABEENIAN, M.E.,MBA.,Ph.D.,FIETE, Professor and Head of Department Electronics and Communication Engineering SONA COLLEGE OF TECHNOLOGY, Salem - 636 C05. Tamilnadu, India.

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Unit III 3G Generation

Introduction – Universal Mobile Telecommunications Service (UMTS), UMTS Basics, The UTRAN Architecture, Handover, UMTS Services – The UMTS Air Interface – Overview of the 3GPP Network Architecture – Overview CDMA2000 – Commonality Between WCDMA/CDMA2000/CDM

Unit IV 4G and Beyond

9

Introduction to LTE - Network architectures - EPC - E-UTRAN architecture - Mobility management - Resource management - Services - Channel - logical and transport channel mapping - downlink/uplink data transfer - MAC control element - PDU packet formats - scheduling services - random access procedure - Objectives of 5G-Architecture - Features and benefits.

Unit V Wireless Security and Mobile Phone service

9

Introduction - Fingerprint - Classification of major security attacks against RFID systems - GSM Security - Barcode scanner technology features and applications - QR code - BAR code - OTP - AirDrop.

Mobile phone Service: Parts in the mobile phones -Mobile phones assembling and disassembling -motherboard - Mobile Operating Systems - Fault finding - Advanced troubleshooting techniques.

TOTAL: 45 HOURS

Text Book

- 1) Clint Smith, P.E., Dannel Collins, "3G Wireless Networks" 2nd edition, Tata McGraw-Hill, 2008.
- 2) Vijay K.Garg, "Wireless Network Evolution- 2G & 3G" Pearson, 2013.

References

- T.S Rapp port, "Wireless Communications" Principles and Practice, Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint, 2013.
- 2) Jochen H. Schiller, "Mobile Communications", 2/e, Pearson, 2014
- 3) SassanAhmadi, "LTE-Advanced A practical systems approach to understanding the 3GPP LTE Releases 10 and 11 radio access technologies", Elsevier, 2014

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05.07.2023

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PREAMBLE TO RENEWABLE ENERGY SYSTEMS

Energy is an important source of all technological developments as well as for all basic needs. The usage of renewable energy sources are the only way for sustainable development and future energy requirements. Renewable energy encourages the generation of electricity without any environmental impact and improves the economic growth of the country.

By choosing this elective the students will be able to know the importance of renewable energy sources for power generation. And also they could understand how the fossil fuels are made an impact on environmental issues. They will be familiar with the following

- Concept of solar energy power production and solar photovoltaic cells and the application of solar PV system and Bio Mass power generation system.
- 2. Principle of conversion of wind energy in to electric energy
- 3. Working of geothermal and hydro power stations.
- 4. Principle of the conversion of tidal and wave energy in to electric energy.
- 5. The emerging technology of power generation.

After completion of this subject students will know how the energy can be produced locally. This knowledge would provide an opportunity to install small capacity power generation units independently for their needs.

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S. PADMA, M.E., Ph.D.,

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Nad.,

Electrical and Electronics Enginering

Regulations-2019

COURSE OUTCOMES

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

- 1. Describe the power demand scenario in world level and impact of various renewable energy sources in satisfying power demand.
- 2. Explain the principle of operation and the application of solar system.
- 3. Outline in the components and to find the suitability based on the performance of wind energy and Conversion system, biomass energy system
- 4. Describe the principle of operation and the application of geo thermal power tidal power generation scheme, wave energy and OTEC scheme.
- 5. Illustrate the emerging energy generation systems of MHD, Thermal and fuel cells applications.

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CO5	3	3	3	2	2	3	3	1	2		3	3	3	3

UNIT I INTRODUCTION

World energy futures-Energy sources and their availability - Energy cycle of the earth - environmental aspects of energy utilization - Energy plantation- Renewable energy resources and their importance-Prospects of Renewable energy sources.

SOLAR ENERGY SYSTEMS **UNIT II**

Introduction -Solar radiation and measurements-Solar energy collectors-solar energy storage systems- Solar pond and applications- Applications of solar energy: solar pumping, solar cooking, solar distillation and solar greenhouse.

WIND AND BIOMASS ENERGY SYSTEMS **UNIT III**

9

Introduction - Wind Energy conversion- Wind speed and power relation - Power extracted from wind wind distribution and wind speed predictions - types of Wind power systems.

Bio mass conversion technologies-Biogas generation-Types of biogas plants-Bio gas from plant wastes-Utilization of Bio gas and applications.

GEO THERMAL, TIDAL AND OCEAN ENERGY SYSTEMS **UNIT IV**

Geothermal energy - Estimates of Geothermal power- site selection for geothermal power plant-Applications of Geothermal energy.

Origin of tides - Basic principle of Tidal power- Operation of a Tidal power plant. Ocean Thermal Energy conversion system- Open and closed OTEC cycles- Prospects of ocean thermal energy conversion in India.

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Magneto Hydro Dynamic (MHD) Power Generation- MHD systems and its operation. Thermo Electric power generation- Basic principle- Thermo electric power generator.

Thermonuclear fusion energy-Nuclear fusion and reactions- Advantages. Fuel cell- classification of fuel cells- Fuel cell based electrical power generation scheme- Applications.

Lecture: 45; Tutorial: 0; Total: 45 Hours

TEXT BOOKS:

- 1. Rai, G.D., "Non-Conventional Energy Sources", Khanna Publishers, Sixth Edition 2017.
- 2. Khan, B.H, Non- Conventional Energy Resources", Mc. Graw Hill Education Ltd, third reprint 2017.

REFERENCE BOOK

- Rao S. Paruklekar, B.B., "Energy Technology Non Conventional, Renewable and Conventional", KhannaPublishers, 1994.
- 2. F.Kreith and J.F.Kreider, "Principles of Solar Engineering", McGraw Hill.
- 3. T.N. Veziroglu, "Alternative Energy Sources", Vol 5 and 6, McGraw Hill.
- 4. Mukund R.Patel, "Wind and Solar Power Systems", CRC Press LLC.

Dr. S. PADMA, M.E., Ph.D.,
Professor and Head,
Professor and Technology
Department of Technology
Sona College of Tamil Nadu.
Salem-636 005. Tamil Nadu.

COURSE OUTCOMES

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

- 1. Define and discuss the fashion and related terms and reason for change in fashion and the classification
- 2. Describe clothing and its purpose, Role of clothing and its status.
- 3. Describe the selection of clothing for various age groups, Fashion apparel and wardrobe planning.
- 4. Explain the elements and principles of the design, with the effects in the apparel
- 5. Bounce out the theme and development of portfolio.

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UNIT I Introduction to Fashion

9

Origin of fashion - terms and definitions - reasons for change in fashion - classification of fashion - Style, Classic, FAD, Trend - theories of fashion - movement of fashion - fashion cycle.

UNIT II Introduction to Clothing

•

Understanding clothing - Purpose of clothing: protection, modesty, attraction etc - Importance of clothing - Clothing Culture, Men and Women clothing and ornamentation - Role and status of clothing - Clothing according to climatic conditions - factors to be considered in the selection of clothing

UNIT III Selection of clothes

9

Clothes for children, middle-aged and adults. Types of clothes according to different types of human figure, Different materials for different clothes, Fabrics and colours suitable for different garments.

Planning for clothing needs: Formal clothing, Clothes for parties, Clothes for sports, Casual Clothes for casualwear. Wardrobe Planning: Wardrobe for men and women

UNIT IV Elements and Principles of Design

9

Elements of Design: Introduction on basics Elements of design - Silhouette, Details, Texture, Color, Lines,

80

17.07.2023

Regulations 2019

Dr. D. RAJA, M.Tech., Ph.D.,
Professor & Head
Department of Fashion Technology
Sona College of Technology
Salem - 636 005. Tamil Nadu

Principle of design: Introduction to principles of Elements of design - Proportion, Balance, Rhythm, Center of Interest, Harmony

UNIT 5 Design and Development

9

Boards: Mood board, fabric board, colour board, accessory board. Fashion illustration – head theories, Illustration techniques – strokes, hatching, shading; Colouring techniques – Medias for colouring. Portfolio presentation – styles of presentation - Fashion shows.

TOTAL: 45 hours

TEXT BOOKS

- 1. Munslow, Janine, McKelvey, Kathryn "Fashion Design Process Innovation and Practice", 2nd Edition, wiley, 2012.
- 2. Nicola White, Ian Griffiths, "The Fashion Business Theory, Practice, Image", Berg, 2000.

REFERENCE

- 1. Sumathi, G. J. Elements of fashion and apparel design. New Age International, 2007.
- 2. Kathryn McKelvey "Fashion Source Book" Balckwell Publishing New Delhi.
- 3. Mills, Jane, and Janet K. Smith. Design concepts. Fairchild Books, 1985.
- 4. Rasband J. Wardrobe strategies for women. Fairchild Publications; 2002.
- 5. Jarnow JA, Judelle B, Guerreiro M. Inside the fashion business. Wiley; 1981.

2

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3/6

U19IT1001

PROBLEM SOLVING TECHNIQUES USING JAVA PROGRAMMING

3003

PREAMBLE

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

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

COURSE OUTCOMES

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

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UNIT I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS 9
Introduction to Object Orientation- Need for Object Oriented Paradigm- Characteristics of Object Oriented Programming - The History and Evolution of Java - An Overview of Java - Java Virtual Machine - Data Types -Variables - Arrays - Operators- Control Statements - Command Line Arguments

UNIT II OBJECTS AND CLASSES

9

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

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UNIT III INHERITANCE AND INTERFACE

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

UNIT IV EXCEPTION HANDLING AND I/O

9

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

UNIT V PACKAGES AND JDBC CONNECTIVITY

9

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

TOTAL: 45 HOURS

TEXT BOOK

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

REFERENCES

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

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SALEM-636 005



D.E

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Department of Mechatronics Engineering

Open Elective

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Unit 02: ROBOT MOTIONS AND DRIVE SYSTEMS

9 Hours

Degrees of freedom – DOF associated with arm and body - DOF associated with wrist – Joint Notation scheme-Robot Kinematics – Robot Drive systems – Hydraulic Actuators – Pneumatic actuators – Electrical actuators: Stepper motors, DC motors, Servomotor.

Unit 03: ROBOT SENSORS AND END EFFECTORS

9 Hours

Classification of Robotic sensors and their functions – Tactile sensors – Inductive Proximity sensor – Hall effect sensor – Range sensor – Force ant Torque sensors- Types of end effectors – Mechanical grippers – Vacuum cups – Magnetic grippers – Adhesive grippers – Tools as end effectors.

Unit 04: ROBOT PROGRAMMING

9 Hours

Methods of Robot Programming: Lead through methods, Textual robot Languages – Robot language structure – First generation Languages – Second generation Languages – VAL Programming – Simple Programming examples.

Unit 05: ROBOT APPLICATIONS

9 Hours

Robotics Applications in Manufacturing: Welding Robot, AGVs- Healthcare: Surgery Robot, Therapeutic Robot - Agriculture: Crop Harvesting & Fruit Picking Robot - Defence & Space: Exoskeleton Robot, Telerobotics.

Theory: 45 Hrs

Tutorial: --

Practical: --

Total Hours: 45 Hrs

TEXT BOOKS

1. M.P.Groover, M.Weiss, R.N. Nagal, N.G.Odrey, "Industrial Robotics - Technology, programming and Applications" Tata McGraw-Hill Publication, 2012.

REFERENCES

- 1. Richard D.Klafter, "Robotics Engineering" PHI Learning Private Limited, 2009.
- 2. Ganesh S.Hedge, "A text book in Industrial Robotics", Laxmi Publications, 2006.
- 3. S K Saha, "Introduction to Robotics", Tata McGraw-Hill Publication, 2012.
- 4. Sathya Ranjan Deb, "Robotics Technology & flexible Automation" Second edition, Tata McGraw-Hill Publication, 2009.

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Junction Main Road, SALEM - 636 005.
Ph:0427-4099999

COURSE CODE

U19ME1004 (

LTPC

COURSE NAME

RENEWABLE ENERGY SOURCES

- - 3

Prerequisites- subject: Environmental Sciences.

Course Outcomes

Upon completion of this course the students will be able to

- **CO1** Discuss the power demand scenario in world level and impact of various renewable energy sources in satisfying power demand.
- **CO2** Explain the different components and the principle of operation and the application of solar PV system and Bio Mass power generation system.
- CO3 Outline in the components and to find the suitability based on the performance of wind energy conversion system, geothermal and hydel power system.
- CO4 Describe the components of tidal power generation scheme and wave energy scheme and to discuss the performance of two schemes.
- **CO5** Compare and contrast the various components and methods of Ocean Energy Conversion Systems.

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CO - 3	3	3	3	2	3	3	3	-	3	3	3	3	3	3	
CO - 4	3	3	3	2	3	3	3	-	3	3	2	3	3	3	
CO - 5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	

Unit I INTRODUCTION

L9T0

World energy use – reserves of energy resources – energy cycle of the earth – environmental aspects of energy Utilization – renewable energy resources and their importance.

Unit II SOLAR & BIO ENERGY

L9T0

Introduction – extra-terrestrial solar radiation – radiation at ground level – collectors – solar cells – applications of solar energy – Biomass Energy – Introduction – Biomass Conversion – Biogas Production – Ethanol Production – Pyrolysis and Gasification – Direct Combustion – Applications.

Unit III GEO THERMAL AND HYDRO ENERGY SOURCES

L9T0

Geothermal energy – types of geothermal energy sites, site selection, and geothermal power plants, Hydro energy – Feasibility of small, mini and micro hydro plants: scheme, layout and economics.

Unit IV WIND AND TIDAL ENERGY

L9T0

Introduction – Wind Energy – Wind speed and power relation – Power extracted from wind – wind distribution and wind speed predictions – types of Wind power systems.

Introduction – origin of tides – power generation schemes – Wave Energy – basic theory – wave power Devices.

Unit V OTHER RENEWABLE ENERGY SOURCES

L9T0

Introduction – Open and Closed OTEC cycles – Ocean Currents – Salinity Gradient Devices – Potential impacts of harnessing the different renewable energy resources.

Total Number of hours: 45

Learning Resources

Text Books

- 1. Twidell John; Weir, Tony, "Renewable energy resources", Taylor & Francis, 2010
- Godfrey Boyle, "Renewable energy power for a sustainable future", Oxford University Press, 2010
- 3. Kothari DP, Singal KC and Rakesh Ranjan, 'Renewable Energy Sources and Emerging Technologies' PHI Learning Pvt. Ltd.2011.
- 4. S.A. Abbasi and Naseema Abbasi, "Renewable energy sources and their environmental impact", Prentice- Hall of India, 2001.

Reference Books

- 1. T.N. Veziroglu, Alternative Energy Sources, Vol 5 and 6, McGraw Hill, 1978.
- 2. G D Rai, "Non-conventional sources of energy", Khanna Publishers, 2002.
- 3. G D Rai, "Solar energy utilization", Khanna Publishers, 2005.
- 4. MukundR.Patel, "Wind and Solar Power Systems", CRC Press, Taylor and Francis, 2005.
- 5. Yogi Goswami, 'Principles of Solar Engineering' CRC Press, 2015, ISBN 10: 1466563788

Dr.D.SENTHIL KUMAR, ME.Ph.D PROFESSOR & HEAD DEPT. OF MECHANICAL ENGG.

SONA COLLEGE OF TECHNOLOGY JUNCTION MAIN ROAD, SALEM-5.

V Jehn

Semester -V

U19GE501: SOFT SKILLS AND APTITUDE - III

L T P C Marks 0 0 2 1 100

Course Outcomes

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

- 1. Demonstrate capabilities in supplementary areas of soft-skills and job-related selection processes using hands-on and/or case-study approaches
- 2. Solve problems of advanced levels than those in SSA-II in specified areas of quantitative aptitude and logical reasoning and score 70-75% marks in company-specific internal tests
- 3. Display effective language knowledge to construct sentences with subject verb agreement and select the best alternative for the underlined parts of the sentences, and fill in the blanks in the given passages with suitable forms of words and their synonyms.

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

Dr.S.Anita

Head/Training
Dr. S. ANITA

Professor and Head Department of Training, SONA COLLEGE OF TECHNOLOGY, SALEM-636 005.

Syllabi for

B.E/B.Tech Honours (Specialization in the same Discipline)

B.E/B.Tech Honours

B.E/B.Tech Minor

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TEXT	DOOKS:
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2.	Arnold, "Introduction To Materials Management", Pearson Education India, 2017.
3.	A.K.Chitale, R.C.Gupta, "Materials Management", Prentice hall India learning private limited. 2014.
REFEI	EENCE BOOKS:
1.	Richard J. Tersine, "Modern Materials Management", John Hardin Campbell, 2007.
2.	Gopalakrishnan .P, "Handbook of Materials Management", PHI Learning Pvt. Ltd. 2004.



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2.	Thomas Uher, Adam S. Zantis., "Programming and Scheduling Techniques", Rout ledge, 2012.
3.	K. K. Chitkara., "Construction Project Management Planning, Scheduling and Controlling", Tata McGraw-Hill Education, 2014.
4.	Andrew Whyte, "Integrated Design and Cost Management for Civil Engineers", CRC Press, 2014.
REFEI	UNCES:
1.	Andrew, D., Szilagg, Hand Book of Engineering Management, 1982
2.	Harvey, A., Levine, Project Management using Micro Computers, Obsorne -McGraw Hill C.A. Publishing Co., Inc. 1988.





U19ADS2035

PYTHON FOR DATA SCIENCE

3 0 2 4/

COURSE OUTCOME:

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

- Learn the foundations of data science and the primary areas of this discipline's research.
- Demonstrate skill in Python sequence data structures, including strings, arrays, lists, tuples, sets, and dictionaries.
- 3. Apply aggregation functions such as finding the minimum, maximum, and mean values of arrays.
- Apply various operations and transformations on data using Pandas methods and functions.
- 5. Analyse the need for data pre-processing and Web scrapping techniques.

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UNIT I INTRODUCTION DATA SCIENCE AND PYTHON

9

What is data? what is data science? - Fundamentals of data science - Data science life cycle - Why data science is important? - Applications of data science -Basics of data: categories of data- Sources of data- data processing -Why Python is necessary for data science? - Jupyter/pycharm/spyder or any other python tool set up and installation.

UNIT II BASICS OF PYTHON AND DATA STRUCTURES

9

Data types - operators - variables - expressions - control structures using sample datasetobjects and functions -Python sequence data structures including String, Array, List, Tuple, Set, and Dictionary.

UNIT III INTRODUCTION TO NUMPY

9

Understanding Data Types in Python -The Basics of NumPy Arrays-Computation on NumPy Arrays: Universal Functions -Aggregations: Min, Max, and Everything In Between - Computation on Arrays: Broadcasting -Comparisons, Masks, and Boolean Logic- Fancy Indexing -Sorting Arrays-Structured Data: NumPy's Structured Arrays

UNIT IV DATA MANIPULATION WITH PANDAS

10

Introducing Pandas Objects - Data Indexing and Selection - Operating on Data in Pandas - Handling Missing Data - Hierarchical Indexing -Combining Datasets: Concat and Append - Combining Datasets: Merge and Join- Aggregation and Grouping - Pivot Tables - Vectorized String Operations - Working with Time Series -High-Performance Pandas: eval () and query()

A Store

DA J. AKILANDESWARI

PROFESSOR & HEAD
Department of Information Technology

SONA COLLEGE OF TECHNOLOGY

SALEM-636 005

Data pre-processing: data loading - dealing with missing values and outliers - data wrangling - filtering data - Data Normalization - Data Formatting -data cleaning - Web scraping with beautiful soup.

THEORY - 45 HRS

PRACTIAL: 30 HRS

TOTAL: 75 HOURS

LAB EXERCISES:

- 1. Write a python program to perform following operations.
 - a. Create a list, insert elements into the list and sort it in ascending order.
 - b. Create a dictionary of 10elements, change/delete the values of few keys and display the dictionary before and after the updates.
 - c. Create a tuple and a list. Convert the list to tuple and display the elements of both. Write the program to remove the duplicate element of the list.
- 2. Write a python program to perform following task using NumPy
 - a. Develop a program to learn concept of array and NumPy module.
 - b. Convert a list of numeric value into a one-dimensional NumPy array. And perform all operations on that array.
 - c. Find the union of two arrays. Union will return the unique, sorted array of values that are in either of the two input arrays.
- 3. Perform the following task using pandas
 - a. Convert a NumPy array to a Pandas series. Also write a Pandas program to calculate the frequency counts of each unique value of a given series.
 - b. Read a dataset from diamonds DataFrame and modify the default columns values and print the first 6 rows. Also find the number of rows and columns and data type of each column of diamonds DataFrame.
- 4. Write a program to perform all basic data pre-processing steps on the given data set.
- 5. Write a program to perform exploratory data analysis on the given dataset.

TEXTBOOKS:

- 1. Python for data science for dummies 2nd Edition, John Paul Mueller, Luca Massaron, and Wiley.(Unit- 1,4,5)
- 2. Vasiliev, Y. (2022). Python for Data Science: A Hands-On Introduction. United Kingdom: No Starch Press. (Unit-1,3,4)
- 3. Thareja, R. (2019). Python Programming: Using Problem Solving Approach. India: Oxford University Press. (Unit- 2)

REFERENCE BOOKS:

- 1. Pandas for everyone: Python Data Analysis, Daniel Y. Chen, Pearson
- Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools, Davy Cielen, Arno D.B. Meysman, et al., Minning
- 3. Applied Data Science with Python and Jupyter: Use powerful industry-standard tools to unlock new, actionable insights from your data.

PROFESSOR & HEAD
Department of Information Technology
SONA COLLEGE OF TECHNOLOGY
SALEM-636 005

28



U19ADS2036 /

INTRODUCTION TO DATA SCIENCE

3003

COURSE OUTCOMES

At the end of the course, student will able to

- 1. Explain the life cycle of data analytics project
- 2. Apply Exploratory Data Analysis over the dataset
- 3. Explore data pre-processing and feature selection techniques over a dataset
- 4. Apply association rule mining to find the frequent item set in business data repository
- 5. Build different type of regression models for different business use cases

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UNIT I INTRODUCTION

9

Need for data science – benefits and uses – facets of data – Data Analytics Lifecycle: Data Analytics Lifecycle Overview - Discovery – Data Preparation – Model Planning –Model Building – Communicate Results

UNIT II EXPLORATORY DATA ANALYTICS

9

Exploratory Data Analysis: Visualization before Analysis, Dirty Data, Examining Single and Multiple Variable, Data Exploration- Statistical Methods for Evaluation: Hypothesis Testing, Difference of Means, Wilcoxon Rank-Sum Test, Type I and Type II errors, Powers and Sample Size, ANOVA

UNIT III DATA PRE-PROCESSING AND FEATURE SELECTION

9

Data cleaning - Data integration - Data Reduction - Data Transformation and Data Discretization, Feature Generation and Feature Selection, Feature Selection algorithms: Filters-Wrappers, and Embedded

Dr. J. AKILANDESWARI

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UNIT IV DATA ANALYTICS METHOD - ASSOCIATION RULE MINING

Association Rules: Apriori Algorithm, Evaluation of Candidate rules, Application of Association Rules, Frequent Pattern Growth Algorithm, Validation and Testing, Rule based Classifiers – Use case: Grocery Stores, Recommendation System

UNIT V REGRESSION MODELS

9

Regression Models – Use of Regression Analysis – Types of Regressions: Linear Regression, Logistic Regression, Polynomial Regression, Stepwise Regression, Ridge Regression, Lasso Regression, and ElasticNet Regression- Selection of Right Regression Model –Use Case: Sales Forecasting, Credit Card industry

TOTAL: 45 HOURS

TEXT BOOKS

1. David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics: Discovering, Analysing, Visualizing, and Presenting Data", Wiely 2015

REFERENCES

- David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016.
- Jiawei Han, Micheline Kamber and Jian Pei ,"Data Mining: Concepts and Techniques", 3rd Edition, Morgan Kaufmann,2011
- 3. Jay Liebowitz, "Big Data and Business Analytics", CRC Press, 2013
- 4. Cathy O'Neil and Rachel Schutt, "Doing Data Science". O'Reilly, 2014.

Mar

PROFESSOR & HEAD
Department of Information Technology
SONA COLLEGE OF TECHNOLOGY
SALEM-636 005

Civil

Sona College of Technology, Salem (An Autonomous Institution)

Courses of Study for B.E. / B.Tech.Semester VI Regulations 2019

Branch: Civil Engineering

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		Theory	·	Maria de la Constantina			
	U19CE601 /	Water Resources and Irrigation Engineering	3	0	0	3	45/
2	U19CE602 /	Structural Analysis-II	2	1	0	3	45
3	U19CE603 /	Foundation Engineering	3	0	0	3	45
4	U19CE604/	Limit State Design of Steel Structures	3	1	0	4	60
5	U19CE916	Professional Elective - Repair and Rehabilitation of Structures	3	0	0	3	45 /
6	U19CE917	Professional Elective - Prefabricated Structures	2	0	0	3	45 /
	U19CE920	Professional Elective - Traffic Engineering and Management]		•		
		Practical		V			
7	U19CE605 /	Civil Engineering Software Applications Laboratory	0	0	4	2	60 /
8	U19CE606	Innovative Projects	0	0	2	1	30 🗸
9	U19GE602 /	Professional Development Skills	0	0	2	1	30/
Antonio proprieda	arana arang ar			To	otal Credits	23 /	405

ApprovedBy

Chairperson, Civil Engineering BoS

PAP Dr.R.Malathy Copy to:- Member Secretary, Academic Council

Dr.R.Shivakumar

Chairperson, Academic Council & Principal

Dr.S.R.R.Senthil Kumar

HOD/Civi I Engineering, Sixth Semester BE Civil Students and Staff, COE

U190	SE CODE					URSE I					L	T	P	C
	CE601	Carlo						ION EN	GINEE	RING	3	0	0	3
Course	Objective													
1	Define tl	ne basic	compor	nents of	the hydr	ological	cycle, i	nterpreti	ing rainf	all data a	nd surfac	e water a	vailabilit	ty.
2										groundw			ving tech	miques.
3										n and wa				
4	Make us	e of suit	able wa	ter distri	bution s	systems	for effec	ctive and	efficien	t irrigatio	on in a gi	ven land	area.	
5	Utilize s	uitable a	approach	nes for in	nplemei	nting Ca	nal irrig	ation, re	ducing S	Salinity a	nd Water	Logging	problem	ıs.
Course	Outcome	(s) (CO)s): At 1	he end	of this c	course, t	he stud	ents wil	l be able	e to:				
CO1	Remem	ber the	basic co	ncepts o	f rainfal	l occurr	ence and	d its data	interpre	etation (K	(1)			
CO2	Underst	and the	ground	water m	ovemen	t and me	ethod of	measuri	ng the y	rield (K2))			
CO3								nagemei						
CO4	Examin	e the va	rious ty	pes of fo	rces, su	itable lo	cation a	nd desig	n of we	irs, impo	unding st	ructures	and Dam	ıs (K4)
CO5	Discove	er the po	ossible c	anal irrig	gation te	chnique	s river t	raining v	works a	nd contro	olling wat	er loggin	g issues	(K4)
Knowle	dge Leve	1:K1 – 1	Rememb	ber: K2	2 – Unde	erstand:	K3 – Ap	oply: K	(4 – Ana	ılyze: K5	– Evalua	ite:		
CO – P	O Mappi	ng												
Cos]	Pos						PS	SOs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	2	1	2	1	1	- 1		-	-	2	1
CO2	3	1	-	1	1	1	2	1	-	-	-	-	1	2
CO3	3	2	-	2	-	2	1	1	-		-	-	2	1
CO4	3	1	<u>.</u>	1	1	1	2	2	-	-	-	-	1	2
CO5	2	1	- ·	2	2	2	1	1	-	-	-	-	2	1
								-			-			
CO	2.0			11	1	16	1.1	12					16	14
(Avg)	2.8	1.4	-	1.6	1	1.6	1.4	1.2	-	-	-	261	1.6	1.4
(Avg) Corr	 relation I	Level:		1:Sligh	t (Low)			1.2 2:Moder	rate (Me	dium)	-	3:Sub	stantial (High)
(Avg) Corr	 relation I NIT-I	Level:	IRFACI	1:Sligh E WATI	t (Low) E R HYI	DROLO	GY	2:Mode					stantial (High) Iours
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2.	Punmia B.C, "Irrigation and Water Power Engineering", Laxmi Publishers, New Delhi,2016.
REFER	ENCES:
1.	Arora K.R, "Irrigation, Water Power and Water Resources Engineering", Standard Publishers Distributors, New Delhi, 2010.
2.	Subramanya, Engineering Hydrology, Tata-McGraw Hill,2013.
3.	Ragunath H.M, "Hydrology", Willey Eastern Limited, New Delhi, 2008.
4.	Asawa G.L, "Irrigation Engineering", New Age International Publishers, New Delhi, 2009.

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COURSE	CODE				CO	URSE	NAME				L	Т	P	C
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Course Ob														140
1.	Gain kn	owledg	e on ana	lysis of	indetern	ninate st	tructures	by slop	e deflect	tion meth	od.			
										of indete	erminate	structure	S	
3. A	Analysi	s of ind	etermin	ate struc	tures by	matrix	flexibilit	ty metho	od.					
4. P	Perform	analysi	is of ind	etermin	ate struc	tures by	matrix	stiffness	method	•				
5.	Compre	ehend th	e conce	pt of pla	stic anal	ysis of l	beams ai	nd rigid	frames.					
CO1 A	Analyse	the cor	ntinuous	beams	and rigio	d frames	by slop	e defect	ion meth	od. (K4)				
CO2 U		and the								ous beam		d frames	with and	l withou
CO3	llustrat (K3)	e knowl	ledge of	to analy	se the c	ontinuo	us beam:	s and pii	n jointed	plane fra	ames by r	natrix fle	xibility r	nethod.
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										eams and				
Knowledg	e Leve	l: K1 –	Remem	ber: K	2 – Und	erstand:	K3 –	Apply:	K4 – A	analyze:	K5 – E	valuate:		
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COs							Pos						P	SOs
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CO2	3	3	3	2	-	-	-	2	-	-	2	1	3	3
CO3	3	3	3	2	-	-	-	2	-	-	2	1	3	3
CO4	3	3	3	2	-	-	-	2	-	-	2	1	3	3
CO5	3	3	3	2	-	-	-	2	-	-	2	1	2	2
CO (Avg)	3	3	3	2	-	-	-	2	-	-	2	1	2.8	2.8
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2. E	Devdas	Menon	, Structu	ıral Ana	lysis, Na	rosa Pu	blishing	House.	2018					
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1. P	Punmia	В.С, "Т	Theory o	f Struct	ures", St	andard	Book Ho	ouse, Ne	w Delhi	, 2000.				
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r	2.	Pandit G.S, and Gupta S. P, "Structural Analysis a Matrix Approach", Tata McGraw Hill Publications, New Delhi,
t		Reddy .C.S , —Basic Structural Analysisl, Tata McGraw Hill Publishing Company, 2011
t	4.	Negi L.S. and Jangid R.S, "Structural Analysis", Tata McGraw Hill Publications, New Delhi, 2003.

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4.	To disc	uss the	importar	nce of pi	le found	lations.								
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CO2	3	3	3	2	2	2	1	3	1	-	-/-	2	3	2
CO3	3	3	3	2	2	2	1	3	1	-	-	2	3	2
CO4	3	3	3	2	2	2	1	3	1	-	-	2	3	2
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REGULATION 2019 / SIXTH SEMESTER

2.	Murthy V.N.S, "Textbook of Soil Mechanics and Foundation Engineering; Geotechnical Engineering Series", CBS Publishers Distribution Ltd, New Delhi. 2017.
3.	Braja m.das, principles of foundation Engineering, Thomson Asia pvt.ltd, Singapore, 2016.

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REFER	ENCES:
1.	Bhavikatti S.S, "Design of Steel Structures", I.K. International Publishing House Pvt. Ltd, New Delhi, 2017
2.	Negi L.S, "Design of Steel Structures", Tata McGraw Hill Publishing Pvt Ltd, New Delhi, 2007.
3.	Jayagopal L.S, and Tensing, "Design of Steel Structures" Vikas Publishing House Pvt. Ltd, India, 2016.
4.	Gambhir M.L, "Fundamentals of Structural Steel Design", McGraw Hill Education India Pvt. Ltd, 2013
5.	Shiyekar M.R, "Limit State Design in Structural Steel", Prentice Hall of India Pvt. Ltd, 2013.

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Sona College of Technology,
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2

1.6

3:Substantial (High)

COUR	RSE CODE COURSE NAME L								L	T	P	C		
U19	CE605	r	CIVIL	ENGI	NEERIN LA	NG SOF		E APPI	LICATI	ONS	0	0	4	2
Course	Objectiv	e (s): T	he Purp	ose of le	earning	this cou	rse is to);						Line and the second
1.	Practic	e the stu	idents to	analyse	the stru	ctural el	lements	with dif	ferent lo	ad combi	nations.			
2.	Design	the eler	nents as	per the	function	al requi	rements	provide	d in the	IS Code	provision	S.		
3.										rawings.				
Course	Outcome	-		and the second s	and the same of th			The state of the s		-		Water State		
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CO2									Control of the Contro	d purpose	e.(K5)			-
CO3				-	the same of the sa					esign.(K				_
Knowle	dge Leve		-									te:	S. Yang	
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Cos							Pos						PS	SOs
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	3	1	1	1	3	1	1	-	-	2	1	2
CO2	3	2	3	1	2	1	3	-	1	-	_	2	1	2

2.67

0.33

2:Moderate (Medium)

Correlation Level: LIST OF EXPERIMENTS:

COe3

CO

Analyse, design and produce detailed drawing as per relevant codes using Excel and drafting software for

1.67

1:Slight (Low)

- 1. Reinforced concrete beam (singly and doubly reinforced section)
- 2. Reinforced concrete column (Short and long column)
- 3. Reinforced concrete slab (one way and two way)
- 4. Reinforced concrete isolated footing

1.67

- 5. Reinforced concrete beam column connections
- 6. Reinforced concrete dog-legged staircase
- 7. Analysis of two Storey RC building
- 8. Analysis, design and detailing of steel roof truss
- 9. Design of Concrete Mix proportioning

TOTAL:	60 Hours
F BOOKS/ CODE BOOKS:	
IS 456-2000 - Code of Practice for Plain and Reinforced concrete	
IS 800-2007 - Code of Practice for General Construction in Steel	
SP 34 – Handbook on Concrete reinforcement and detailing	
IS 10262 - 2009 - Guidelines for Concrete mix design proportioning	
S Unnikrishna Pillai &Devdas Menon "Reinforced Concrete Design", 3rd Edition, McGraw Hill Education,	2017
SK Duggal, "Design of Steel Structures", 3rd edition, Tata McGraw-Hill Education, 2017	-12
RENCES:	
N Subramanian, "Design of reinforced concrete Structures", 1st Edition, Oxford University Press, 2013	
	1
	IS 456-2000 – Code of Practice for Plain and Reinforced concrete IS 800-2007 – Code of Practice for General Construction in Steel SP 34 – Handbook on Concrete reinforcement and detailing IS 10262 – 2009 – Guidelines for Concrete mix design proportioning S Unnikrishna Pillai & Devdas Menon "Reinforced Concrete Design", 3 rd Edition, McGraw Hill Education, SK Duggal, "Design of Steel Structures", 3 rd edition, Tata McGraw-Hill Education, 2017





Correlation Level:

COURS	E CODE				CO	URSE I	NAME				L	Т	P	С
U190	CE606			I	NNOV	ATIVE	PROJE	CTS			0	0	2	1
Course (Objective	(s): Th	e Purpo	ose of le	arning	this cou	rse is to							
1.	To impa	art the k	nowledg	ge of exe	ecution of	of innov	ative pro	ojects						
2.	To appl	y the kr	owledge	e of Civ	il Engin	eering fo	or innova	ative pro	ojects					
3.	To inter	pret the	outcom	es of the	e project	s pertaii	n to indu	istrial ap	plication	ns				
Course (Outcome	(s) (CC	s): At t	he end	of this c	ourse, t	he stude	nts will	be able	to:				
CO1	To iden	tify the	thrust ar	eas in C	ivil Eng	gineering	g and rela	ated don	nains.(K	(3)				
CO2	To form	ulate th	e metho	dology	in interd	lisciplina	ary mode	e. (K4)						
CO3	Draft th	e metho	dology	and dev	elop the	product	related	to the co	oncept.(I	K5)				
Knowled	lge Level	: K1 – l	Rememb	per: K2	2 – Unde	erstand:	K3 – A	Apply:	K4 – A	nalyze:	K5 – Ev	aluate:		
CO – PC) Mappin	ıg									T.		ay regions	
Cos)	Pos						PS	Os
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	.1	4	2	1	2	2	3	2	1	-	-2-	2	1	2
CO2	3	3	3	2	2	2	1	2	3	-	-	1	2	2
CO3	1	1	2	2	1	2	3	-	2	-	-	2	2	1
CO	2.2	2	3	1.4	1.8	1.4	3	1	1.4	-	-	2	1.4	2

The objective of this course is to impart and inculcate the interdisciplinary thinking knowledge of the Civil Engineering students. Any existing problem in the society or industry related to Civil Engineering may be taken up by the students and innovative low cost solutions may be derived by the students etc. A team of students comprising not more than three may be mentored by the faculty in the department.

2:Moderate (Medium)

- Every project may hold one academic expert who is appointed by the HoD of the Department and industry mentor who is expert in the innovative area chosen by the team.
- * The project problem formulated should be innovative and unique in Civil Engineering domain.

1:Slight (Low)

- ❖ Prior industry visits may be arranged to the industry where the problem is identified for example Cement manufacturing industry, RMC plants, Steel manufacturing industries etc.,
- Final solution identified by the student may be converted in to prototype and subjected to IRF may be filed along with guidance of the guide and HoD
- The hours allotted for this course shall be utilized by the students to receive directions from the guide to refer the existing literatures and perform the experiments in the lab to come up with the low cost solutions.
- Periodic reviews shall be held by the expert committee identified by the Head of the Department and assessment may be done.
- Monitoring committee may be appointed to regularly monitor the progress work of the student team
- Final report and relevant drawings may be submitted and final assessment may be done by the external member appointed by the Institute.

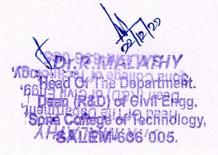
		TOTAL: 30 Hours
WEBS	ITES:	
1.	http://www.mycollegeproject.com/Innovative%20Projects.html	
2.	https://www.electronicsforu.com/mini-projects-ideas	
3.	https://www.innovation-project.info/	

Held Of The Department.
Dean (R&D) of Civil Engg.
Sona College of Technology,
SALEM-636 005.

3:Substantial (High)

****	E CODI	E			CO	URSE 1	NAME				L	T	P	C
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1.				ce and r										
2.	Identify	y the var	rious pat	terns of	cracks a	nd mois	ture mo	vement	internall	y and ext	ernally.			
3.				oair mate										
4.	Recom	mend ri	ght techi	niques to	elimina	ate distre	essing in	concret	e and st	eel structi	ures.			
5.	Sugges	t suitabl	e repair	techniqu	ies for d	ifferent	deterior	ation.						
Course	Outcome						THE RESPONDED FOR THE	Appropriate the property of the party of the		n, 1998, Vincentification (No. 1988)				
CO1														
CO2	Familiarize the Strategies in maintenance and repair of all type of structures .(K2) Learn the crack formation and moisture accumulation internally and externally in the structure.(K2)													
CO3										ncrete str	ucture.(F	(3)		
CO4	Check	with sui	table me	thod for	any dis	tress hap	pen in t	he struc	tures.(K	3)				
CO5				he distre										
Knowle	dge Leve	l: K1 –	Rememl	oer: K2	2 – Unde	erstand:	K3 – A	Apply:	K4 – A	nalyze:	K5 – Ev	aluate:		
CO – PC) Mappi	ng												
Cos		Pos									PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO:
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CO2	3	2	. 3	2	2	1	3	1	1	-	-	2	1	2
CO3	1	2	3	1	3	1	3	1	1	-	-	2	1	2
CO4	1	2	3	2	2	2	3	3	2	-	, b -	2	2	2
CO5	1	3 .	3	2	2	2	3	1	. 2	-	-	2	2	2
CO	1.4	1.8	2.6	1.4	2	1.4	3	1.6	1.4	-	-	2	1.4	2
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	tion-racti									tion-Asso	essmem	procedur	e for ev	aruatiii
	IT-II			CRAC									9 H	ours
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trees -C	hemical a	action -	Foundat	ion mov	ements	. Moistu	ire pene	etration:	Sources	off dan	ipness -	Moisture	moveme	ent from
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				LS FOF		IR							9 H	ours
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REFEI	RENCES:
1.	Gambhir M.L, "Concrete Technology", Tata McGraw Hill, 2012.
2.	Neville A.M., Properties of Concrete, Fifth edition, Pearson Education Ltd.
3.	Ravishankar.K, Krishnamoorthy.T.S, "Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures", Allied Publishers, 2004.
4.	Denison Campbell, Allen and Harold Roper, "Concrete Structures, Materials, Maintenance and Repair", Longman Scientific and Technical UK, 1991.



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REGULATION 2019 / SIXTH SEMESTER

1.	Fred L, and Mannering, Scott S. Washburn and Walter P.Kilareski, Principles of Highway Engineering and Traffic
	Analysis, Wiley India Pvt. Ltd, New Delhi, 2011.
2.	Garber and Hoel, "Principles of Traffic and Highway Engineering", CENGAGE Learning, New Delhi, 2010.
3.	Hobbs F.D. "Traffic Planning and Engineering", University of Brimingham, Peragamon Press Ltd, 2005.

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Semester -VI

U19GE602- Professional Development Skills (For Civil Dept only)

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. Explain the values of career planning and prepare a resume.
- 2. Demonstrate interview skills and undergo mock interviews and group discussions.
- 3. State entrepreneurship and prepare business plan.

Demonstrating Soft -Skills capabilities in the following areas:

- a. Career planning (Employment) Resume writing Tips for great resume
- b. Interview Skills Importance of body language in an interview Confidence building FAQs
- c. Mock interview, mock stress interview
- d. Mock Group Discussion
- e. Career Planning (Self Employment) Understanding Entrepreneurship Advantages of being an Entrepreneur Create a Business plan.

30 Hours

Dr.S.Anita
Professor and Head
Department of Training

Dr. S. ANITA

Professor and Head

Department of Training,

SONA COLLEGE OF TECHNOLOGY,

SALEM-636 005.

Syllabi for

B.E/B.Tech Honours (Specialization in the same Discipline)

B.E/B.Tech Honours

B.E/B.Tech Minor

courses

COURS	SE CODI	E			CC	URSE	NAME				L	T	P	C
U19	CE930 FORMWORK ENGINEERING 3 0 Objective (s): The Purpose of learning this course is to:												0	3
Course	Objectiv	e (s): Tl	ne Purp	ose of lo	earning	this cou	rse is to):						
1	Study t	he basic	s and cl	assificat	ions of l	Formwo	rk.							
2.	Know	the basic	es of for	mwork o	design c	oncepts	and Fou	ndation	formwo	rk.				
3.	Unders	tand for	mwork	calculati	ions in b	eam, sla	b, bridg	es and s	pecial st	ructures.				
4.	Know	he slab	and bea	m formy	vork.									
5.	Study t	he Flyin	g Form	work.										
Course	Outcome	(s) (CC	Os): At t	he end	of this c	ourse, t	he stude	ents wil	be able	e to:				
CO1	Describ	e the m	aterials	and beh	avior of	formwo	ork (K1))						
CO2	Design	of foun	dation, v	wall and	column	formwe	ork (K3))						
CO3	Design	the for	mwork	for bean	n, slab, l	oridges a	and spec	ial struc	tures (K	1)				
CO4	Design	of Flyir	ng Form	work sli	p form	techniqu	ies.(K1)							
CO5	Design	of form	work fo	r suppo	rts – Sca	affolds a	nd prec	ast conc	rete (K2)				
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CO2	3	3	2	2	2	3	2	1	1 .	-	-	3	1	2
CO3	3	2	2	2	2	2	3	-	1	-	-	2	1	2
CO4	2	2	3	2	2	2	3	3	2	-	-	2	2	2
CO5	2	3	3	2	2	2	3	1	2	-		2	-2	2
CO (Avg)	3.2	2.4	2.6	1.8	1.8	2.4	2.8	1.4	1.4	-	-	2.2	1.8	2
Corre	elation L	evel:		1:Slight	(Low)		2:	:Modera	te (Med	ium)		3:Subst	antial (H	igh)

UNIT-I INTRODUCTION

9 Hours

Introduction-Formwork as a temporary structure-requirements for Formwork-selection of Formwork- Classification of Formwork-Formwork Materials-Timber-Plywood-Steel-Aluminium Form-Plastic Forms-other Material-Form Coating and Mould Linings-Form Anchors-Tie System-Spreaders, Spacers-Form Linings Materials.

UNIT-II FORMWORK DESIGN CONCEPTS & FOUNDATION FORMWORK

9 Hours

Loads on Formwork-Dead or Permanent Loads-Imposed Loads-Environmental Loads-Design Basis (Assumption Made in Formwork Design)-Estimating Permissible Stress-Maximum Bending Moment, Shear Force, and Deflection-Formwork for Foundation-Conventional Formwork for Foundation-Foundation Formwork (All Steel) - Foundation Formwork Design-Illustration on Foundation Wall Design.

UNIT-III WALL & COLUMN FORMWORK

9 Hours

Wall Formwork - Conventional Wall Formwork-Proprietary Wall Formwork System - Large Area Wall Forms- Climbing Formwork - Different types of Climbing formwork - Doka climbing Formwork - Wall Form Design - Illustration of Wall Formwork Design Using Plywood and H-16 Beams - Column Formwork - Conventional Column Formwork - Proprietary Column Formwork - Column Formwork System - Doka form work system - PERI Column Formwork - Disposable Column Formwork - All Metal Column Formwork-Achieving Formwork Economy in Column Construction-Design For Column Formwork-Illustration of Column Formwork Design-Example.

UNIT-IV SLAB AND BEAM FORMWORK

9 Hours

Traditional Slab and Beam Formwork-Slab and Beam Formwork Solutions offered by L&T - Beam and Slab Formwork Solution by PERI and Mivan - achieving Economy In Slab Construction - Design of Slab and Beam Construction - Illustration of Slab and Beam Formwork Design - Illustration of Proprietary Slab Formwork - Formwork Arrangement for Caissons - Formwork For Piers And Pier Caps-Bridge Superstructures - Formwork for Bridge Railing / Parapets / Edge Beams - Cases Temporary Support Structures of Bridges.

UNIT-V FLYING FORMWORK

9 Hours

Some Examples of Flying Formwork - Flying Formwork Cycle - Advantages and Limitation of Flying Formwork - Design Issues In Flying Forms - Safety Issues in Flying Forms - Table Forms - Tunnel Formwork System - Column Mounted Shoring System - Gang Forms - Slipform - Vertical Slipform - Horizontal Slipform - Types of Slipform - Functions of Varies Slipform Components - Assembly, Sliding and Dismantling of Slipform - Slipform Design Issues -

Some Cofform	Cases in Slipform - Safety Operation during Slipform Erection - Productivity Issues in Slipform Construction. Failure works.
	TOTAL: 45 Hours
TEXT	BOOKS:
1.	Kumar Neeraj Jha, "Formwork for concrete structures" Tata McGraw Hill Education Private Limited NewDelhi – 2012
2.	Modern Practices in Formwork for Civil Engineering Construction Works Dr. JanardanJha and Prof. S K Sinha, Istedition, 2017, Laxmi Publications Pvt Ltd, ISBN-13: 978-9383828388.
REFE	RENCES:
1.	Peurifoy R.L., Oberlender G.D., "Formwork For Concrete Structures", McGraw Hill, New York, 1996
2.	Concrete Formwork Systems: 2 (Civil and Environmental Engineering Series), Awad S. Hanna, First Edition, 1998, Vol. 2, CRC Press, ISBN-13: 978-0824700720.

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2.	know	about the	concep	t of Sche	duling T	echnique	es											
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4.	Learn	about ma	anageme	nt of Qu	ality, Saf	ety and	Organiza	tion.										
5.	Unders	stand the	use of d	atabase n	nanagem	ent syste	ems in co	nstructio	n.									
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CO2	Sched	uling the	construc	ction acti	vities wi	th uncert	tain durat	ions. (K.	3)									
CO3	Know	the forec	east, mor	nitoring a	nd contr	olling the	e cost in	a constru	iction. (K	(4)								
CO4	Under	stand the	quality	control a	nd safety	during	construct	ion. (K2)									
CO5	Organ	ize infori	nation in	n Central	ized data	base Ma	nagemen	t system	s. (K5)									
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UNIT-III COST CONTROL, MONITORING AND ACCOUNTING

9 Hours

The Cost Control Problem – The Project Budget – Forecasting for Activity Cost Control – Financial Accounting Systems and Cost Accounts – Control of Project Cash Flows –Schedule Control – Schedule and Budget Updates – Relating Cost and Schedule Information.

UNIT-IV QUALITY CONTROL AND SAFETY DURING CONSTRUCTION

9 Hours

Quality and Safety Concerns in Construction – Organizing for Quality and Safety – Work and Material Specifications – Total Quality Control – Quality Control by Statistical Methods – Statistical Quality Control with Sampling by Attributes – Statistical Quality Control with Sampling by Variables – Safety.

UNIT-V ORGANIZATION AND USE OF PROJECT INFORMATION

9 Hours

Types of Project Information – Accuracy and Use of Information – Computerized Organization and Use of Information – Organizing Information in Databases – Relational Model of Databases – Other Conceptual Models of Databases – Centralized Database Management Systems – Databases and Applications Programs – Information Transfer and Flow.

TOTAL: 45 Hours

TEXT BOOKS:

Chitkara, K.K. "Construction Project Management: Planning, Scheduling and Control", Tata McGraw-Hill Publishing Company, New Delhi. (2009).

2.	Chris Hendrickson and Tung Au, "Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders", Prentice Hall, Pittsburgh, (2000).
3.	Halpin, D. W., "Financial and Cost Concepts for Construction Management", John Wiley & Sons, New York, (2009).
REFE	RENCE BOOKS:
1.	Srinath, L.S., "Pert and CPM Principles and Applications", Affiliated East West Press, 2001
2.	Glenn. A, Sea's & Reichard, Clough . H, "Construction Project Management", John Wiley & Sons, Inc, 2009.

Dr.R.MALATHY
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Sona Coflege of Technology,
SALEM-636 005.

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1.	Explore	e various	green b	uilding	rating sy	stems p	revail in	India						
2.	To kno	w about	the vario	ous ratin	g systen	ns and it	s proced	ures						
3.	To stud	ly variou	s policie	s and la	ws relate	ed to gre	en build	ings						
4.	To kno	w about	various	rating sy	stems a	pplicable	e for resi	dential	building	s				
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CO2	Study o	of differen	nt types	of rating	g system	for imp	lementa	tion (K3	3)					
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CO4	Analyz	e rating s	systems	for resic	lential bi	uildings	(K4)							
CO5	Unders	tand vari	ous ratir	ng syster	n for co	mmercia	al buildir	ngs (K2))					
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CO3	3	2	2	2	2	2	3	-	1	-	-	2	1	2
CO4	2	2	3	2	2	2	3	3	2	-	-	2	2-	2
CO5	2	3	3	2	2	2	3	1	2	-		2	2	2
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Dean (R&D) of Civil Engg.
Sona College of Technology,
SALEM-636 005.

11100	RSE CODE COURSE NAME L OCE2021 ENERGY AND WATER EFFICIENCY IN BUILDINGS 3									T	P	C		
0190	CE2021		ENERO	GY ANI	WATI	ER EFF	ICIEN	CY IN B	UILDII	NGS	3	0	0	3
Course	Objectiv):						
1.	Familia	rize wit	h energ	y metho	ds and p	oresent e	nergy							
2.				-		-		of waste						
3.	Knowl	now to s	elect the	e suitabl	e locatio	n for str	ucture a	nd differ	ent way	s to pres	erve wate	er		
4.	Elabora	ate energ	gy asses	sment ai	nd clean	develop	ment m	echanisn	n					
5.	Explair	the dif	ferent te	chnolog	y availa	ble to pr	eserve e	energy						
Course	Outcome	THE PERSON NAMED IN COLUMN TWO				LADOUTE TANADA T		The second second second second	The state of the s	Co. P. C. S. C. S. C. S. C. S.				
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CO2						ating sy								
CO3										een cons		And the second s		
CO4									agement	, demand	and pric	ing. (K3)		
CO5	Analyz	e the tec	chnology	and ch	aracteris	tics for t	fuels(K4	1)						
Knowle	dge Leve	l: K1 – I	Rememl	per: K	2 – Unde	erstand:	K3 – .	Apply:	K4 – A	nalyze:	K5 – Ev	aluate:		
CO – Po) Mappii	ng												
Con						1	Pos						PS	Os
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PO
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CO2	2	2	2	3	3	1	3	2	1	1	2	2	3	3
CO3	3	3	2	2	2		2	3	3	1	2	2	3	2
CO4	3	2	2	2	1	1	3			1	2	2	3	2
CO5	2	2	- 3	2				3	3	1		2	3	3
CO (Avg)	2.6	2	1.8	2	1.2	0.4	1.8	1.6	1.4	1	1.2	2	2.8	2.4
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4.	Daniel Vallero and Chris Baiser. 2008. Sustainable Design. John Wiley and Sons. New Jersey Ching and Shapiro. 2014. Green Buildings Illustrated. John Wiley and Sons. New Jersey
5.	Mittal, K.M. 1996. Biogas system: principles and applications. New age international (P) Ltd., New Delhi.
REFER	ENCES:
1.	Energy Manager Training Manual (4 Volumes) www.energymanagertraining.com, Bureau Of Energy Efficiency (BEE), A Statutory Body Under Ministry Of Power, Government Of India, 2004.
2.	ECBC Code 2007 (Edition 2008) published by Bureau of Energy Efficiency, New Delhi

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COURSE OUTCOMES

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

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

			(3/2/1	indica	tes stre			PSO M lation)		g ng, 2-M	edium,	1-Weak		
COs			Prog	gramm	e Outc	omes (POs) a	nd Pro	gramn	ne Speci	fic Outc	ome (Ps	SOs)	
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	1				. 1	1		1	2	2
CO2	3	3	3	3	3				1	1		1	2	2
CO3	3	3	3	3	3		91700-01		1	1		1	2	2
CO4	3	3	3	1	1				1	1		1	2	2
CO5	3	3	1	1	1				1	1		1	2	2

UNIT I INTRODUCTION AND LINEAR REGRESSION

9

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

UNIT II LOGISTIC REGRESSION

9

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

UNIT III NEURAL NETWORKS AND SUPPORT VECTOR MACHINES 9

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

UNIT IV ADVICE FOR APPLYING MACHINE LEARNING

9

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

Unsupervised learning – k-means algorithm – optimization objective – choosing number of clusters - Dimensionality reduction – principle component analysis - Anomaly detection – algorithm – developing and evaluating the algorithm – anomaly detection Vs supervised algorithm

THEORY: 45 HRS

PRACTICALS: 30 HRS

TOTAL: 75 HOURS

REFERENCES

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

LIST OF EXPERIMENTS

- 1. Write a program to implement simple linear regression to minimize the cost function. Sample Exercise: In AB Company, there is a salary distribution table based on Year of experience. You are a HR officer and you got a candidate with 5 years of experience. Plot the given data. and find the best salary to offer the candidate.
- 2. Build a logistic regression model to classify the data in the given dataset. Sample Exercise: Suppose that you are the administrator of a university department and you want to determine each applicant's chance of admission based on their results on two exams. You have historical data from previous applicants that you can use as a training set. For each training example, you have the applicant's scores on two exams and the admissions decision. Write a program to build a classification model (logistic regression) that estimates the probability of admission based on the exam scores.
- 3. Write a program to fit a logistic regression model with regularization to avoid overfitting of the given dataset.
- 4. Load the given dataset, split it into train and test sets, then estimate the mean squared error (MSE) for a linear regression as well as the bias and variance for the model error over 100 bootstrap samples.
- 5. Apply K means algorithm to cluster a set of data stored in a .CSV file and plot the clusters

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COURSE OUTCOMES

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

- 1. Explain the fundamentals of Exploratory Data Analysis.
- 2. Explore the significance of different data transformation techniques.
- 3. Implement correlation and time series data analysis.
- 4. Evaluate different datasets with NumPy and Pandas.
- 5. Apply data exploration and visualization techniques with Matplotlib on different datasets.

			(3/2/1	indicate	es strer			SO Ma tion) 3		g, 2-Me	dium, 1-	-Weak		
COs			Prog	ramme	Outco	mes (P	Os) an	d Prog	ramme	Specifi	c Outco	me (PSC	Os)	
COS	PO1	PO2								PO10				PSO2
CO1	3	3	3	3	3	2			2	2	2	2	2	2
CO2	3	3	3	3	3	2			2	2	2	2	2	2
CO3	3	3	3	3	3	2			2	2	2	2	2	2
CO4	2	3	3	3	3	2			2	2	2	2	3	3
CO5	2	3	3	3	3	2			2	2	2	2	3	3

UNIT I INTRODUCTION TO DATA VISUALIZATION IN EDA

Exploratory Data Analysis (EDA) fundamentals – Understanding data science – Significance of EDA – Making sense of data – Comparing EDA with classical and Bayesian analysis – Software tools for EDA - Visual Aids for EDA.

UNIT II DATA TRANSFORMATION TECHNIQUES

9

Technical requirements - merging database, reshaping and pivoting, Transformation techniques - Grouping Datasets - data aggregation - Pivot tables and cross-tabulations.

UNIT III CORRELATION AND TIME SERIES ANALYSIS

9

Introducing Correlation – Types of analysis – Discuss multivariate analysis using the Titanic dataset – Outline Simpson's paradox – Understand the time series dataset – TSA with open power system data.

UNIT IV BUILDING VISUALIZATIONS

9

Chart your data - Chart design principles, Google sheet charts, Bar and Column charts, Histograms, Pie, Line and Area charts, Data wrapper charts, Annotated charts, Range charts, Scatter and Bubble charts, Tableau public charts, Filtered Line chart - Map your data - Table your data.

UNIT V CODE TEMPLATES AND ADVANCED TOOLS

9

Edit and Host code with GitHub – Chart.js and Highcharts templates – Leaflet map templates – Transform your map data – Geospatial data and GeoJSON, Find GeoJSON Boundary files, Draw and edit GeoJson.io, Edit and join with Mapshaper.

THEORY: 45 HRS PRACTICALS: 30 HRS TOTAL: 75 HOURS

TEXT BOOKS:

1. Suresh Kumar Mukhiya, Usman Ahmed, "Hands-On Exploratory Data Analysis with Python", Packt Publishing, 2020. (Unit 1, 2 and 3)

 Jack Dougherty, Ilya Ilyankou, "Hands-On Data Visualization", O'Reilly Media, Apr 2021. (Unit 4 and 5)

REFERENCES:

- Eric Pimpler, Data Visualization and Exploration with R, GeoSpatial Training service, 2018.
- 2. Claus O. Wilke, "Fundamentals of Data Visualization", O'reilly publications, 2019.
- 3. Matthew O. Ward, Georges Grinstein, Daniel Keim, "Interactive Data Visualization: Foundations, Techniques, and Applications", 2nd Edition, CRC press, 2015.
- 4. Fabio Nelli, "Python Data Analytics with Pandas, Numpy and Matplotlib", Apress, 2nd Edition, 2018.

LIST OF EXPERIMENTS:

- Perform exploratory data analysis (EDA) on with datasets like email data set. Export all your emails as a dataset, import them inside a pandas data frame, visualize them and get different insights from the data.
- 2. Perform Time Series Analysis and apply the various visualization techniques.
- Perform Data Analysis and representation on a Map using various Map data sets with Mouse Rollover effect and user interaction.
- 4. Build cartographic visualization for multiple datasets involving various countries of the world, states, and districts in India etc.
- Perform EDA on Wine Quality Data Set and Map data transformation using advanced tools.

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COURSE OUTCOMES:

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

- Describe the basic principles of digital forensics.
- Apply the suitable data acquisition technique to collect the forensic data.
- Apply the different techniques to collect digital evidences from the acquired data.
- Validate the digital evidences and write report on the collected digital evidences.
- Apply the Sleuth Kit Autopsy tool to perform forensics on images and disks

	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)														
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	3	2	1	3	1	2	2	2	2	3	2	3	2	2	2
CO2	2	3	3	3	3	3	2	1	. 2	3	2	3	3	3	2
CO3	3	3	2	3	3	2	1	1	2	3	2	3	3	3,-	2
CO4	2	3	2	3	2	1	1	2	1	3	2	3	3	2	1
CO5	2	3	1	3	1	2	1	1	1	3	2	3	2	2	1

UNIT I INTRODUCTION

9

An Overview of Digital Forensics - Preparing for Digital Investigations - Maintaining Professional Conduct - Preparing a Digital Forensics Investigation - Procedures for Private-Sector High-Tech Investigations - Understanding Data Recovery Workstations and Software - Conducting an Investigation.

UNIT II DATA ACQUISITION

9

Understanding Storage Formats for Digital Evidence - Determining the Best Acquisition Method - Contingency Planning for Image Acquisitions - Using Acquisition Tools - Validating Data Acquisitions - Performing RAID Data Acquisitions - Using Remote Network Acquisition Tools - Using Other Forensics Acquisition Tools.

UNIT III PROCESSING CRIME AND INCIDENT SCENES

9

Identifying Digital Evidence - Collecting Evidence in Private-Sector Incident Scenes - Processing Law Enforcement Crime Scenes - Preparing for a Search - Securing a Digital Incident or Crime

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Scene - Seizing Digital Evidence at the Scene - Storing Digital Evidence - Obtaining a Digital Hash.

UNIT IV DATA VALIDATION AND REPORT WRITING

9

Determining What Data to Collect and Analyze - Validating Forensic Data - Understanding the Importance of Reports - Guidelines for Writing Reports - Generating Report Findings with Forensics Software Tools.

UNIT V DIGITAL FORENSIC TOOLS

9

Evaluating Digital Forensics Tool Needs - Digital Forensics Software Tools - Digital Forensics Hardware Tools - Validating and Testing Forensics Software - **Case Study:** Sleuth Kit Autopsy tool.

TOTAL: 45hours

TEXT BOOK:

 Nelson, B, Phillips, A, Enfinger, F, Stuart, C., "Guide to Computer Forensics and Investigations, 6th ed., Cengage Learning, 2019.

REFERENCE BOOKS:

- 1. Eoghan Casey, "Handbook of Digital Forensics and Investigation", 1st edition, Academic Press, 2009.
- 2. Marjie T. Britz, "Computer Forensics and Cyber Crime", 3rd edition, Pearson Education, 2013.
- 3. Richard Boddington, "Practical Digital Forensics", 1st edition, Packt Publisher, 2016
- 4. Aaron Philipp, David Cowen and Chris Davis, "Hacking Exposed Computer Forensics: Computer Forensics Secrets & Solutions", Second Edition, McGraw Hill, 2009
- 5. Dejey and Murugan, "Cyber Forensics", 1st edition, Oxford Press, 2018.

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COURSE OUTCOMES

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

- Describe the ethical and legal aspects of ethical hacking.
- Perform penetration testing using metasploit framework.
- Exploit the vulnerabilities present in the different operating systems and web applications.
- Perform the vulnerability analysis using different tools.
- Penetrate the victim's network / system using privilege escalation.

	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)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	P09	PO1 0	PO1 1	PO1	PSO 1	PSO 2	PSO 3
CO1	3	3	1.	3	1	2	3	3	3	3	2	3	2	2	2
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CO3	3	3	3	3	3	2	2	3	3	3	2	3	3	3	2
CO4	3	3	2	3	2	1	2	3	3	3	3	3	3	2	2
CO5	3	3	1	3	1	2	3	3	3	3	2	3	2	2	2

UNIT I INTROCUTION TO ETHICAL DISCLOSURE

9

Ethics of ethical hacking – Ethical hacking and the legal system – proper and ethical disclosure.

UNIT II PENETRATION TESTING AND TOOLS

9

Social engineering attacks – Physical penetration attacks – Insider attacks – Using the Backtrack Linux distribution – Using the Metasploit framework – Managing a penetration test.

UNIT III EXPLOITATION

9

Programming survival skills – Basic Linux exploits – Windows exploits – Understanding and detecting Content-Type attacks – Web application security vulnerabilities.

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UNIT IV VULNERABILITY ANALYSIS

9

Passive analysis – Advanced static analysis with IDA pro – Client side browser exploits – Exploiting the windows access control model – From vulnerability to exploit – Closing the holes: Mitigation.

UNIT V PENETRATION

9

Acquiring situation awareness – Privilege escalation – Maintaining access – Installing backdoors – Identifying and exploiting further targets.

TOTAL: 45hours

TEXT BOOK:

 Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, Gideon Lenkey and Terron Williams, "Gray Hat Hacking The Ethical Hackers Handbook", 3rd Edition, McGraw Hill Education, 2017.

REFERENCES:

- 1. Rafay Baloch, "Ethical Hacking and Penetration Testing Guide", Auerbach Publications, 2014.
- Stephen Fletcher, "Hacking with Kali Linux: A Beginner's Guide to Ethical Hacking with Kali and Cybersecurity, Includes Linux Command Line, Penetration Testing, Security Systems and Tools for Computer", Monticello Solutions Ltd, 2020.
- 3. Jon Erickson, "Hacking: The Art of Exploitation", Second Edition, No Starch Press, 2008.

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