SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.E- Civil Engineering

CURRICULUM and SYLLABI

[For students admitted in 2024-2025]

B.E / B.Tech Regulations 2023

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 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
	Theory Courses									
1.	U23ENG101A	Communication Skills in English	2	0	2	0	3	HS	60	TL
2.	U23MAT102A	Linear Algebra and Calculus with MATLAB	3	0	2	0	4	BS	75	TL
3.	U23CHE104A	Chemistry for Civil Engineering	4	0	0	0	4	BS	60	T
4.	U23PPR105	Problem Solving using Python Programming	3	0	0	0	3	ES	45	T
5.	U23EGR107	Engineering Graphics	3	0	0	0	3	ES	45	T
6.	U23TAM101	தமிழர் மரபு / Heritage of Tamils	1	0	0	0	1	HS	15	T
7.	U23GE101	Basic Aptitude-I	2	0	0	0	0	AC	30	T
	Practical Courses									
8.	U23CHL111A	Engineering Chemistry Laboratory	0	0	2	0	1	BS	30	L
9.	U23PPL112	Python Programming Laboratory	0	0	2	0	1	ES	30	L
10.	U23WPL114	Workshop Practice	0	0	2	0	1	ES	30	L
							Total Credits	21		
	Optional Language Courses**									
11.	U23OL1101	French	1	0	0	0	1	OL	15	T
12.	U23OL1102	German							15	T
13.	U23OL1103	Japanese							15	T
14.	U23OL1104	Korean							15	T
15.	U23OL1105	Hindi							15	T

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

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

Approved By

Chairperson, Science and Humanities BoS	**Chairperson, Civil BoS**	**Member Secretary, Academic Council**	**Dean-Academics**	**Chairperson, Academic Council & Principal**
Dr. M. Renuga	**Dr. R. Malathy**	**Dr.R.Shivakumar**	**Dr.J.Akilandeswari**	**Dr.S.R.R.Senthil Kumar**

Copy to:-
HOD/ Civil Engineering, First Semester B.E. Civil, Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester II under Regulations 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
	Theory courses									
1.	U23ENG201A	Technical English	2	0	0	0	2	HS	30	T
2.	U23MAT202C	Vector Calculus and Differential Equations	3	1	0	0	4	BS	60	TT
3.	U23PHY203B	Physics For Civil Engineering	4	0	0	0	4	BS	60	T
4.	U23BEE206A	Basics of Electrical Engineering	3	0	0	0	3	ES	45	T
5.	U23CE201	Engineering Mechanics for Civil Engineering	3	1	0	0	4	PC	60	TT
6.	U23TAM201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	0	1	HS	15	T
7.	U23GE201	Basic Aptitude- II	2	0	0	0	0	AC	30	T
	Practical courses									
8.	U23PHL210A	Physics Laboratory	0	0	2	0	1	BS	30	L
9.	U23BEEL213A	Basics of Electrical Engineering Laboratory	0	0	2	0	1	ES	30	L
						Total Credits	**20**			
	Optional Language Courses**									
10.	U23OL1201	French - II	1	0	0	0	1	OL	15	T
11.	U23OL1202	German - II							15	T
12.	U23OL1203	Japanese - II							15	T
13.	U23OL1204	Korean - II							15	T
14.	U23OL1205	Hindi - II							15	T

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

Approved By

Chairperson, Science and Humanities BoS	Chairperson, Civil Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. R. Malathy	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil Engineering, Second Semester, B.E. Civil Students and Staff, COE

Civil III

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23MAT301A	Statistics and Numerical Methods	3	1	0	0	4	BS	60	TT
2.	U23CE301	Strength of Materials -I	3	1	0	0	4	PC	60	TT
3.	U23CE302	Fluid Mechanics and Hydraulics Engineering	3	1	0	0	4	PC	60	TT
4.	U23CE303	Surveying and Field Applications	3	0	2	0	4	PC	75	TL
5.	U23CE304	Construction Materials and Practices	3	0	0	0	3	PC	45	T
6.	noc25-mg106	**NPTEL** - Design Thinking - A Primer	1	0	0	0	1	ES	15	T
7.	U23GE302	**Audit Course**: Environment and Climate Science	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23CE305	Computer Aided Building Planning and Modeling	0	0	2	0	1	PC	30	L
9.	U23ENG301	Communication Skills Laboratory	0	0	2	0	1	HS	30	L
10.	U23GE301	Soft Skills and Aptitude-I	0	0	2	0	1	EEC	30	L
Total Credits							23			

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Approved By

Chairperson, Civil Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.R.Malathy	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/ Civil Engineering, Third Semester B.E. Civil Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23CE401	Strength of Materials-II	3	1	0	0	4	PC	60	TT
2.	U23CE402	Transportation Engineering	3	0	0	0	3	PC	45	T
3.	U23CE403	Hydrology and Irrigation Engineering	3	0	0	0	3	PC	45	T
4.	U23CE404	Environmental Engineering and its Applications	3	0	0	2	4	PC	75	TP
5.	U23CE901	**Professional Elective** - Elements of Building Planning	3	0	0	0	3	PE	45	T
	U23CE903	**Professional Elective** - Energy Efficiency and green building								
6.	U23GE402	**Audit Course**: Essence of Indian Traditional Knowledge	2	0	0	0	0	AC	30	T
Practical courses										
7.	U23CE405	Fluid Mechanics Laboratory	0	0	2	0	1	PC	30	L
8.	U23CE406	Environmental Engineering Laboratory	0	0	2	0	1	PC	30	L
9.	U23CE407	Materials Testing Laboratory	0	0	2	0	1	PC	30	L
10	U23GE401	Soft Skills and Aptitude-II	0	0	2	0	1	EEC	30	L
Total Credits							21			

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Approved By

Chairperson, Civil Engineering BoS	**Member Secretary, Academic Council**	**Dean-Academics**	**Chairperson, Academic Council & Principal**
Dr.R.Malathy	**Dr.R.Shivakumar**	**Dr.J.Akilandeswari**	**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/ Civil Engineering, Fourth Semester B.E. Civil Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester I under Regulations 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
	Theory Courses									
1.	U23ENG101A	Communication Skills in English	2	0	2	0	3	HS	60	TL
2.	U23MAT102A	Linear Algebra and Calculus with MATLAB	3	0	2	0	4	BS	75	TL
3.	U23CHE104A	Chemistry for Civil Engineering	4	0	0	0	4	BS	60	T
4.	U23PPR105	Problem Solving using Python Programming	3	0	0	0	3	ES	45	T
5.	U23EGR107	Engineering Graphics	3	0	0	0	3	ES	45	T
6.	U23TAM101	தமிழர் மரபு / Heritage of Tamils	1	0	0	0	1	HS	15	T
7.	U23GE101	Basic Aptitude-I	2	0	0	0	0	AC	30	T
	Practical Courses									
8.	U23CHL111A	Engineering Chemistry Laboratory	0	0	2	0	1	BS	30	L
9.	U23PPL112	Python Programming Laboratory	0	0	2	0	1	ES	30	L
10.	U23WPL114	Workshop Practice	0	0	2	0	1	ES	30	L
							Total Credits	21		
	Optional Language Courses**									
11.	U23OL1101	French	1	0	0	0	1	OL	15	T
12.	U23OL1102	German							15	T
13.	U23OL1103	Japanese							15	T
14.	U23OL1104	Korean							15	T
15.	U23OL1105	Hindi							15	T

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

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

Approved By

Chairperson, Science and Humanities BoS	**Chairperson, Civil BoS**	**Member Secretary, Academic Council**	**Dean-Academics**	**Chairperson, Academic Council & Principal**
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Copy to:-
HOD/ Civil Engineering, First Semester B.E. Civil, Students and Staff, COE

U23ENG101A	Communication Skills in English (Common to ADS, AIML, BME, CSD, CSE, CIVIL, ECE, EEE, MCT, FT, IT Branches)	L	T	P	J	C
		2	0	2	0	3

Course Outcomes

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

CO1:	Use grammatical components effectively in both written and spoken communication
CO2:	Develop speaking skills for self-introduction, delivering speeches and technical presentation
CO3:	Demonstrate effective listening skills for academic and professional purposes
CO4:	Write emails and formal letters and build resumes and construct paragraphs
CO5:	Develop speaking skills both in terms of fluency and comprehensibility

Pre-requisite:

- Knowledge and Understanding of Grammar
- Fundamental Language Skills (LSRW)

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (10) (Theory) CIE test II (10) (Theory) CIE test III (10) (Theory) CIE test IV (10) (Practical) Assignment/seminar/Quiz (5)	Attendance (5) Total CIE: 50 marks Semester End Examination (50) (SEE – Theory (25 marks + Lab (25 marks)	Course end survey

Unit 01: **6 Hours**

- General vocabulary, Parts of Speech, Articles
- 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 02:	6 Hours
• Tenses, Sentence Patterns • Instructions • Letter Writing - calling for quotations, placing orders	
Unit 03:	**6 Hours**
• Prefixes and Suffixes • Cover letter and resume writing	
Unit 04:	**6 Hours**
• Modal verbs, concord • Checklist • Letter Writing - Business communication, complaints, replies to queries from business customers	
Unit 05:	**6 Hours**
• If conditionals • Letter Writing - inviting dignitaries, accepting and declining invitations	

Lab component:

1. 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.
2. Mini presentation - Office Arrangements, Facilities, Office Functions, Sales, Purchases, Training Recruitment, Advertising, Applying for financial assistance, applying for a job.
3. Listening - understanding short conversations or monologues, taking down phone messages, orders, notes, etc.
4. Listening – entering information in tabular form
5. Loud Reading

Theory: 30 Hrs	Tutorial: --	Practical: 30 hours-	Project:--	Total Hours: 60 Hrs

TEXT BOOKS

1.	Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016
2.	**Extensive Reading** 1. She is Dancing Back to Life – A Short Story" 2. The Story of Google – Sara Gilbert, published by Jaico 3. The Story of Amazon.com- Sara Gilbert, published by Jaico

REFERENCES

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

HOD

Dr. M.RENUGA,
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Sona College of Technology,
SALEM - 6

B. E. / CIVIL ENGINEERING						
SEMESTER - I	LINEAR ALGEBRA AND CALCULUS WITH MATLAB	L	T	P	J	C
U23MAT102A		3	0	2	0	4

Course Outcomes

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

CO1:	find the rank of the matrix and solve linear system of equations by direct and indirect methods
CO2:	apply the concepts of vector spaces and linear transformations in real world applications
CO3:	apply the concepts of eigenvalues and eigenvectors of a real matrix and their properties to diagonalize the matrix.
CO4:	find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables
CO5:	apply the appropriate techniques of multiple integrals to find the area and volume.

Pre-requisites:

- Fundamentals of elementary algebra
- Fundamentals of calculus
- Fundamentals of geometry
- Fundamentals of trigonometry

CO/PO, PSO Mapping

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

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

Course assessment methods [Theory with laboratory course]

Direct		Indirect
CIE test I (10) (Theory) CIE test II (10) (Theory) CIE test III (10) (Theory) CIE test IV (10) (Practical) Attendance (5) Assignment/Quiz/Seminar (5)	Total CIE: 50 marks Semester End Examination (50) [SEE- Theory (35) + Lab(15) marks]	Course end survey

Unit 01	LINEAR SYSTEM OF EQUATIONS	9 Hours

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

Unit 02	VECTOR SPACES	9 Hours

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.

Unit 03	EIGENVALUES AND EIGENVECTORS	9 Hours

Eigenvalues and eigenvectors of real matrices – properties of eigenvalues and eigenvectors – Cayley-Hamilton theorem – diagonalization of real symmetric matrices.

Unit 04	MULTIVARIABLE CALCULUS	9 Hours
Functions of several variables – partial differentiation – total derivative – Jacobians – Taylor's theorem for functions of two variables – maxima and minima of functions of two variables without constraints – constrained maxima and minima by Lagrange's method of undetermined multipliers.		
Unit 05	**MULTIPLE INTEGRALS**	**9 Hours**
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.		

List of MATLAB Programs

1.	Programs based on elementary operations on matrices
2.	Computing the rank of a matrix
3.	Finding eigenvalues and eigenvectors of a matrix
4.	Finding partial derivatives of functions of several variables
5.	Computing stationary points of functions of two variables
6.	Taylors series expansion of functions of two variables
7.	Evaluating double integrals
8.	Finding area as double integrals
9.	Evaluating triple integrals
10.	Finding volume as triple integrals

Theory: 45 Hrs	Tutorial: -	Practical: 30 Hrs	Project:--	Total Hours: 75 Hrs

TEXT BOOKS:

1. T. Veerarajan, "Linear Algebra and Partial Differential Equations", McGraw Hill Publishers, 1st Edition, 2018.
2. T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1st Edition, 2019.
3. W. Yang, Y. K. Choi, K. Jaekwon, M. C. Kim, H. J. Kim and T. Im, "Engineering Mathematics with MATLAB", CRC Press Publishers, 1st Edition, 2017.

REFERENCE BOOKS:

1. S. Lipschutz and M. L. Lipson, "Linear Algebra", McGraw Hill Publishers, 6th Edition, 2018.
2. E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017.
3. C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1st Edition, 2018.
4. B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.
5. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2018.
6. D. Xu, "Calculus problem solutions with MATLAB", Walter de Gruyter Publishers, 1st Edition, 2020.

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U23CHE104A	CHEMISTRY FOR CIVIL ENGINEERING	L	T	P	J	C
		4	0	0	0	4

Course Outcomes

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

CO1:	Analyse the impurities of water, their removal methods and explain the conditioning methods for domestic and industrial uses.
CO2:	Outline the principle and applications of electrochemistry, types of corrosion and its control methods.
CO3:	Compare the types of polymerization reactions, techniques, fabrication methods of polymers and compare the various types of fibre reinforced polymer composite materials.
CO4:	Analyze the composition, properties and industrial applications of engineering materials.
CO5:	Describe the ingredients, manufacture, properties and applications of construction materials.

Pre-requisite: Basic knowledge on the concepts of organic, inorganic and physical chemistry.

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

Unit 01: WATER TECHNOLOGY — **12 Hours**

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 02: ELECTROCHEMISTRY AND CORROSION	12 Hours
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 – Fe2+ 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 03: POLYMERS AND COMPOSITES	**12 Hours**
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 and solution methods - Plastics – Moulding constituents of plastic – Moulding of plastics into articles-Injection-Compression and Blow moulding – Thermoplastic and Thermosetting resins – Rubbers-types-applications-vulcanization of rubber - Composites – definition, constituents of composites – composition, properties and applications of various fibre reinforced polymer (FRP) composites.	
Unit 04: CHEMISTRY OF ENGINEERING MATERIALS	**12 Hours**
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. **Ceramics** - Introduction - components of ceramics – classification of ceramic materials –general methods of fabricating ceramic wares-applications of ceramics. **Adhesives** - Introduction-requisites of a good adhesive-advantages and disadvantages of adhesive bonding- adhesive action-classification of adhesives-industrial applications of adhesives.	
Unit 05: CHEMISTRY OF BUILDING MATERIALS	**12 Hours**
Lime – classification – manufacture and properties of lime – Cement – classification – Portland cement – chemical composition – manufacture of Portland cement by wet process - 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 – special paints and their applications in construction sector – Green building materials – Introduction and their salient features.	

Theory: 60 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 60 Hrs

TEXT BOOKS

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi , 17th Edition, 2018.

2.	Wiley Editorial Board, "Wiley Engineering Chemistry", 2nd Edition, Wiley India Pvt.Ltd, New Delhi, Reprint 2019.
REFERENCES	
1.	O G Palana, Engineering Chemistry", Tata McGraw Hill Education (India) Private Limited, Chennai, Second Edition, 2017.
2.	B.Sivasankar, "Engineering Chemistry", Tata McGraw-Hill Pub. Co. Ltd., New Delhi (2008).
3.	B.K. Sharma, "Engineering Chemistry", Krishna Prakasan Media (P) Ltd., Meerut (2001).
4.	N. Krishnamurthy, K. Jeyasubramanian and P. Vallinayagam, "Applied Chemistry", Tata McGraw-Hill Publishing Company Limited, New Delhi (1999).

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Dr. M. RENUGA,
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U23CHL111A	ENGINEERING CHEMISTRY LABORATORY (For Civil Engineering)	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Analyse the given water sample to determine the amount of hardness, alkalinity and analyse the quality of brass by estimating copper in brass solution.
CO2:	Estimate the amount of HCl in a given sample by pH metry, conductometry and estimate the amount of iron in a sample by potentiometry and spectrophotometry.
CO3:	Analyse the given cement sample to determine the amount of calcium oxide, determine the molecular weight of water soluble polymer and estimate the amount of chromium in waste water.

Pre-requisite: Capable of handling pipette, burette, standard measuring flask and conical flask.

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (15)	RTPS (10)	Course end survey
Quiz 1 (5)	Record (10)	
CIE test II (15)	Total CIE:60 marks	
Quiz 2 (5)	Semester End Examination (40 marks)	

LIST OF EXPERIMENTS

1	Estimation of hardness of water sample by EDTA method.
2	Estimation of alkalinity of water sample by indicator method.
3	Estimation of copper in brass by EDTA method.
4	Estimation of HCl by pH metry.

5	Estimation of HCl by conductometry. (HCl vs NaOH)	
6	Estimation of Calcium Oxide in Cement.	
7	Estimation of ferrous ion by potentiometric titration.	
8	Determination of molecular weight of a polymer by viscosity measurements.	
9	Estimation of chromium prepared from electroplating sludge by Permanganometry.	
10	Estimation of iron content in water by spectrophotometry.	
		TOTAL : 30 HOURS

24.7.2024

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24/7/24.

Dr.M. Renuga
BoS - Chairperson,
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U23PPR105	PROBLEM SOLVING USING PYTHON PROGRAMMING (Common to ADS, IT, CSE, CSE(AIML), CSD, CIVIL, BME, ECE, EEE, MECH and MCT Branches)	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	Develop algorithmic solutions to simple computational problems
CO2:	Write simple Python programs
CO3:	Write programs with the various control statements and handling strings in Python
CO4:	Develop Python programs using functions and files
CO5:	Analyze a problem and use appropriate data structures to solve it.

Pre-requisite: NIL

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

Unit 01: ALGORITHMIC PROBLEM SOLVING — **9 Hours**

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

Unit 02: BASICS OF PYTHON PROGRAMMING — **9 Hours**

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 03: CONTROL STATEMENTS AND STRINGS — **9 Hours**

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.

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Unit 04: FUNCTIONS, FILES AND MODULES	9 Hours
Functions - Introduction, inbuilt functions, user defined functions, passing parameters - positional arguments, default arguments, keyword arguments, return values, local scope, global scope and recursion. Files -Text files, reading and writing files. Modules – create – import.	
Unit 05: DATA STRUCTURES: LISTS, SETS, TUPLES, DICTIONARIES	**9 Hours**
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, Union Operation.	

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs

TEXT BOOKS

1.	Reema Thareja, "Problem Solving and Programming with Python" Oxford University Press, 2nd Edition 2023.

REFERENCES

1.	Ashok Namdev Kamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python" Mc-Graw Hill Education, 2018.
2.	Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus" Wiley India Edition, 2013.
3.	Allen Downey, "Think Python: How to Think Like a Computer Scientist" O'Reilly Media, 2nd Edition 2016.
4.	Timothy A. Budd," Exploring Python" Mc-Graw Hill Education (India) Private Ltd., 2015.

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U23PPL112	PYTHON PROGRAMMING LABORATORY (Common to ADS, IT, CSE, CSE(AIML), CSD, CIVIL, BME, ECE, EEE, MECH and MCT Branches)	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Implement the algorithms using basic control structures in Python
CO2:	Develop Python programs to use functions, strings and data structures to solve different types of problems
CO3:	Implement persistent storing information through file operations

Pre-requisite: NIL

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz I- (5) CIE test II (15) Quiz II- (5)	RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination (40 marks)	Course end survey

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. Implement python program to perform operations on file and module.
9. Develop python programs to perform operations on list and tuples.
10. Implement dictionary and set in python.

Theory: --	Tutorial: --	Practical: 30Hrs	Project: --	Total Hours: 30 Hs

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U23EGR107	ENGINEERING GRAPHICS	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	Construct –Ellipse, Parabola, Hyperbola, Cycloids and Involutes.
CO2:	Draw the projection of Point, Line and Plane surfaces.
CO3:	Draw the projection of simple solids by rotating object method.
CO4:	Develop the section of simple solids and lateral surface of truncated solids.
CO5:	Draw the isometric view to orthographic projection.

Pre-requisite: Nil

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

CONCEPTS AND CONVENTIONS - (Not for Examination).

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

Unit 01: PLANE CURVES - (Manual drafting). **9 Hours**

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of Involute of circle — Drawing of tangents and normal to the above curves.

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Unit 02: PROJECTION OF POINTS, LINES AND PLANE SURFACES (CAD software). Orthographic projection- principles-principal planes-First angle projection-projection of points. Projection of straight lines **(only First angle projections)** inclined to both the principal planes -Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to one of the principal plane by rotating object method.	**9 Hours**
Unit 03: PROJECTION OF SOLIDS (CAD software). Projection of simple solids - prisms, pyramids, cylinder and cone, when the axis is inclined to one of the principal planes and parallel to the other by change of position method.	**9 Hours**
Unit 04: PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES (CAD software). Section of solids in simple vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other — **(obtaining true shape of section is not required)**. Development of lateral surfaces of truncated solids — Prisms, pyramids cylinders and cones.	**9 Hours**
Unit 05: ISOMETRIC TO ORTHOGRAPHICS PROJECTION- (Manual drafting). Representation of three dimensional objects – General Principles - Need for importance of multiple views – First angle projection – layout of views – Conversion of isometric view to orthographic views. Practicing three dimensional modelling of simple objects using CAD Software **(Not for examination)**	**9 Hours**

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs

TEXT BOOKS

1.	Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2.	Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3.	Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015
4.	P.Suresh., "Engineering Graphics and Drawing", Sonaversity, Sona College of Technology, Salem, Revised edition, 2012.

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REFERENCES	
1.	BasantAgarwal and Agarwal C.M.,"Engineering Drawing", McGraw Hill, 2nd Edition, 2019.
2.	Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27thEdition, 2017.
3.	Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4.	Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
5.	Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.
6.	Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.

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U23WPL114	WORKSHOP PRACTICE	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Perform the various techniques of sheet metal fabrication.
CO2:	Analyse various techniques of welding and carpentry works.
CO3:	Solve the real-time problems using sheet metal, welding and carpentry.

Pre-requisite: Nil

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz I- (5) CIE test II (15) Quiz II- (5)	RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination (40 marks)	Course end survey

Importance of workshop practice- Introduction to Measuring and marking devices, Tools and equipment Maintenance - Workshop apparatus - Human safety practices - First aid procedures. **(Not for Examination)**

LIST OF EXPERIMENTS

SECTION 1:	**SHEET METAL** Making of Cone, Dust Pan and Funnel.	8 hours
SECTION 2:	**WELDING** Arc welding of Butt joint and Lap Joint.	8 hours
SECTION 3:	**CARPENTRY** Making of Half Lap joint and Dovetail Joint.	8 hours
Demonstration:	**FOUNDRY PRACTICES** Simple pattern making	6 hours

Total Number of hours: 30

Theory: 0	Tutorial: 0	Practical: 30 Hrs	Project: 0	Total Hours: 30 Hrs

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U23TAM101	தமிழர் மரபு / Heritage of Tamils	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Describe Tamil Language and Literature
CO2:	Analyse Heritage - Rock Art Paintings To Modern Art – Sculpture
CO3:	Explain Folk and Martial Arts
CO4:	Describe Thinai Concept of Tamils
CO5:	Analyse Contribution of Tamils to Indian National Movement and Indian Culture

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

அலகு 1 : மொழி மற்றும் இலக்கியம்	3 Hours

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

அலகு 2 : மரபு – பாறை ஓவியங்கள் முதல் ஓவியங்கள் வரை – சிற்பக் கலை	3 Hours

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

அலகு 3: நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	3 Hours

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோலபாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு 4: தமிழர்களின் திணைக் கோட்பாடுகள்	3 Hours

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் -

சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.				
அலகு 5: இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு				**3 Hours**
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள் கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.				
Theory: 15 Hrs	**Tutorial: --**	**Practical: --**	**Project:--**	**Total Hours: 15 Hrs**

REFERENCES

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

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U23TAM101	தமிழர் மரபு / Heritage of Tamils	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Describe Tamil Language and Literature
CO2:	Analyse Heritage - Rock Art Paintings To Modern Art – Sculpture
CO3:	Explain Folk and Martial Arts
CO4:	Describe Thinai Concept of Tamils
CO5:	Analyse Contribution of Tamils to Indian National Movement and Indian Culture

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01: **LANGUAGE AND LITERATURE**	3 Hours
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan..	
Unit 02: **HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE**	3 Hours
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils	
Unit 03: FOLK AND MARTIAL ARTS	**3 Hours**
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils	
Unit 04: THINAI CONCEPT OF TAMILS	**3 Hours**
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.	
Unit 05: CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	**3 Hours**
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

REFERENCES

1	தமிழக வரலொறு – மக்களும் பண் பொடும் – மக.மக. பிள்மள (தவளியீடு: தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித ் தமிழ் – முமனவர ்இல. சுந்தரம் . (விகடன் பிரசுரம்).

3	கீழடி – மவமக நதிக்கமரயில் ெங்ககொல நகர நொகரிகம் (ததொல்லியல் துமறதவளியீடு)
4	பொருமந – ஆற்றங்கமர நொகரிகம். (ததொல்லியல் துமற தவளியீடு)
5	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies
7	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

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U23GE101	BASIC APTITUDE-1	L	T	P	J	C
		2	0	0	0	0

Course Outcomes

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

CO1:	Solve the problems in Divisibility , Division algorithm ,Successive Division and HCF & LCM. Identify Synonyms and Antonyms.
CO2:	Elucidate the problems in BODMAS rule, Approximation, Surds and Indices, Algebraic Simplification and Square root and Cube root. Choose appropriate Verbal Analogies and edit the given passages.
CO3:	Crack the problems involving Ratio and Proportion, and discuss Proportionality Theorems. Comprehend the given passages for Reading Comprehension activity and answer the questions correctly.
CO4:	Deduce the problems involving Linear equation and Quadratic equation. Demonstrate good vocabulary skill by doing the one word substitution and sentence filler exercise with high degree of accuracy.
CO5:	Interpret the logical reasoning problems from Number series ,Coding and Decoding and Exhibit good expertise in detecting errors in the given sentences.

Pre-requisite:

- Basic English language and Grammar knowledge
- Knowledge in Basic Mathematics

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO 11	PO12
CO1	3	3	3	2	1	1	1	3	3	3	2	3
CO2	3	3	3	2	1	1	1	3	3	3	2	3
CO3	3	3	3	2	1	1	1	3	3	3	2	3
CO4	3	3	3	2	1	1	1	3	3	3	2	3
CO5	3	3	3	2	1	1	1	3	3	3	2	3

Course Assessment methods

Direct		Indirect
CIE test I (30) - Theory CIE test II (30) - Theory CIE test III (40) – Theory	Total CIE: 100 marks Semester End Examination – NIL	Course end survey

Unit 01	6 Hours
Number Properties: Classification of numbers - Divisibility - Division algorithm -Successive Division - HCF and LCM –Problems Verbal Aptitude: Synonyms and b. Antonyms	
Unit 02	**6 Hours**
Simplification: BODMAS Rule - Approximation - Surds and Indices - Algebraic Simplification - Square root and Cube root – Problems Verbal Aptitude: Verbal analogy, Editing passages	
Unit 03	**6 Hours**
Ratio and Proportion : Ratio - Properties of Ratios - Compound Ratio - Coin based problems - Proportion - Proportionality Test - Proportionality Theorems - Inverse Proportion - Variation - Problems Verbal Aptitude: Reading Comprehension	
Unit 04	**6 Hours**
Equations: a. Linear equation: Simultaneous Linear Equations - Consistent System - Inconsistent System - Problems b. Quadratic Equation: Different Ways to Express the Quadratic Equation - Discriminant of the Quadratic Equations - Roots - Nature of the Roots - Relation between roots and coefficient of equation - Formation of a Quadratic Equation – Problems Verbal Aptitude: One word substitution , Sentence filler words	
Unit 05	**6 Hours**
Logical Reasoning : Number series – Coding and Decoding – Problem Verbal Aptitude: Error detection	

Theory: 30 Hrs	Tutorial: 0	Practical: 0	Project: 0	Total Hours: 30 Hrs

TEXT BOOKS

1.	S.Chand and Dr.R.S.Aggarwal, "Quantitative Aptitude for competitive examinations", S Chand and Company Limited 2019.
2.	Nishit K.Sinha, "Logical Reasoning and Data Interpretation", Pearson 2021.

15/09/2023

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U23OL1101	French	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Read French phrases, Spell French phonitis, practice French accents, differentiate French and English sounds
CO2:	Introduce oneself, talk about someone, ask others personal information, identify an object, ask and respond politely in a conversation
CO3:	Read and write a small annoncement, describe about neighbours, write a small portrait
CO4:	Express one's wishes, talk about one's hobbies, ask time, describe one's status of life in a blog, justify a choice, express one's preferences, write a list of needs
CO5:	Suggest to do something, appreciate something, talk about a movie, write a postal card

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01:	**3 Hours**
Hr 2: Alphabets, Basic wishes, self-introduction, basic verbs: avoir and être Hr 4: Nationalities and countries, colors, days & months Hr 6: Definite articles, numbers 0-20, write about one's identification	
Unit 02:	**3 Hours**
Hr 8: Professions, conjugation: 1st group verbs, indefinite articles Hr 10: Preposition of place, identity card, negative sentence Hr 12: Things around us, subjective and ephatitic pronouns, self-introduction online	
Unit 03:	**3 Hours**
Hr 14: Talk about accommodation, conjugation: aller and venir, possessive adjectives Hr 16: Adjective's gender, noun's gender, things in a room, simple prepositions Hr 18: Physical description, speak about accommodation, writing a self-potrait	
Unit 04:	**3 Hours**
Hr 20: Hobbies, conjugation: vouloir, pouvoir and devoir, connected articles Hr 22: Interrogative adjectives, daily activities, time and seasons, pronominal verbs Hr 24: Near future tense, talk about preferences, write a mail	
Unit 05:	**3 Hours**
Hr 26: Outing activities, conjugation: faire and sortir, demonstrative adjectives Hr 28: Adverbs of frequency, family members, past tenses (passé composé and imparfait) Hr 30: French arts, talk about a film, and write a postal card	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

TEXT BOOKS

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

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U23OL1102	German	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Use common, everyday expressions to greet others and introduce themselves.
CO2:	Construct simple sentences /questions.
CO3:	Initiate and sustain basic conversation based on family, professions,
CO4:	Hobbies and food.
CO5:	Identify differences in using nouns based on gender.

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01:	**3 Hours**
• Greeting and taking leave, introducing oneself, introducing others	
Unit 02:	**3 Hours**
• Alphabets, spelling, numbers	
Unit 03:	**3 Hours**
• Age, Telephone/mobile numbers, Month, Date, Time	
Unit 04:	**3 Hours**
• Languages, Family, Asking/giving information about family members	
Unit 05:	**3 Hours**
• Hobbies, Professions	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

TEXT BOOKS

1.	Netzwerk A1

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U23OL1103	Japanese	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Use words and phrases of greeting in Japanese, write the letters of the alphabet, identify names of objects and do a self-introduction using short and simple sentences
CO2:	Demonstrate the use of time-related words and verb conjunctions and make light conversation asking for directions and answering questions
CO3:	Use different kinds of verbs through the day and those used for giving things, and demonstrate the use of adjectives
CO4:	Express liking for the Japanese language, describe the locations of different things and demonstrate counting in Japanese
CO5:	Make comparisons of stated things, express a willingness to go to Japan and use 'Te-form' verbs

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01:	**3 Hours**
Hr 1-2: Greeting words and phrases; the Japanese alphabet: 104 Hiragana and 104 Katakana letters Hr 3-4: Identifying words from pictures or objects shown Hr 5-6: Self-introduction	
Unit 02:	**3 Hours**
Hr 7-8: Asking for directions when shopping Hr 9-10: Time words and Verb Conjugations Hr 11-12: Making light conversation	
Unit 03:	**3 Hours**
Hr 13-14: Expressions to use verbs from morning to night Hr 15-16: Verbs used for giving things Hr 17-18: Adjectives	
Unit 04:	**3 Hours**
Hr 19-20: Ways to show liking for the Japanese language Hr 21-22: Describing the location of things (or where things are) Hr 23-24: Japanese numbers and counting	
Unit 05:	**3 Hours**
Hr 25-26: Making comparisons Hr 27-28: Expressions wishing for something, like 'I want to go to Japan …!' Hr 29-30: Using 'Te-form' Verb	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

TEXT BOOKS

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

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U23OL1104	Korean	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Use single vowels and consonants syllable structure.
CO2:	Greet others and introduce themselves.
CO3:	Identify time , date and week
CO4:	Explain location and places
CO5:	Construct simple sentences / questions.

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01: Hangeul	3 Hours
Single Vowels & Consonants Syllable Structure Tense Consonants Aspirated Consonants Double Vowels Final Consonants Double Final Consonants Liaison	
Unit 02: Introduction	3 Hours
Greetings Talking about names Self-introduction Introducing my family members	
Unit 03: Time and Date	**3 Hours**
Talking about location Talking about dates and days of the week Talking about doing something in the past	
Unit 04: Location and Places	**3 Hours**
Talking about location Talking about doing something at a location Talking about directions	
Unit 05: Future	**3 Hours**
Talking about doing something in the future Talking about plans for the future Talking about hope for the future	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

REFERENCES

1	Vitamin Korean - 1

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U23OL1105	Hindi	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Write स्वर(अ - अः), व्यंजन(क - श्र)
CO2:	Identify and write बारहखडी(क - श्रः)
CO3:	Coin 2,3&4 letters words
CO4:	Read and frame sentences (grammar, verb, noun, pronoun, adjective, etc…)
CO5:	Communicate effectively using tenses (with Continuous)

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01: स्वर (अ - अः), व्यंजन (क - श्र)	3 Hours
Hindi letters learning Letters identification Reading Writing Letters pronunciation	
Unit 02: बारहखडी (क - श्रः)	3 Hours
Hindi letters learning Letters identification Reading Writing Letters pronunciation	
Unit 03: 2,3 & 4 letters words	**3 Hours**
Words making Words meaning Reading & Writing	
Unit 04 : Grammar, (Verb, noun, pronoun, adjective, etc…)	**3 Hours**
Words meaning Reading & Writing Sentence framing	
Unit 05 : Tenses (with Continuous)	**3 Hours**
Talking about school Talking about family, friends Talking about doing something in the past, present, future Translation	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

REFERENCES

1	Diploma in Hindi (department of higher education, Delhi)

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester II under Regulations 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
	Theory courses									
1.	U23ENG201A	Technical English	2	0	0	0	2	HS	30	T
2.	U23MAT202C	Vector Calculus and Differential Equations	3	1	0	0	4	BS	60	TT
3.	U23PHY203B	Physics For Civil Engineering	4	0	0	0	4	BS	60	T
4.	U23BEE206A	Basics of Electrical Engineering	3	0	0	0	3	ES	45	T
5.	U23CE201	Engineering Mechanics for Civil Engineering	3	1	0	0	4	PC	60	TT
6.	U23TAM201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	0	1	HS	15	T
7.	U23GE201	Basic Aptitude- II	2	0	0	0	0	AC	30	T
	Practical courses									
8.	U23PHL210A	Physics Laboratory	0	0	2	0	1	BS	30	L
9.	U23BEEL213A	Basics of Electrical Engineering Laboratory	0	0	2	0	1	ES	30	L
						Total Credits	**20**			
	Optional Language Courses**									
10.	U23OL1201	French - II	1	0	0	0	1	OL	15	T
11.	U23OL1202	German - II							15	T
12.	U23OL1203	Japanese - II							15	T
13.	U23OL1204	Korean - II							15	T
14.	U23OL1205	Hindi - II							15	T

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

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

Approved By

Chairperson, Science and Humanities BoS	Chairperson, Civil Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. R. Malathy	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil Engineering, Second Semester, B.E. Civil Students and Staff, COE

U23ENG201A	Technical English (Common to ADS, AIML, BME, CSD, CSE, CIVIL, ECE, EEE, MCT, FT, IT, EXE, EFE Branches)	L	T	P	J	C
		2	0	0	0	2

Course Outcomes

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

CO1:	Frame sentences correctly, both in written and spoken forms of language with accuracy and fluency
CO2:	Develop effective reading skills and reinforce language skills required for using grammar and building vocabulary
CO3:	Organise ideas and supporting arguments logically
CO4:	Develop skills for writing conversations, proposals, reports and transcoding
CO5:	Read for understanding and interpreting information and to utilise information accordingly

Pre-requisite:

- Knowledge and Understanding of Grammar
- Fundamental Language Skills (LSRW)

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7) Assignment/seminar/Quiz (5)	Total CIE: **40 marks** Semester End Examination: **60 marks**	Course end survey

Unit 01: **6 Hours**

- Comparative adjectives
- Recommendations
- Guided writing – Conversation in workplace context
- Reading passages for specific information transfer

Unit 02:	6 Hours
• Prepositions, adverbs • Note making • Reading passage with multiple choice questions, reading for gist and reading for specific information	
Unit 03:	**6 Hours**
• Collocations, direct and indirect speech • Memo • Proposal: establishing a lab, introducing a subject in the curriculum, training programme for students • Short reading passage: gap-filling exercise related to grammar	
Unit 04:	**6 Hours**
• Cause and effect • Technical report writing – feasibility report, accident report, survey report • Short reading passages for sentence matching exercises, picking out specific information in a short text	
Unit 05:	**6 Hours**
• Active, passive and impersonal passive voices • Transcoding – bar chart, pie chart, tabular column, graph, flow chart	

Theory: 30 Hrs	Tutorial: --	Practical: -	Project:--	Total Hours: 30 Hrs

TEXT BOOKS	
1.	Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016
2.	**Extensive Reading** 1. Who Moved my Cheese? – Spencer Johnson-G. P. Putnam's Sons 2. Discover the Diamond in You – Arindham Chaudhari – Vikas Publishing House Pvt. Ltd.

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

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SEMESTER - II	VECTOR CALCULUS AND DIFFERENTIAL EQUATIONS	L	T	P	J	C
U23MAT202C	(Common to CIVIL, MECHANICAL and MECHATRONICS)	3	1	0	0	4

Course Outcomes

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

CO1:	apply the concepts of vector differentiation and integration to determine the line, surface and volume integrals.
CO2:	apply the classical methods to solve linear ordinary differential equations.
CO3:	apply the appropriate numerical methods to solve ordinary differential equations.
CO4:	apply the classical methods to solve partial differential equations.
CO5:	apply the appropriate finite difference schemes to solve partial differential equations.

Pre-requisites:

- Fundamentals of elementary algebra
- Fundamentals of calculus
- Fundamentals of trigonometry
- Fundamentals of geometry

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2							2	3	3
CO2	3	3	3	3	2							2	3	3
CO3	3	3	3	3	2							2	3	3
CO4	3	3	3	3	2							2	3	3
CO5	3	3	3	3	2							2	3	3

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)	Assignment/seminar/Quiz (5) Total CIE: **40 marks** Semester End Examination: **60 marks**	Course end survey

Unit 01 VECTOR CALCULUS **12 Hours**

Vector differentiation: Scalar and vector valued functions – Gradient of a scalar point function - Level surface, Unit normal vector, Angle between the two surfaces, directional derivatives – Divergence of a vector point function – Solenoidal vector – Curl of a vector point function – Irrotational vector – Problems based on vector identities – Scalar potential.

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

Unit 02 ORDINARY DIFFERENTIAL EQUATIONS **12 Hours**

Higher order linear ordinary differential equations with constant coefficients – Cauchy's and Legendre's linear ordinary differential equations – Method of variation of parameters.

Unit 03	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	12 Hours
Single Step Methods: Numerical solution of first order ordinary differential equations by Taylor's series, Euler and Modified Euler and Fourth order Runge – Kutta method. **Multi Step Methods:** Numerical solution of first order ordinary differential equations by Milne's and Adam's predictor-corrector methods.		
Unit 04	**PARTIAL DIFFERENTIAL EQUATIONS**	**12 Hours**
Formation of partial differential equations – Lagrange's partial differential equation – Clairaut's form of partial differential equations – Second order linear partial differential equation with constant coefficients.		
Unit 05	**NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS**	**12 Hours**
Classification of second order partial differential equations – Finite difference schemes for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat flow equation by explicit (Bender-Schmidt's) and implicit (Crank Nicholson) methods.		

Theory: 45 Hours	Tutorial: 15 Hours	Practical: -	Project: -	Total Hours: 60 Hours

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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Ph: 0427 - 4099999.

BoS Date: 08. 07. 2023 **HoD / Mathematics**

U23PHY203B	PHYSICS FOR CIVIL ENGINEERING	L	T	P	J	C
		4	0	0	0	4

Course Outcomes

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

CO1:	Analyse the relation between the arrangement of atoms and material properties.
CO2:	Discuss the dual nature of matter and radiation and the application of the wave nature of particles.
CO3:	Describe the basic components of lasers.
CO4:	Explain the factors affecting the architectural acoustics of buildings and applications of ultrasonics.
CO5:	Elucidate the different modes of heat transfer.

Pre-requisite:

Basic knowledge of modern physics, optics, thermal physics and ultrasonics.

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)	Assignment / Seminar / Quiz (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

Unit 01: CRYSTAL PHYSICS	12 Hours
Importance of crystals - Types of crystals - Basic definitions in crystallography (Lattice -space	

lattice - unit cell - lattice parameters - basis) - 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 02: QUANTUM PHYSICS	**12 Hours**

Limitations of classical theory - Dual nature of matter and radiation - Compton effect - Expression for Compton shift (no derivation) - de Broglie waves - Heisenberg's Uncertainty Principle - 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 03: LASERS	**12 Hours**

Energy level - normal population - Stimulated absorption - population inversion - metastable state - spontaneous emission - stimulated emission - Basic components of a laser - Einstein's theory of spontaneous and stimulated emission of radiation - Types of lasers - Solid state laser - Nd: YAG laser - Gas laser - CO_2 laser - Semiconductor laser - Homojunction and hetero junction laser - Holography - Construction and reconstruction of hologram- Application of laser in industry – Cutting, welding and drilling – Medical applications – Lasik.

Unit 04: ACOUSTICS AND ULTRASONICS	**12 Hours**

Classification of sound - Pitch, Loudness, Intensity level, Phon and Timbre - Reverberation, Reverberation time - Sabine's formula and its importance (no derivation) - Sound absorbing materials - Absorption Coefficient and its determination - Factors affecting acoustics of buildings and their remedies - Production of ultrasonic waves by magnetostriction and piezoelectric methods - Acoustic grating – Non-Destructive Testing – Ultrasonic flaw detector - A-scan display.

Unit 05: THERMAL PHYSICS	**12 Hours**

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 a good conductor - Forbe's method - Measurement of thermal conductivity of a 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 and applications of thermal radiations.				
Theory: 60 Hrs	**Tutorial: --**	**Practical: --**	**Project: --**	**Total Hours: 60 Hrs**

TEXTBOOKS	
1.	M.N. Avadhanulu, P.G. Kshirsagar, "A Textbook of Engineering Physics", S. Chand & Company Ltd, New Delhi 2014.
2.	D. K. Bhattacharya, Poonam Tandon "Engineering Physics" Oxford University Press 2017.
REFERENCES	
1.	"Engineering Physics", Sonaversity, Sona College of Technology, Salem Revised Edition 2019.
2.	B. K. Pandey and S. Chaturvedi, "Engineering Physics", Cengage Learning India Pvt. Ltd., Delhi, 2021.
3.	R. Wolfson, "Essential University Physics", Volume 1 & 2. Pearson Education (Indian Edition), 2009.
4.	William D. Callister Jr., David G. Rethwisch, "Callister's Materials Science and Engineering", 10th Edition, Global Edition 2019.
5.	R. Murugeshan, Kiruthiga Sivaprasath, "Thermal Physics", S. Chand & Company Ltd, New Delhi 2018.

27.1.2025

Dr. C. Shanthi
HOD / Science

Dr. C. SHANTHI, M.Sc.,M.E.,Ph.D.,
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27/1/25

Dr. M. Renuga
BoS – Chairperson,
Science and Humanities

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

U23PHL210A	PHYSICS LABORATORY (Common to I Year B.E/B. Tech. CIVIL, MECH & FT)	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Determine the optical, thermal and magnetic properties of materials by various physics laboratory equipment.
CO2:	Access, process and analyse scientific information.
CO3:	Solve problems individually and collaboratively.

Pre-requisite: Capable of using Screw gauge, Vernier calliper, Travelling microscope, able to handle interferometer.

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (15)	RTPS (10)	Course end survey
Quiz 1 (5)	Record (10)	
CIE test II (15)	Total CIE:60 marks	
Quiz 2 (5)	Semester End Examination (40 marks)	

LIST OF EXPERIMENTS

1	Determination of the thickness of a thin wire by forming interference fringes using air wedge apparatus.
2	Determination of velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
3	Determination of Rigidity Modulus of given wire using Torsion Pendulum.
4	Determination of coefficient of viscosity of liquid by Poiseuille's method.
5	Determination of Young's modulus of the material of the beam by Non-uniform bending method.
6	Determination of the wavelength of a diode laser.

7	Determination of particle size of lycopodium powder using diode laser.	
8	Determination of acceptance angle and numerical aperture of an optical fibre using diode laser.	
9	Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.	
10	Determination of hysteresis loss using B-H curve method.	
		TOTAL : 30 HOURS

27.1.2025

Dr. C. Shanthi
HOD / Science

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27.1.25

Dr.M. Renuga
BoS - Chairperson,
Science and Humanities

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Professor & Head,
Department of Humanities & Lan
Sona College of Technology,
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EEE
II

U23BEE206A	BASICS OF ELECTRICAL ENGINEERING	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	analyze the various DC & AC circuits and find the circuit parameters.
CO2:	select the DC machines for different applications.
CO3:	interpret the construction and working principle of single phase Transformer & AC machines.
CO4:	describe the various types of measuring techniques and power supply.
CO5:	discuss the electrical systems in buildings and protective devices.

Pre-requisite:

Physics , Mathematics

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Assignment/seminar/Quiz (5)	Objectives Test (7) Total CIE: **40 marks** Semester End Examination:**40 marks**	Course end survey

Unit 01: DC & AC CIRCUITS — **9 Hours**

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 RL, RC & RLC circuits.

Unit 02: DC MACHINES — **9 Hours**

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

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

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Unit 03: SINGLE PHASE TRANSFORMER & INDUCTION MOTORS	9 Hours
Transformer: Construction and working principle of transformer - EMF equation - types of transformers - Transformation ratio – Applications. Induction motors: Construction and working principle of single phase induction motor, Construction and working principle of three phase induction motor – Torque – slip characteristics – Applications.	
Unit 04: MEASURING TECHNIQUES AND POWER SUPPLY	**9 Hours**
Measuring techniques: Strain measuring techniques using electrical strain gauge - Measurement of Resistance – Wheatstone bridge, Megger - Measurement of Inductance – Anderson Bridge, Measurement of Capacitance – Schering Bridge – Measurement of energy –Digital Energy Meter. Power supply: Construction and working principle of Uninterrupted Power Supply (UPS) and its types – Applications.	
Unit 05: - ELECTRICAL SYSTEMS IN BUILDINGS	**9 Hours**
Protective devices in electrical installations- Fuse, MCB, ELCB - Earthing in Building for safety- Types of Earthing- ISI Specifications for wires and cables - Types of wires, wiring systems and selection criteria – Planning electrical wiring for building- Main and distribution boards- Layout of a substation.	

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs

TEXT BOOKS

1. B.L. Theraja, "A Text book of Electrical Technology (Volume 1&2)", S.Chand & Co Ltd, 2021.
2. S.K. Bhattacharya, "Basic Electrical and Electronics Engineering",Pearson publications, Third Impression, 2019.

REFERENCES

1. A.K.Sawhney, "A course in Electrical and Electronics Measurement & Instrumentation", DhanpatRai and Co, 9th Edition, 2012.
2. Muthusubramanian R, Salivahanan S, "Basic Electrical and Electronics Engineering", 3rd Edition 2007, Tata McGraw-Hill publishing company limited.
3. Charles K. Alexander, Matthew N. O. Sadiku "Fundamentals of Electric Circuits" 7th Edition, McGraw-Hill - May 2022.
4. "Earthing and Grounding of electrical and electronic systems and equipment", Abdallah Saad P E, 2020.

S. Padma 27.1.25

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U23BEEL213A	BASICS OF ELECTRICAL ENGINEERING LABORATORY	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Apply basic circuit laws for calculating electric parameters of DC & AC circuits.
CO2:	Determine and draw the mechanical, electrical and performance characteristics of electrical machines.
CO3:	Determine the value of Resistance, Inductance and Capacitance using various bridges.

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz I- (5) CIE test II (15) Quiz II- (5)	RTPS (10) Record (10) Total CIE: **60 marks** Semester End Examination :**40 marks**	Course end survey

List of Experiments

1. Verification of Ohm's law and Kirchhoff's laws
2. Measurement of power and power factor for series RLC circuit.
3. Open circuit and load characteristics of separately excited DC shunt Generator.
4. Load characteristics of DC shunt motor.
5. Load test on single phase transformer.
6. Load test on three phase Induction motor.
7. Measurement of DC resistance by Wheatstone bridge.
8. Measurement of inductance using Anderson bridge.
9. Measurement of capacitance using Schering bridge.
10. Measurement of earth pit resistance using Megger.
11. Demonstration of MCB and ELCB.

Theory: --	Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 30 Hrs

S. Padma 27/1/25

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U23CE201	Engineering Mechanics for Civil Engineering	L	T	P	J	C
		3	1	0	0	4

Course Outcomes

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

CO1:	Apply the various methods to determine the resultant forces and its equilibrium acting on a particle in 2d and 3d.
CO2:	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.
CO3:	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.
CO4:	Apply the concepts of frictional forces at the contact surfaces of various engineering systems.
CO5:	Apply the various methods of evaluating kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces

Pre-requisite: Basic Mathematics & Physics

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)	Assignment/seminar/Quiz (5) Total CIE: **40 marks** Semester End Examination: **60 marks**	Course end survey

UNIT I - STATICS OF PARTICLES — **9+3 Hours**

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, Free-Body Diagrams.

UNIT II - EQUILIBRIUM OF RIGID BODIES	9+3 Hours
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, 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 Hours**
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 Hours**
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 Hours**
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.	

Theory: 45 Hrs	Tutorial: 15 Hrs	Practical: –	Project:–	Total Hours: 60 Hrs

TEXT BOOKS

1.	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", Sri Balaji Publications 2004.

Sona College of Technology APPROVED Board of Studies Civil Engineering Chairperson Autonomous

U23TAM201	தமிழரும் தொழில்நுட்பமும்	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Describe the weaving and ceramic technology
CO2:	Explain the design and construction technology
CO3:	Analyse the manufacturing technology
CO4:	Describe the agriculture and irrigation technology
CO5:	Explain the Scientific Tamil and Tamil Computing

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01: WEAVING AND CERAMIC TECHNOLOGY — **3 Hours**

அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்: 3

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

Unit 02: DESIGN AND CONSTRUCTION TECHNOLOGY — **3 Hours**

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: 3

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

Unit 03: MANUFACTURING TECHNOLOGY — **3 Hours**

அலகு III உற்பத்தித் தொழில் நுட்பம்: 3

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

Unit 04: AGRICULTURE AND IRRIGATION TECHNOLOGY — **3 Hours**

அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: 3

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

Unit 05: SCIENTIFIC TAMIL & TAMIL COMPUTING — **3 Hours**

அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: 3

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

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

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

HOD

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

U23TAM201	TAMILS AND TECHNOLOGY	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Describe the weaving and ceramic technology
CO2:	Explain the design and construction technology
CO3:	Analyse the manufacturing technology
CO4:	Describe the agriculture and irrigation technology
CO5:	Explain the Scientific Tamil and Tamil Computing

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01: WEAVING AND CERAMIC TECHNOLOGY — **3 Hours**

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

Unit 02: DESIGN AND CONSTRUCTION TECHNOLOGY — **3 Hours**

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

Unit 03: MANUFACTURING TECHNOLOGY — **3 Hours**

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

Unit 04: AGRICULTURE AND IRRIGATION TECHNOLOGY — **3 Hours**

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

Unit 05: SCIENTIFIC TAMIL & TAMIL COMPUTING — **3 Hours**

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

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

TEXT BOOKS

1. தமிழக வரலாறு –மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் –முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
   கீழடி –வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
   பொருநை –ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

REFERENCES	
1.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
3.	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
5.	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
6.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
7.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
8.	Journey of Civilization Indus to Vaigai (R.Ramakrishna) (Published by: RMRL) – Reference Book.

HOD

Dr. M.RENUGA,
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U23GE201	BASIC APTITUDE-II (Common to All Departments)	L	T	P	J	C
		2	0	0	0	0

Course Outcomes

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

CO1:	Solve the problems in Percentage, Conversion of Percentage to Ratio and Ratio into Percentage and work on verbal aptitude questions
CO2:	Elucidate the problems in Profit and loss and percentage of profit and loss. Choose appropriate sentence fillers and Idioms and phrase
CO3:	Crack the problems involving Geometry, Area, Perimeter/Circumference, Surface area and Volume. Comprehend the given passages for Reading Comprehension activity and answer the questions correctly.
CO4:	Deduce the problems involving Trigonometry and exhibit good expertise in detecting errors in the given sentences.
CO5:	Interpret the problems on Ages & logarithm and work on logical reasoning and demonstrate good vocabulary skill by spotting errors.

Pre-requisite:

- Basic English language and Grammar knowledge
- Knowledge in Basic Mathematics

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO 11	PO12
CO1	3	3	3	2	1	1	1	3	3	3	2	3
CO2	3	3	3	2	1	1	1	3	3	3	2	3
CO3	3	3	3	2	1	1	1	3	3	3	2	3
CO4	3	3	3	2	1	1	1	3	3	3	2	3
CO5	3	3	3	2	1	1	1	3	3	3	2	3

Course Assessment methods

Direct		Indirect
CIE test I (30) - Theory CIE test II (30) - Theory CIE test III (40) – Theory	Total CIE: 100 marks Semester End Examination – NIL	Course end survey

Unit 01	6 Hours
Percentage: Conversion of a Percentage into a Fraction – Conversion of a Percentage into a Ratio – Conversion of a Ratio into a Percentage - Percentage Change – Successive percentage – Problems **Verbal Aptitude:** Jumbled sentences & Reconstructions of sentences (PQRS)	
Unit 02	**6 Hours**
Profit Loss: Types of prices – Profit – Loss – Percentage of Profit and Loss - Common Gain or Loss – Selling Price and Cost Price Equality – Successive Profit and Loss – Problems **Verbal Aptitude:** Sentence fillers two words & Idioms and phrase	
Unit 03	**6 Hours**
Geometry: Angles – Complementary and Supplementary angles – Lines – Triangle – Types of triangles – Properties of Triangles – Problems **Area, Perimeter / Circumference:** Triangles - Rectangles and Squares – Parallelogram, Rhombus and Trapezium – Circles – Problems **Surface area, curved surface area & Volume:** Cuboid – Cube – Right circular cylinder – Right circular cone – Sphere – Hemisphere– Problems **Verbal Aptitude:** Reading comprehension.	
Unit 04	**6 Hours**
Trigonometry: Value of Trigonometry ratios for particular values – Sign of Trigonometrical ratios – Trigonometrical ratios for sum or difference of angles Problems **Verbal Aptitude:** Spotting errors	
Unit 05	**6 Hours**
Averages – Problems on ages – Logarithm **- Logical Reasoning:** Alpha Series – Venn diagram – Problems **Verbal Aptitude**: Writing captions for given pictures.	

Theory: 30 Hrs	Tutorial: 0	Practical: 0	Project: 0	Total Hours: 30 Hrs

TEXT BOOKS

1.	S.Chand and Dr.R.S.Aggarwal, "Quantitative Aptitude for competitive examinations", S Chand and Company Limited 2019.
2.	Nishit K.Sinha, "Logical Reasoning and Data Interpretation", Pearson 2021.

6/02/2024

Dr.S.Anita
Professor & Head
Department of Training

Dr. S. ANITA
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SONA COLLEGE OF TECHNOLOGY,
SALEM-636 005.

U23OL1201	French - II	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Accept and refuse of an invitation, give some instruction of do's and don'ts, converse in commercial centres, write an invitation
CO2:	Describe a city, locate a place in a city, ask further details, describe one's hometown
CO3:	Talk about things around us, recite a past event, identify sign boards, express agree and disagree, express obligation and prohibition, sell an object in online
CO4:	Talk about one's goals, express one's feelings, write a list of things to do, express an opinion, talk about weather, draft a mail response
CO5:	Express one's interest and wish, describe a pet animal, express one's aversions, encourage others, write to ask for a help, narrate a past event, write a biography

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01:	**3 Hours**
Hr 2: City shopping and services, conjugation: payer, manger and acheter, negative sentence Hr 4: Imperative sentence, food and beverages, utensils, cutleries, corckeries Hr 6: Quantitative articles, quantities, pronoun 'en', express appreciation, write an invitation	
Unit 02:	**3 Hours**
Hr 8: City and localities, Conjugation: prendre, adjectives of place, pronoun 'y' Hr 10: Transport, leisure activities, preposition of place, degrees of comparison Hr 12: Asking information about a new place, describe a city	
Unit 03:	**3 Hours**
Hr 14: Things in a store, conjugation : faire, imparfait 2, passé composé Hr 16: Things in a repairing shop, computer, relative pronouns: que and qui Hr 18: Imperative negative, express obligation and interdiction, online sale and response	
Unit 04:	**3 Hours**
Hr 20: Professions, conjugation: croire, voir, recent past tense Hr 22: Traveling formalities, expressing about health condition, future tense Hr 24: Pronoun COD, talk about weather condition, write about one's plans and projections	
Unit 05:	**3 Hours**
Hr 26: Citizenship and solidarity, conjugation: connaitre and savoir, depuis vs pendant Hr 28: Imparfait vs passé composé, nature and environment, indirect pronouns COI Hr 30: Animals, conditional, talk on supporting others, write a biography	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

TEXT BOOKS

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

13/2/24.

HOD

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SALEM - 6.

U23OL1202	German - II	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Use grammatical expressions appropriately in day-to-day conversation.
CO2:	Make them frame simple sentences /questions.
CO3:	Accentuate to start and sustain basic conversation
CO4:	Helps them articulate thoughts in German
CO5:	Identify the different forms of the verb

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01:	**3 Hours**
Nominative/accusative case, adjectives	
Unit 02:	**3 Hours**
Modes of transportation, orientation, giving/understanding simple directions	
Unit 03:	**3 Hours**
• Food and beverages, Modal verbs, Separable verbs	
Unit 04:	**3 Hours**
• Simple sentences using modal / separable verbs	
Unit 05:	**3 Hours**
• Articles of clothing	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

TEXT BOOKS

1. Netzwerk A1

HOD 13/2/24

Dr. M.RENUGA,
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SALEM - 636 :

U23OL1203	Japanese - II	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Use verbs in polite conversation or for dissuasion and describe two different activities
CO2:	Demonstrate the application of causative verbs and those that express ability or possibility, and describe experiences
CO3:	Use plain-style expressions, those that state opinions, and verbs and adjectives that go with nouns
CO4:	Express sentences that use 'when' and 'if' and those that describe how services are given and received
CO5:	Read 126 letters of Kanji, and demonstrate adequate knowledge of the lessons learnt in Levels I and II to pass the Japanese Language Proficiency Test (JLPT) for the N5 Level

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01:	**3 Hours**
Hr 1-2: Words and verbs expressing requests / Kanji 1-10 Hr 3-4: Asking for permission; making statements to prohibit something / Kanji 11-20 Hr 5-6: Describing two activities / Kanji 21-30	
Unit 02:	**3 Hours**
Hr 7-8: Verbs that express 'I have to ...' / Kanji 31-40 Hr 9-10: Verbs which express ability or possibility / Kanji 41-50 Hr 11-12: Describing experience / Kanji 51-60	
Unit 03:	**3 Hours**
Hr 13-14: Plain-style expressions / Kanji 61-70 Hr 15-16: Expressions like 'I think that ...' / Kanji 71-80 Hr 17-18: Qualifying nouns with verbs and adjectives / Kanji 81-90	
Unit 04:	**3 Hours**
Hr 19-20: Expressions using 'When ...' / Kanji 91-100 Hr 21-22: Describing the giving and receiving of services / Kanji 101-110 Hr 23-24: Expressions using 'If ...' / Kanji 111-126	
Unit 05:	**3 Hours**
Hr 25-26: Preparing for JLPT N5 Hr 27-28: Preparing for JLPT N5 Hr 29-30: Preparing for JLPT N5	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

TEXT BOOKS

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

13/4/24
HOD

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U23OL1204	Korean - II	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Identify time
CO2:	Identify the date and days of the week
CO3:	Explain location and places
CO4:	Explain destination
CO5:	Construct simple sentences / questions.

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01: Time	3 Hours
Talking about time	
Unit 02: Date	3 Hours
Talking about dates and days of the week Talking about doing something in the past	
Unit 03: Location	**3 Hours**
Talking about location Talking about doing something at a location	
Unit 04: Direction	**3 Hours**
Talking about directions	
Unit 05: Future	**3 Hours**
Talking about doing something in the future Talking about plans for the future Talking about hope for the future	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

REFERENCES

1	Vitamin Korean - 1

13/2/24.

HOD

Dr. M.RENUGA,
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SALEM - 635 005.

U23OL1205	Hindi - II	L	T	P	J	C
		1	0	0	0	1

Course Outcomes

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

CO1:	Write Tenses and Self – Introduction
CO2:	Write Hindi numbers & sentence Translations
CO3:	Read and Write comprehension question & days of the week
CO4:	Read and frame sentences (Story) & part of the body
CO5:	Communicate effectively using tenses (Conversation)

Course Assessment methods

Direct		Indirect
CIE test I (30) CIE test II (30) CIE test III (40)	Total CIE: 100 marks Semester End Examination: NIL	Course end survey

Unit 01: Tenses and Self – Introduction	3 Hours
Learning Hindi pronunciation Speaking based on Tenses (Present, past & future) Reading Writing	
Unit 02: Hindi Numbers & Sentence Translations	3 Hours
Reading Writing Letters pronunciation Meanings learning	
Unit 03: Comprehension question & Days of the week	**3 Hours**
Reading & analysing the meaning Learning	
Unit 04 : Story and Part of the body	**3 Hours**
Words meaning Reading & Writing Sentence framing	
Unit 05 : Conversation and Colours name	**3 Hours**
Conversation between a boy and Doctor Coersation between Taxi driver and Passenger	

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs

REFERENCES

1	Diploma in Hindi (department of higher education, Delhi)
2	Hindi Prachara sabha exam books (Prathamic and Madhyama)

HOD

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Civil III

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23MAT301A	Statistics and Numerical Methods	3	1	0	0	4	BS	60	TT
2.	U23CE301	Strength of Materials -I	3	1	0	0	4	PC	60	TT
3.	U23CE302	Fluid Mechanics and Hydraulics Engineering	3	1	0	0	4	PC	60	TT
4.	U23CE303	Surveying and Field Applications	3	0	2	0	4	PC	75	TL
5.	U23CE304	Construction Materials and Practices	3	0	0	0	3	PC	45	T
6.	noc25-mg106	**NPTEL** - Design Thinking - A Primer	1	0	0	0	1	ES	15	T
7.	U23GE302	**Audit Course**: Environment and Climate Science	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23CE305	Computer Aided Building Planning and Modeling	0	0	2	0	1	PC	30	L
9.	U23ENG301	Communication Skills Laboratory	0	0	2	0	1	HS	30	L
10.	U23GE301	Soft Skills and Aptitude-I	0	0	2	0	1	EEC	30	L
Total Credits							23			

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory,TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project, P-Project.

Approved By

Chairperson, Civil Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.R.Malathy	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/ Civil Engineering, Third Semester B.E. Civil Students and Staff, COE

SEMESTER - III	STATISTICS AND NUMERICAL METHODS	L	T	P	J	C
U23MAT301A	(CIVIL ENGINEERING)	3	1	0	0	4

COURSE OUTCOMES

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

CO1:	represent the data in the form of diagram and graph and analyze them.
CO2:	apply the concepts of measures of central tendency and dispersion to the given data and analyze the results.
CO3:	apply the concepts of correlation and regression to the given data and analyze the result.
CO4:	apply the Newton's forward, backward, divided difference formulae and Lagrange's formula to obtain the polynomial interpolation and their derivatives at desired point.
CO5:	apply the Trapezoidal rule, Simpson's rule, Romberg's method and Gaussian quadrature formula to evaluate definite integrals.

Pre-requisites:

- Fundamentals of elementary algebra
- Fundamentals of calculus
- Fundamentals of trigonometry
- Fundamentals of geometry

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3						2	2	2	
CO2	3	3	3	3	3						2	2	2	
CO3	3	3	3	3	3						2	2	2	
CO4	3	3	3	3	3						2	2	2	
CO5	3	3	3	3	3						2	2	2	

COURSE ASSESSMENT METHODS

DIRECT		INDIRECT
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)	Assignment/Quiz/Seminar (5) Total CIE: 40 marks Semester End Examination: 60marks	Course end survey

Unit 01 COLLECTION AND REPRESENTATION OF DATA **12 Hours**

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.

Unit 02 MEASURES OF CENTRAL TENDENCY AND DISPERSION **12 Hours**

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

Unit 03 CORRELATION AND REGRESSION **12 Hours**

Simple and rank correlations – Multiple and partial correlations – Linear regression – Relation between simple correlation and regression - Curve fitting (straight line and parabola).

Unit 04	INTERPOLATION AND NUMERICAL DIFFERENTIATION	12 Hours
Newton's forward and backward and divided difference interpolations – Lagrange's and Inverse Lagrange's interpolations – Approximation of derivatives using interpolating polynomials.		
Unit 05	**NUMERICAL INTEGRATION**	**12 Hours**
Trapezoidal rule – Simpson's $1/3^{rd}$ and $3/8^{th}$ rules – Romberg's method – Gaussian two point and three point quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rule.		

Theory: **45 Hours**	Tutorial: **15 Hours**	Practical:--	Project:--	Total: **60 Hours**

TEXT BOOKS:

1.	S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 46th Edition, 2023.
2.	R. L. Burden and J. D. Faires, "Numerical Analysis" Cengage Publishers, 9th Edition, 2021.

REFERENCE BOOKS:

1.	S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 12th Revised Edition, 2020.
2.	R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
3.	I. Levin Richard, H. Siddiqui Masood, S. Rubin David and R. Sanjay, "Statistics for Management", Pearson Publishers, 8th Edition, 2017.
4.	T. Veerarajan and T. Ramachandran, "Numerical Methods with programs in C", McGraw Hill Publishers, 2nd Edition, Reprint, 2019.
5.	B. S. Grewal, "Numerical Methods in Engineering & Science with Programs in C, C++ & MATLAB", Khanna Publishers, 11th Edition, 2013
6.	P. Kandasamy, K. Thilagavathy and K. Gunavathy, "Numerical Methods", S. Chand Publishers, 5th Edition, 2013.

B.E/B. TECH REGULATIONS 2023	HEAD OF THE DEPARTMENT OF MATHEMATICS
S&H BoS DATE:22-06-2024	

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U23CE301	Strength of Materials - I	L	T	P	J	C
		3	1	0	0	4

Course Outcomes

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

CO1:	Apply the concept of stresses and strains to evaluate the displacement of simple and composite bars.
CO2:	Comprehend the behavior of stresses in two- and three-dimensional systems.
CO3:	Analyze the shear force and bending moment for the beams under different loading conditions and support conditions.
CO4:	Apply the concept of simple bending to evaluate the stresses in the beams.
CO5:	Apply the theory of torsion to evaluate the bending and torsion in shafts and springs.

Pre-requisite: Engineering Mechanics for Civil Engineering

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	SDG
CO1	3	3	2	3	-	1	1	1	-	-	-	3	2	-	4 & 9
CO2	3	3	2	3	-	1	1	1	-	-	-	3	2	-	
CO3	3	3	2	3	3	1	1	1	3	-	2	3	2	-	
CO4	3	3	2	3	3	1	1	1	3	-	2	3	2	-	
CO5	3	3	2	3	-	1	1	1	-	-	-	3	2	-	

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)	Assignment/seminar/Quiz (5) Total CIE: **40 marks** Semester End Examination: **60 marks**	Course end survey

UNIT-I - SIMPLE STRESSES — **9+3 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+3 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 - SHEAR FORCE AND BENDING MOMENT	9+3 Hours
Types of loads, supports, beams-Concept of shear 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 – Shear Force and Bending Moment Diagram for determinate beams using MATLAB R2024a.	
UNIT-IV - STRESSES IN BEAMS	**9+3 Hours**
Theory of simple bending-Assumptions and derivation of simple bending equation-Flexural rigidity- Bending and shearing stress distribution diagrams- Composite beams – Computation of bending and shear stress for different sections using MATLAB R2024a.	
UNIT-V - TORSION	**9+3 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.	

Theory: 45 Hrs	Tutorial: 15 Hrs	Practical: --	Project:--	Total Hours: 60 Hrs

TEXT BOOKS

1.	Rajput R.K, "Strength of Materials", S. Chand and Co, New Delhi, Seventh Edition, 2018.
2.	Bansal R.K, "Strength of Materials", Laxmi Publications, New Delhi, Sixth Edition, 2018.
3.	Bhavikatti. S., "Solid Mechanics", Vikas publishing house Pvt. Ltd. New Delhi, 2010.
4.	Chandramouli P.N, "Fundamentals of Strength of Materials", PHI Learning Private Limited, New Delhi, 2013.

REFERENCES

1.	Subramanian R, "Strength of Materials", Oxford University Press, New Delhi, 2016.
2.	Timoshenko. S.B. and Gere. J. M, "Mechanics of Materials", Van Nos Reinhold, New Delhi, 5th edition, 2015.
3.	S.S. Rattan "Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 3rd Edition, 2017.

Sona College of Technology APPROVED Board of Studies Civil Engineering Chairperson Autonomous

U23CE302	Fluid Mechanics and Hydraulics Engineering	L	T	P	J	C
		3	1	0	0	4

Course Outcomes

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

CO1:	Determine the fluid properties and its behaviour in static conditions.
CO2:	Apply the conservation laws for fluids in fluid kinematics and dynamics.
CO3:	Estimate losses in pipelines and analysis of flow characteristics in open channel sections.
CO4:	Study the working principle of pumps and turbines, and estimate their performance.
CO5:	Apply boundary layer concept for different fluid flow and to formulate the dimensional analysis.

Pre-requisite: NIL

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	SDG
CO1	3	3	2	3	1	1	1	1	1	1	2	2	1	1	
CO2	3	3	2	3	1	2	1	2	1	1	1	2	2	1	
CO3	3	3	2	3	1	2	1	1	1	1	1	2	2	1	4
CO4	3	3	2	3	1	1	1	2	1	1	2	2	1	1	
CO5	3	3	2	3	2	2	1	2	1	1	2	2	2	1	

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)	Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks	Course end survey

UNIT-I - FLUID PROPERTIES AND FLUID STATICS — **9+3 Hours**

Fluid – definition, distinction between solid and fluid – Units and dimensions – Properties of fluid. Fluid statics – concepts of fluid static pressure, absolute and gauge pressure – Pressure measurements using single column manometers – Forces on planes – centre of pressure – Buoyancy – Meta centre.

UNIT-II - FLUID KINEMATICS AND DYNAMICS — **9+3 Hours**

Fluid Kinematics: Types of flow- Velocity field and acceleration – Continuity equation - stream function – velocity potential function – flow net. **Fluid Dynamics:** Equations of motion -Euler's equation along a streamline – Bernoulli's equation – Applications – Venturimeter- orificemeter and velocity measurement (Pitot tube, Current metre).

UNIT-III - FLOW THROUGH PIPES AND OPEN CHANNEL FLOW	9+3 Hours
Flow through Pipes: Laminar flow through circular pipes (Hagen Poiseulle's equation) - Hydraulic and energy gradient line – flow through pipes – Darcy Weisbach equation – Major and minor losses of flow in pipes. **Open Channel Flow:** Definition - Differences between pipe flow and open channel flow –Types of open channels- Velocity distribution in open channel. Steady uniform flow: Chezy equation, Manning equation - Best hydraulic sections for uniform flow.	
UNIT-IV - PUMPS AND TURBINES	9+3 Hours
Pumps: Classification of Pumps - Centrifugal pumps – working principle – priming of centrifugal pump – specific speed - Minimum speed to start the pump - Reciprocating pumps -single acting reciprocating pump - Negative slip. **Turbines:** Classification – impulse and reaction turbines – components and functions of Pelton wheel turbine, Velocity triangle – specific speed.	
UNIT-V - BOUNDARY LAYER AND DIMENSIONAL ANALYSIS	9+3 Hours
Boundary layer: Definition- Laminar and turbulent boundary layer- Displacement thickness, energy and momentum thickness- Boundary layer separation. **Dimensional Analysis:** Fundamental dimensions – Dimensional homogeneity – Method of dimensional analysis -Rayleigh's method and Buckingham π- theorem.	

Theory: 45 Hrs	Tutorial: 15 Hrs	Practical: --	Project:--	Total Hours: 60 Hrs

TEXT BOOKS	
1.	Bansal R.K, "A text book of fluid mechanics and hydraulic machines" Laxmi Publications, 2017.
2.	R.K. Rajput, "A text book of fluid mechanics and hydraulic machines", S. Chand Publishing, 2019
3.	Subramanya, K., "Flow in open channels", Tata McGraw Hill Publishing Company Ltd, New Delhi 2019

REFERENCES	
1.	Modi, P.N., and Seth, S.M., "Hydraulics and Fluid Mechanics", Standard book house, New Delhi, 2019
2.	Rajesh Srivastava, "Flow through open channels", Oxford University Press, New Delhi ,2007
3.	Kumar K.L, "Engineering Fluid Mechanics" Eurasia Publishing House Pvt. Ltd, New Delhi, 2007.
4.	http://nptel.ac.in/courses/105103095

Sona College of Technology APPROVED Board of Studies Civil Engineering Chairperson Autonomous

U23CE303	Surveying and Field Applications	L	T	P	J	C
		3	0	2	0	4

Course Outcomes

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

CO1:	Understand the basic principles of surveying and apply the knowledge to find reduced levels using dumpy level.
CO2:	Determine the horizontal and vertical distance by traversing using a theodolite, measure the elevation difference and calculate the reduced level of the given points.
CO3:	Calculate Tachometric constants and prepare the map and land features using contours.
CO4:	Formulate curves in the field and understand the concept of signals and satellite stations.
CO5:	Evaluate the horizontal and vertical measurements using total station instruments and to understand the working principle and application of drones.

Pre-requisite: Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	SDG
CO1	3	3	2	3	2	2	1	1	3	3	2	3	3	2	4 & 9
CO2	3	3	2	3	2	2	1	1	3	3	2	3	3	2	
CO3	3	3	2	3	2	2	1	1	3	3	2	3	3	2	
CO4	3	3	1	3	2	2	1	1	3	2	2	3	2	3	
CO5	3	3	1	3	3	2	1	1	3	2	2	3	2	3	

Course Assessment methods

Direct		Indirect
CIE test I (10) - Theory CIE test II (10) - Theory CIE test III (10) - Theory CIE test IV(15) - Laboratory	Assignment / Quiz/ Seminar (5) Total CIE: **50 marks** Semester End Examination: **50 marks** [SEE- Theory (35 marks), Lab (15 marks)]	Course end survey

UNIT-I - FUNDAMENTALS OF 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 TRIGONOMETRIC 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. Trigonometrical levelling: Heights and distances - Base of the object accessible and inaccessible.	
UNIT-III - TACHEOMETRIC SURVEYING AND CONTOURS	**9 Hours**
Introduction-Instruments-Different systems of tacheometric measurements- Tacheometer -Stadia Constants - Analytic Lens -Tangential and Stadia Tacheometry surveying-Subtense 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 - CURVES AND 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.	
UNIT-V - ADVANCED SURVEYING	**9 Hours**
Total station: Features-Recording-Advantages-Fields procedure. Photogrammetry: Aerial Photogrammetry-Application. Remote sensing: Classification-principles- Resolution-Sensors-Methods of remote sensing-Image Interpretation-Application- Remote sensing in India. Geographic Information Systems: Scope- Purposes-Hardware of GIS-Applications. Global Positioning Systems: GPS & DGPS elements- Application and uses-Advantages. Introduction, working principles and applications of Drone surveying, post-processing software.	

List of Experiments

1. Study of chains and their accessories, Aligning, Ranging, Chaining and Marking Perpendicular offset.
2. Compass Traversing – Measuring Bearings & arriving included angles.
3. Reduction of levels (Check and Fly levelling) - Height of collimation and Rise and fall method.
4. Measurements of horizontal angles by reiteration and repetition and vertical angles.
5. Determination of elevation of an object using Tacheometric surveying.
6. Measurement of height and distance using stadia and tangential system of tachometry.
7. Setting out of a simple curve.
8. Measurement of angles and height using total station.
9. Traverse using Total station and Area of Traverse.
10. Determination of distance and difference in elevation between two inaccessible points using Total station.
11. Calculation of latitude and longitude for an area using GPS.
12. Advanced surveying using Drones.

Theory: 45 Hrs	Tutorial: -- Hrs	Practical: 30 Hrs	Project:--	Total Hours: 75 Hrs

TEXT BOOKS

1.	Punmia B.C, "Surveying, Vol. I and II", Laxmi Publications, 17th edition, 2016.
2.	Senthil Kumar S.R.R, "Surveying", Amaravathi Publishers, 1st edition, 2022.
3.	Kumar S., "Basics of Remote Sensing and GIS", Laxmi Publication (P) Ltd. 1st Edition, 2016.
4.	Raghava Rao E.V., "Advance Methods and Techniques in Drone Surveying", Prashas Research Consulting (P) Ltd. 2022.

REFERENCES

1.	Arora K. R, "Surveying Vol. I and II", Standard Book House, 17th edition, 2019.
2.	Duggal S.K, "Surveying Vol. I and II", Tata McGraw Hill, New Delhi, 5th edition, 2019.
3.	Kanetkar T.P, "Surveying and Levelling Vols. I and II". United Book Corporation, Pune, 2014.
4.	Basak N.N, "Surveying and Levelling", Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2nd edition, 2017.

U23CE304	Construction Materials and Practices	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	Understand the components of substructure and superstructure and know their technical terms.
CO2:	Identify properties of various building materials with their testing for different application.
CO3:	Select concrete ingredients with their properties and testing as per IS codal specification.
CO4:	Implement various construction practices and techniques adopted for different types of buildings.
CO5:	Categorize the building components according to its function and suitability in construction.

Pre-requisite: Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	SDG
CO1	3	2	2	1	1	1	2	1	1	-	-	3	1	1	9,11 &12
CO2	3	2	2	1	1	1	3	-	1	-	-	3	1	1	
CO3	3	2	2	1	1	1	3	-	1	-	-	3	1	1	
CO4	3	2	2	2	2	2	3	3	2	-	-	3	2	2	
CO5	3	2	2	2	2	2	3	1	2	-	-	3	2	2	

Course Assessment methods

Direct		Indirect
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)	Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks	Course end survey

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.

UNIT-II - BUILDING MATERIALS	9 Hours
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.	
UNIT-IV - CONSTRUCTION PRACTICES	**9 Hours**
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 - Damp proof courses - Construction joints - Movement and expansion joints - Fabrication and erection of steel trusses - Frames - Braced domes - Laying brick -Weather and water proof - Acoustic and fire protection. Introduction to precast elements: Beams and Columns. Introduction to automation technology in construction industry. 3D concrete printing introduction– ingredients & techniques – workflow & design principles – applications – software used –types of 3D printers.	
UNIT-V - BUILDING COMPONENTS AND FORMWORKS	**9 Hours**
Lintel: Functions of lintel and sunshade-Types of lintel; Arches: Construction-Elements-Classification. Doors and Windows: Technical terms-Types and their suitability. Stair and stair cases: Terminology-Location and classification of stairs-Requirement of good stair. Form works: Centering and shuttering - Scaffoldings, shoring and underpinning - Slip forms.	

Theory: 45 Hrs	Tutorial: -- Hrs	Practical: --	Project:--	Total Hours: 45 Hrs

TEXT BOOKS

1.	Arora S.P and Bindra S.P, "Building Construction", DhanpatRai Publications (P) Ltd, 2015.
2.	Punmia B.C, "Building Construction", Laxmi Publication, New Delhi, 2016.
3.	Shetty M.S, "Concrete Technology Theory and Practice", S. Chand and Company Ltd. New Delhi, 2014.
4.	Jay G. Sanjayan, Ali Nazari, Behzad Nematollahi, "3D Concrete Printing Technology: Construction and Building Applications", Butterworth-Heinemann Inc, 2019.

REFERENCES

1.	Sahu G.C., Joygopal Jena., "Building Materials and Construction", McGraw Hill Education (India) Private Limited, New Delhi, 2015.
2.	Building Materials, P.C. Varghese, Prentice-Hall of India, New Delhi, 2015.
3.	Fundamentals of Building Construction, Edward Allen and Joseph Iano, 5th Edition, John Wiley & Sons Inc., New Jersey, 2008.
4.	Rajput R K., "Engineering Materials", S Chand and Company Ltd, 2014.
5.	IS 1077: Common Burnt Clay Building Bricks -Specification

6.	IS 269:1989 – Specification for ordinary Portland cement
7.	IS 383:2016 – Specification for coarse and fine aggregates from natural sources for concrete
8.	IS 456:2019 - Code of practice for plain and reinforced concrete

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noc25_mg106	DESIGN THINKING - A PRIMER	1 0 0 0 1

ABOUT THE COURSE

Design thinking is a systematic method of solving problems. This method is unique that it starts and ends with humans. The design thinkers start by observing, interviewing or just plain experiencing a situation. Then, they proceed to improve the situation of the humans by solving problems for them.

COURSE LAYOUT

Week 1 : Introduction to Design Thinking
Week 2 : Empathize Phase: Customer Journey Mapping
Week 3 : Analyze Phase: 5-Whys and How might we...
Week 4 : Solve Phase: Ideation: Free Brainstorming & Make/Test Phase: Prototype

TOTAL HOURS : 15

BOOKS AND REFERENCES

Prescribed Textbook for the course:

1.Karmic Design Thinking by Prof. Bala Ramadurai, available at Amazon (paperback), Amazon (e-book), Flipkart, Pothi, bookspace.in

REFERENCES

1.Design: Creation of Artifacts in Society by Prof. Karl Ulrich, U. Penn
2.Change by Design by Tim Brown.

U23GE302	ENVIRONMENT AND CLIMATE SCIENCE	L	T	P	J	C
		2	0	0	0	0

Course Outcomes

At the end of the course, the student 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 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.

Pre-requisite:

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (30) - Theory CIE test II (30) - Theory CIE test III (40)- Theory	Total CIE: **100 marks** Semester End Examination – **NIL**	Course end survey

Unit 01: INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES — 6 Hours

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 Conservati of Natural Resources.

Unit 02: ECOSYSTEMS AND BIODIVERSITY — 6 Hours

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 03: ENVIRONMENTAL POLLUTION	**6 Hours**
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 04: FUNDAMENTALS OF CLIMATE CHANGE	**6 Hours**
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 prot ozone layer depletion-Rainwater Harvesting-Effect of climate change due to air pollution Case study - CNG vehicles in Delhi.	
Unit 05: EFFECT OF CLIMATE CHANGE	**6 Hours**
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.	

Theory: 30	Tutorial: --	Practical: --	Project:--	Total Hours: 30 Hrs

TEXT BOOKS

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

REFERENCES

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

14/6/25

Dr. M.RENUGA,
Professor & Head,
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Sona College of Technology,
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14.6.2025

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

U23CE305	Computer Aided Building Planning and Modeling	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Apply the principles of planning and bye laws used for building planning
CO2:	Develop plan, elevation, and section for various types of buildings
CO3:	Formulate and develop a 3D information model for efficient decision-making

Pre-requisite: Engineering Graphics

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	SDG
CO1	3	2	3	-	3	3	3	2	1	2	2	2	2	2	9&11
CO2	3	2	3	-	3	3	3	2	1	2	2	2	2	2	
CO3	3	2	3	1	3	3	3	2	1	3	2	2	2	3	

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz 1 (5) CIE test II (15) Quiz 2 (5)	RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination: 40 marks	Course end survey

Introduction to Building Planning: Types of buildings-Building regulations as per Indian standards - Provisions of national building code - Building bye-laws - Open area - Setbacks - Principles of planning – Orientation - Ventilation and lighting. Minimum standard dimensions of building elements: Area limitation- Floor area ratio - Floor space index - Setback distances-Open spaces.

Preparation of building plan: Site plan-Line plan-Detailed plan-Sectional view and elevation-Preparation of blue print-Contents of plan-Signing authority-Procedure for approval of the plan. Introduction to Vastu sastra - Technical back ground. Symbols of materials and sign convention.

Introduction to Building Information modeling – Dimensions, Level of development (LoD), Augmented reality (AR) and virtual reality (VR) – techniques - gadgets and software available.

List of Exercises:

Preparation of line sketches by functional requirements and rules for the following types of building as per National Building Code. Preparation of plan, elevation, sectional view of superstructure and substructure and other details if required for

1. Load-bearing structure - residential building.
2. Framed structure - Institutional building.
3. Multi-storied framed structure – In building Approval format.

4. Pre-engineered steel industrial building.
5. Pitched Steel roof truss warehouse building.
6. Plumbing and electric work layout for building.
7. Creation of 3D modeling of simple residential building.
8. Extract plans, views and reports for the 3D model of residential building.
9. Exporting 3D model to AR and VR views.

Theory: -- Hrs	Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 30 Hrs

REFERENCES

1.	Verma.B.P., "Civil Engineering Drawing and House Planning", Khanna Publishers, 1989
2.	Dr.N.Kumaraswamy, A Kameswara Roa, "Building planning and drawing" 9th Revision, Charotor Publishing house pvt ltd, 2019.
3.	ISO 19650 - Organization and digitization of information about buildings and civil engineering works, including building information modeling (BIM) — Information management using building
4.	Verma.B.P., "Civil Engineering Drawing and House Planning", Khanna Publishers, 1989

U23ENG301	Communication Skills Laboratory [Common to ADS, CIVIL, IT & FT]	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Communicate confidently and appropriately in professional environment
CO2:	Demonstrate active interpersonal skill knowledge to excel in their career
CO3:	Use language efficiently to write winning proposals and effective reports, and to face interviews, participate in group discussions and present speeches.

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (15) QUIZ I (5) CIE test II (15) Quiz II (5)	RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination: 40 marks	Course end survey

1. **Listening Comprehension**: listening to audio files and sequencing of sentences – Filling in the blanks – Listening comprehension.

2. **Reading Comprehension**: Filling in the blanks – Cloze exercises – Vocabulary building – Reading and answering questions.

3. **Speaking:** Correct Pronunciation – Common errors in spoken English.
Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

4. Making presentations: introducing oneself – introducing a topic – answering questions – individual presentation practice

5. Creating effective PPTs – presenting the visuals effectively

6. Using appropriate body language in professional contexts – gestures, facial expressions, etc.

7. Preparing job applications - writing covering letter and résumé

8. Applying for jobs online - email etiquette

9. Participating in group discussions – understanding group dynamics - brainstorming the topic – mock GD

10. Training in soft skills - persuasive skills – people skills - questioning and clarifying skills 11. Writing Project proposals: collecting, analysing and interpreting data / drafting the final report 12. Attending job interviews – answering questions confidently 13. Interview etiquette – dress code – body language – mock interview				
Theory:--	**Tutorial: --**	**Practical: 30 hours-**	**Project:--**	**Total Hours: 30 Hrs**
Extensive Reading 1. The 7 Habits of Highly Effective People, Covey, Stephen R. New York: Free Press, 1989. 2. The Professional. Bagchi, Subroto. New Delhi: Penguin Books India, 2009.				

REFERENCES

1.	English and Soft Skills, Dhanavel, S.P. Hyderabad: Orient Black Swan Ltd. 2010.
2.	How to Prepare for Group Discussion and Interview, Corneilssen, Joep. New Delhi: Tata-McGraw-Hill, 2009.
3.	Group Discussion and Team Building D'Abreo, Desmond A. Mumbai: Better yourself books, 2004.
4.	The ACE of Soft Skills, Ramesh, Gopalswamy, and Mahadevan Ramesh. New Delhi: Pearson, 2010.
5.	Corporate Soft Skills, Gulati, Sarvesh. New Delhi: Rupa and Co. 2006.
6.	Presentation Skills for Students, Van Emden, Joan, and Lucinda Becker. New York: Palgrave Macmillan, 2004
7.	Dictionary of Common Errors, Turton, N.D and Heaton, J.B. Addision Wesley Longman Ltd., Indian reprint 1998.

14/6/25.

HoD

(Dr. M. Renuga)

U23GE301	SOFT SKILLS AND APTITUDE - I	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches
CO2:	Solve problems of greater intricacy than those in BA-I and II in stated areas of quantitative aptitude and logical reasoning
CO3:	Demonstrate higher than BA-I and II levels of verbal aptitude skills in English regarding specific topics

Pre-requisite: Basic Aptitude I & II

CO/PO, PSO Mapping

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

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

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz - I (5) CIE test II (15) Quiz – II (5)	RTPS (10) Record (10) Total CIE marks : **60 marks** Semester End Examination : **40 marks**	Course end survey

1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics:** a. Attitude building b. Self-awareness and self -acceptance c. Dealing with criticism d. Innovation and creativity e. Problem solving and decision making f. Public speaking g. Group discussions.

2. Quantitative Aptitude and Logical Reasoning		**Solving problems with reference to the following topics:** a. Vedic Mathematics b. Simplification c. Number Properties d. Averages e. Percentage f. Profit Loss and Discount g. Ratio & Mixtures h. Equation i. Problem on Ages j. Data interpretation		
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		
Theory : ---	**Tutorial : ----**	**Practical : 30hrs**	**Project : ---**	**Total hours : 30hrs**

S. Anita 6/06/2025

Dr.S.Anita
Professor & Head
Department of Training

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

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2023 (CBCS)
Branch: Civil Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23CE401	Strength of Materials-II	3	1	0	0	4	PC	60	TT
2.	U23CE402	Transportation Engineering	3	0	0	0	3	PC	45	T
3.	U23CE403	Hydrology and Irrigation Engineering	3	0	0	0	3	PC	45	T
4.	U23CE404	Environmental Engineering and its Applications	3	0	0	2	4	PC	75	TP
5.	U23CE901	**Professional Elective -** Elements of Building Planning	3	0	0	0	3	PE	45	T
	U23CE903	**Professional Elective -** Energy Efficiency and green building								
6.	U23GE402	**Audit Course**: Essence of Indian Traditional Knowledge	2	0	0	0	0	AC	30	T
Practical courses										
7.	U23CE405	Fluid Mechanics Laboratory	0	0	2	0	1	PC	30	L
8.	U23CE406	Environmental Engineering Laboratory	0	0	2	0	1	PC	30	L
9.	U23CE407	Materials Testing Laboratory	0	0	2	0	1	PC	30	L
10	U23GE401	Soft Skills and Aptitude-II	0	0	2	0	1	EEC	30	L
Total Credits							21			

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project, P-Project.

Approved By

Chairperson, Civil Engineering BoS	**Member Secretary, Academic Council**	**Dean-Academics**	**Chairperson, Academic Council & Principal**
Dr.R.Malathy	**Dr.R.Shivakumar**	**Dr.J.Akilandeswari**	**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/ Civil Engineering, Fourth Semester B.E. Civil Students and Staff, COE

U23CE401	Strength of Materials-II	L	T	P	J	C
		3	1	0	0	4

Course Outcomes

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

CO1:	Apply the different methods to evaluate the slope and deflection of determinate beams.
CO2:	Analyze the determinant and indeterminate truss by using different methods.
CO3:	Apply the Euler theory and Rankine's-Gorden formula to evaluate the critical load of the columns
CO4:	Analyze the thin and thick cylinders and comprehend the application of various failure theories.
CO5:	Analyze the unsymmetrical bending of beams and evaluate the stresses in curved beams.

Pre-requisite:

Strength of Materials-I

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	-	-	-	-	2	-	2	3	2
CO2	3	3	2	2	3	-	-	-	-	2	-	2	3	2
CO3	3	3	2	2	2	-	-	-	-	2	-	2	3	2
CO4	3	3	2	3	2	-	-	-	-	2	-	2	3	2
CO5	3	3	2	2	2	-	-	-	-	2	-	2	3	2
SDG	4,9,11 & 13													

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

UNIT-I - DEFLECTION OF DETERMINATE BEAMS	12 Hours
Elastic curve – Governing differential equation - Double integration method - Macaulay's method - Area moment method - conjugate beam method for computation of slope and deflection of statically determinate beams.	
UNIT-II - ANALYSIS OF TRUSSES	**12 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	**12 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	**12 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	**12 Hours**
Unsymmetrical bending of beams of symmetrical and unsymmetrical sections – Shear Centre - curved beams – Winkler Bach formula – Stresses in hooks.	

Theory: 45 Hrs	Tutorial:15 Hrs	Practical: --	Project:--	Total Hours: 60 Hrs

TEXT 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.
3.	Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011.
4.	Bhavikatti, S.S. Strength of Materials, Vikas Publishing House, Pvt. Ltd, 2013

REFERENCES

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.	Sadhu Singh, "Strength of Materilas', Khanna Publishers, India, 2024.
4.	Debabrata Nag and Abhijit Chanda, "Strength of Materials", Wiley, 2012
5.	Christian Mittelstedt, "Engineering Mechanics 2: Strength of Materials: An introduction with many examples", Springer Vieweg, 2023.

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Civil Engineering
Chairperson
Autonomous

U23CE402	Transportation Engineering	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	Explain the fundamentals of highway engineering and apply geometric design principles, including sight distances, gradients, super-elevation and curve design.
CO2:	Evaluate soil strength using CBR and field density tests and apply IRC-based design principles to analyze and design flexible and rigid pavements.
CO3:	Explain the components, functions, and geometric design principles of railway tracks and tunnels.
CO4:	Plan the airport by wind rose analysis and evaluate the functional components required for safe and efficient air transport operations.
CO5:	Explain the fundamental concepts of harbours, ports and functions of coastal structures, docks and navigational aids for efficient and safe maritime operations.

Pre-requisite:

Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	-	2	2	2	-	2	2	2	3	2
CO2	3	3	3	2	-	2	2	2	-	2	2	2	3	2
CO3	3	3	2	2	-	2	2	-	-	-	2	2	2	2
CO4	3	3	2	2	-	2	2	2	-	-	2	2	3	2
CO5	3	3	2	2	-	2	2	-	-	-	2	2	2	2
SDG	3,7,9 &11													

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

UNIT-I - HIGHWAY ENGINEERING COMPONENTS	09 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 (Concepts only). Types of road constructions: Water Bound Macadam, bituminous, Granular based Macadam and cement concrete road.	
UNIT-II - PAVEMENT DESIGN	**09 Hours**
Soil: California bearing ratio test - field density test, Pavements - 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).	
UNIT-III - RAILWAY ENGINEERING	**09 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-IV - AIRPORT ENGINEERING	**09 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.	
UNIT-V - DOCKS AND HARBOURS	**09 Hours**
Definition of Basic Terms: Harbor, Port, Satellite Port, Docks – Dry and Floating Dock, Waves and Tides – Planning of Harbors: Harbour Layout and Terminal Facilities – Coastal Structures: Piers, Break waters, Wharves, Jetties, Quays, Spring Fenders, Dolphins Floating Landing Stage – Navigational Aids.	

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs

TEXT BOOKS

1.	Khanna.S. K., Justo.C.E.G and Veeraragavan A. "Highway Engineering", Nemchand Publishers, 2014.
2.	Subramanian K.P., "Highways, Railways, Airport and Harbour Engineering", Scitech Publications

	(India). Chennai. 2010.
3.	Kadiyali.L.R. "Principles and Practice of Highway Engineering", Khanna Technical Publications, 6th edition Delhi, 2015.
4.	C. Venkatramaiah., Transportation Engineering-Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels., Universities Press (India) Private Limited, Hyderabad, 2015.

REFERENCES

1.	Fred L. 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.	Indian Road Congress (IRC), Guidelines for the Design of Flexible Pavements, (Third Revision), IRC:37-2012.
4.	Indian Road Congress (IRC), Guidelines for the Design of Plain Jointed Rigid Pavements for Highways.

Sona College of Technology Autonomous APPROVED Board of Studies Civil Engineering Chairperson

U23CE403	Hydrology and Irrigation Engineering	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	Understand the components of the hydrological cycle by interpreting rainfall data, and conducting hydrograph analysis including unit hydrograph derivation.
CO2:	Evaluate the hydraulic properties (permeability, transmissivity, storage) and assess well yield and design with deep understanding of ground water potential in India.
CO3:	Understand the diverse irrigation needs of various crops, calculate water requirements and efficiencies, and design various irrigation methods including modern intelligent systems.
CO4:	Examine various impounding structures and dams, evaluate their stability on pervious foundations, and assess the suitability of spillways based on location-specific factors.
CO5:	Develop the suitable canal irrigation techniques, river training works and controlling water logging issues.

Pre-requisite:

Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	2	2	-	2	-	-	-	-	2	-	2
CO2	2	3	-	2	2	2	2	-	-	-	-	2	-	2
CO3	2	2	-	2	2	2	2	-	-	-	-	2	2	2
CO4	2	2	2	2	2	-	2	-	-	-	-	2	2	2
CO5	2	2	2	2	2	-	2	-	-	-	-	2	-	2
SDG	11,12,13,14 & 15													

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

UNIT-I - SURFACE WATER HYDROLOGY	09 Hours
Hydrological Cycle - Precipitation: Types and forms - Rainfall and its measurements –-interpretation of rainfall data. Runoff-infiltration indices- Hydrograph analysis - Unit hydrograph.	
UNIT-II - GROUND WATER HYDROLOGY	**09 Hours**
Groundwater occurrence-Distribution-Aquifer-Types, properties: Permeability, specific yield, transmissivity and storage coefficient. Measurement of yield of an open well-Typical cross section of open and tube well. Sanitary protection of wells. Water logging – causes, Preventive measures, Methods of estimation. Groundwater Development and Potential in India.	
UNIT-III - IRRIGATION PRACTICES	**09 Hours**
Irrigation - need for irrigation-Merits and demerits of irrigation -Crop and crop seasons- Consumptive use of water- Duty, delta, base period-Factors affecting duty-Irrigation efficiencies. Irrigation methods: Canal irrigation-Lift Irrigation-Tank Irrigation-Flooding methods: Sprinkler Irrigation-Drip irrigation. Intelligent Irrigation System.	
UNIT-IV - DIVERSION AND IMPOUNDING STRUCTURES	**09 Hours**
Weirs - Weirs on pervious foundations – Types of impounding structures - Percolation ponds- Dams-Types-Factors affecting location and type of dams - Spill ways.	
UNIT-V - HYDRAULIC STRUCTURES	**09 Hours**
Canal irrigation: Classification and alignment of canals-Canal drops: Types-Cross drainage works- Types - Canal regulators. Salinity and water logging- Causes and effect -River training works. Introduction to Open source software for Precipitation, runoff and hydrological analysis.	

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs

TEXT BOOKS

1.	Garg.S.K., "Water Supply Engineering", Khanna Publishers, New Delhi, 2017
2.	Garg.S.K., "Water Resources Engineering (Vol.II)-Irrigation Engineering and Hydraulic Structures", Khanna Publishers, New Delhi, 2017
3.	Ojha.C.S.P., "Engineering Hydrology", Oxford University Press, New Delhi, 2015
4.	Sahasrabudhe.S.R.,"A Textbook of Irrigation Engineering", S.K.Kataria & Sons, 2013

REFERENCES

1.	Jaya Rami Reddy., "A Textbook of Hydrology", Lakshmi Publications,2016
2.	Garg.S.K., "Elementary Irrigation Engineering", Khanna Publishers, New Delhi, 2016

U23CE404	Environmental Engineering and its Applications	L	T	P	J	C
		3	0	0	2	4

Course Outcomes

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

CO1:	Analyse water sources, demand patterns, and distribution system components to evaluate their suitability for urban water supply.
CO2:	Evaluate raw water quality and recommend appropriate treatment processes based on scientific principles of unit operations and unit processes.
CO3:	Analyse and design sewer systems by determining peak flows and evaluating sewer shapes, forces, and appurtenances for efficient wastewater conveyance.
CO4:	Examine sewage characteristics and evaluate the functional performance of various sewage treatment units within a treatment plant layout.
CO5:	Develop sustainable sewage disposal and plumbing solutions by integrating SDG principles and IoT-based wastewater monitoring into sewerage design.

Pre-requisite:

Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	2	2	2	3	2	-	2	2	-
CO2	3	2	2	2	2	2	2	2	2	2	-	2	2	-
CO3	3	3	2	2	2	2	2	2	2	2	-	2	2	-
CO4	3	2	2	2	2	2	2	2	3	2	-	2	2	-
CO5	3	3	2	2	2	2	2	2	3	2	-	2	2	-
SDG	3,6,13,14 & 15													

Course Assessment methods

Direct		Indirect
CIE test I (10) - Theory CIE test II (10) - Theory CIE test III (10) - Theory	Attendance (5) Assignment / Quiz/ Seminar (5) Total CIE: **50 marks**	Course end survey

CIE test IV(10) - Project	Semester End Examination: **50 marks** [SEE- Theory (35 marks),Project (15 marks)	

UNIT-I - WATER SOURCES, DEMAND AND QUANTITY	**09 Hours**
Water Cycle - Sources of water - Water demand - Population forecasting - Impurities in Water and their effect - Drinking Water quality standards - Intake structures - Laying, Jointing and Testing of pipes - Selection of Pump and Pipe Materials - Pipe Joints - Distribution System of Water Supply – House service connection	
UNIT-II - TREATMENT OF WATER	**09 Hours**
Introduction to unit operations and unit process - Theory of Screening, Coagulation, Flocculation, Sedimentation, Slow Sand Filter, Rapid Sand Filter and Pressure Filter, Chlorination - Water Softening - Fluoridation - Aeration – Desalination (only theory)	
UNIT-III - SEWAGE COLLECTION AND DISCHARGE	**09 Hours**
Types and Components of Sewerage system - Estimation of Peak Runoff discharge -Shapes of Sewer - Factors acting on Sewer Pipes - Laying and Testing of sewer pipes -Sewer Appurtenances - Maintenance, Cleaning and Ventilation of Sewers.	
UNIT-IV - TREATMENT OF SEWAGE	**09 Hours**
Sewage Characteristics - Layout of Sewage Treatment Plant - Working principles of Screen Chamber, Grit Chamber, Primary Sedimentation Tank, Activated Sludge Process - Rotating Biological Contractors - Oxidation Ponds (only theory)	
UNIT-V - SEWAGE DISPOSAL AND PLUMBING SYSTEM	**09 Hours**
Disposal by dilution - Sewage Farming and Sewage Sickness – Significance of SDG - Role of IoT in Wastewater reclamation - Principles of Sanitary Plumbing System - Plumbing systems- Sanitary Fittings - Sewerage plan of a Residential Building.	
PROJECT	**30 Hours**
Assignment and Guidance: Each student will undertake a project topic assigned related to the course by the course instructor & Head of the Department under the supervision of an instructor. A comprehensive project report must be prepared upon successful completion of the work. Evaluation will be based on the quality of the report and a viva voce examination conducted by a panel of examiners, including an external examiner. **Team Composition:** A project group can consist of a maximum of three students. **Report Submission:** Each group or individual must produce a detailed project report, including background information, literature review, problem statement, methodology, project details, and conclusions. The final	

report should be submitted on or before the last working day of the semester. The report will be reviewed and acknowledged by the HoD				
Theory: 45 Hrs	**Tutorial: --**	**Practical: --**	**Project: 30 Hrs**	**Total Hours: 75 Hrs**

TEXT BOOKS

1.	Garg S.K, "Environmental Engineering Vol.I& II", Khanna Publishers, New Delhi, 43rd Edition, 2024.
2.	Dr.Punmia, B.C.,Er.Ashok Kumar Jain, and Dr.Arun K. Jain, "Water Supply Engineering", Laxmi Publications (P) Ltd., New Delhi, second edition, 2016.
3.	Birdie G.S, Birdie J.S, "Water Supply & Sanitary Engineering", Dhanpat Rai Publishing Company (P) Ltd. New Delhi, 2018.
4.	Sudha Goel, "Water and Wastewater Engineering", Cambridge University Press, First Edition, 2019.

REFERENCES

1.	Indian Standard 10500:2012, "Drinking Water Specification" and CPCB Effluent Discharge standards Schedule VI.
2.	Metcalf and Eddy- Wastewater Engineering:Treatment and Reuse, Tata Mc.Graw Hill Education, Fourth Edition, July 2017.
3.	G.L.Karia, R.A. Christian and N.D.Jariwala, "Wastewater Treatment", PHI Learning private limited, Third Edition,2023.

Sona College of Technology APPROVED Board of Studies Civil Engineering Chairperson Autonomous

U23CE405	Fluid Mechanics Laboratory	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Measure the flow, discharge, and energy loss in pipes and open channels.
CO2:	Demonstrate the characteristics curves of pumps and turbines.
CO3:	Apply the fluid mechanics principles to analyse pipe flow and hydraulic machines for solving real – time engineering problems.

Pre-requisite:

Fluid Mechanics and Hydraulics Engineering

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	-	-	3	3	-	2	3	2
CO2	3	2	3	2	2	-	-	-	3	3	-	2	3	3
CO3	3	3	3	3	2	2	2	2	2	3	2	3	3	3
SDG	6,7,9,11 &12													

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz 1 (5) CIE test II (15) Quiz 2 (5)	RTPS (10) Record (10) Total CIE: **60 marks** Semester End Examination: **40 marks**	Course end survey

List of Experiments

1. Flow-through venturimeter and orifice meter
2. Flow-through variable duct area - Bernoulli's experiment
3. Flow-through orifice, mouthpiece, and notches
4. Determination of friction coefficient in pipes
5. Determination of minor losses
6. Performance characteristics of centrifugal pumps (Constant speed / Variable speed)
7. Performance characteristics of reciprocating pump
8. Characteristics of Pelton wheel turbine
9. Characteristics of Francis turbine
10. Characteristics of Kaplan turbine
11. Study of the impact of jet on a flat plate (normal/inclined)

Theory: --	Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 30 Hrs

TEXT BOOKS

REFERENCES

1.	Modi, P.N and Seth, S.M., Hydraulics and Fluid Mechanics, Standard Book House, Delhi, 22nd Edition, 2019
2.	Dr. R. K. Bansal, A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications Pvt Ltd, Tenth Edition, 2019
3.	T.S. Desmukh, Comprehensive Fluid Mechanics and Hydraulic Machines: A Lab Manual, Laxmi Publications Pvt Ltd, 2005

Sona College of Technology APPROVED Board of Studies Civil Engineering Chairperson Autonomous

U23CE406	Environmental Engineering Laboratory	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Analyze key physicochemical parameters of water samples using standard laboratory equipment.
CO2:	Determine and evaluate optimum coagulant dosage and residual/available chlorine using appropriate laboratory methods in accordance with standard water treatment guidelines.
CO3:	Measure and interpret DO, BOD, and COD in wastewater samples using standard analytical methods to classify water quality as per regulatory norms.

Pre-requisite:

Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	3	2	-	-	-	-	3	-
CO2	3	2	-	-	2	-	3	2	-	-	-	-	3	-
CO3	3	2	-	-	2	-	3	2	-	-	-	-	3	-
SDG	3,6,13,14 & 15													

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz 1 (5) CIE test II (15) Quiz 2 (5)	RTPS (10) Record (10) Total CIE: **60 marks** Semester End Examination: **40 marks**	Course end survey

List of Experiments

1. Determination of pH and Electrical Conductivity for the given Water samples
2. Determination of Chlorides present in the given Water samples
3. Determination of Sulphates present in the given Water samples
4. Determination of Total Hardness, Calcium Hardness and Magnesium Hardness present in the given Water samples
5. Determination of Total Solids, Suspended solids, Dissolved Solids, Volatile and Fixed solids present in the given Water sample
6. Determination of Optimum Coagulant Dosage in the given water samples
7. Determination of Residual Chlorine & Available Chlorine in Bleaching powder for effective water disinfection
8. Determination of Dissolved Oxygen in the Wastewater samples given
9. Determination of B.O.D. in the given Wastewater samples
10. Determination of C.O.D. in the given Wastewater samples

Theory: --	Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 30 Hrs

REFERENCES

1.	Indian Standard 10500:2012, "Drinking Water Specification" and CPCB Effluent Discharge standards Schedule VI.
2.	Garg S.K., "Environmental Engineering Vol. I & II", Khanna Publishers, New Delhi, 37th Edition 2019.
3.	Modi P.N., "Environmental Engineering Vol. I & II", Standard Book House, Delhi-6, 16th Edition 2018.

Sona College of Technology APPROVED Board of Studies Civil Engineering Chairperson Autonomous

U23CE407	Materials Testing Laboratory	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Determine the physical properties of given cement, fine aggregates and coarse aggregates samples.
CO2:	Evaluate the hardness, tensile strength Modulus of elasticity and torsional strength of given specimens.
CO3:	Apply the concepts learnt to perform experiments for various construction materials.

Pre-requisite:

Construction Materials and Practices

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	3	3	2	3	2	-	2	2	2
CO2	3	3	2	2	-	3	3	2	3	2	-	2	2	2
CO3	3	3	2	2	-	3	3	2	3	2	-	2	2	2
SDG	9,11,12 & 13													

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz 1 (5) CIE test II (15) Quiz 2 (5)	RTPS (10) Record (10) Total CIE: **60 marks** Semester End Examination: **40 marks**	Course end survey

List of Experiments

1. **Brick/Building blocks:** Shape and Size -Compressive strength-Water absorption- Field test.
2. **Cement:** Specific gravity test- Fineness -Consistency test- Setting time- Soundness -Compressive strength of cement mortar cubes- Field test.
3. **Fine aggregate:** Specific gravity test- Bulking of sand-Sieve Analysis-Fineness modulus.
4. **Coarse aggregate:** Specific gravity test-Crushing strength-Impact strength-Shape test-Water absorption- Sieve Analysis- Fineness modulus.
5. **Steel:** Stress-strain characteristics - Modulus of elasticity -Hardness -Impact strength-Shear strength.
6. Evaluation of Stiffness on helical spring.
7. Stiffness and modulus of rigidity of the specimen using torsion testing machine.
8. Deflection test on cantilever and simply supported beam.

Theory: --	**Tutorial: --**	**Practical: 30 Hrs**	**Project: --**	**Total Hours: 30 Hrs**

REFERENCES

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 sieving.
3.	IS 2386 (Part 1 to Part 6) – 1963 – Indian Standard methods for test for aggregate for concrete.
4.	IS 383– 1970 Indian Standard specification for coarse and fine aggregates from natural sources for concrete.
5.	IS 456-2019 Code of Practice is an Indian Standard code for Plain and Reinforced Concrete

U23CE901	Elements of Building Planning	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	Understand the nomenclature of building fundamental principles of basic building components in both load-bearing and framed structures.
CO2:	Describe the fundamental principles of building planning by considering functional requirements and climatic responsiveness to design comfortable, efficient, and sustainable buildings
CO3:	Elucidate the fundamental concepts of residential building planning and architectural drawings by applying standard functional requirements of various building components
CO4:	Apply the essential building bye-laws related to planning, standard dimensions and provisions for low-income housing to ensure safe, functional, and compliant building design.
CO5:	Interpret, prepare, and evaluate building drawings as per drafting principles, government approval procedures and working drawings.

Pre-requisite:

Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	-	-	3	3	2	-	2	2	3	2	-
CO2	3	2	3	-	-	3	3	2	-	2	2	3	2	-
CO3	3	2	3	-	3	3	3	3	-	2	2	3	3	3
CO4	3	2	3	3	3	3	3	3	2	2	2	3	3	3
CO5	3	2	3	3	3	3	3	3	2	2	2	3	3	3
SDG	4, 9 &11													

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

UNIT-I - BUILDING FUNCTIONAL ELEMENTS	09 Hours
Introduction-Nomenclature of building planning and construction- Classification of buildings based on nature of occupancy, life of structure, fire resistance, built in environment and natuarlity. Site selection for building - affecting factors - Orientation of buildings -Factors affecting orientation: sun, wind, and rain. C.B.R.I: Suggestions for obtaining optimum orientation, criteria for Indian condition. Basic concepts of building elements: Components of a building: Foundations, Masonry walls, beams, columns, Doors, Windows, Lintels and arches, Stairs, Roof, Flooring, Plastering, ceiling, load bearing and framed structures.	
UNIT-II - REQUIREMENTS OF BUILDING	**09 Hours**
Principles of planning of buildings: Aspect-Prospect-Privacy- Roominess-Grouping – Circulation Sanitation-Lighting – Ventilation – Cleanliness – Flexibility - Elegance- Economy, Practical considerations. Climate and its influence on building planning: Solar radiation, Temperature of air, Wind, Humidity, Precipitation, Climatic zones, Climate and comfort, Earth and its motion, Directions and their characteristics, Landscaping.	
UNIT-III - PLANNING OF RESIDENTIAL BUILDING	**09 Hours**
Introduction: House-Home. Rooms meant for the various activities – types of residential buildings: detached houses – semi-detached houses, row houses or chawls, Block of flats or terrace houses, Duplex houses, Economic measures in building construction: Economy of land, materials, labour, time, money spending. Guidelines for planning and drawing of residential buildings: planning, plan, section, elevation, standard dimensions for various building units, fixing the position of various building components, and justification.	
UNIT-IV - BUILDING BYE-LAWS	**09 Hours**
Introduction, Objectives of building bye-laws, Minimum plot sizes and building frontage, Open spaces, Minimum standard dimensions of building elements, Provisions for lighting and ventilation, Provisions for safety from fire and explosions, Provisions for means of access, Provisions for drainage and sanitation, Provisions for the safety of works against hazards or accidents, Requirements for off-street parking, Requirements for green belt and landscaping, Special requirements for low-income housing, Sizes of structural elements, Applicability of the bye-laws	
UNIT-V - BUILDING DRAWING	**09 Hours**
Introduction to building drawing-Preparation of drawing-Working drawing. Building plans approval procedure as per State government: Documents to be submitted for approval of proposed building to the sanction authority. Conventional symbols- Preparation of Key plan, site plan, elevation, and sectional drawing- Interpretation of Structural, Architectural and service drawings	

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs

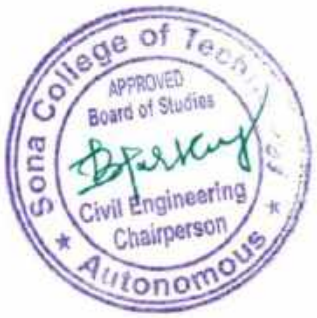
TEXT BOOKS

1. Kumara Swamy N. "Building Planning and Drawing", Charator Publishing House Pvt.Ltd. 8th

	edition 2015.
2.	Sahu G.C, Joygopal Jena, "Building Material s and Construction", McGraw Hill Education (India) Pvt. Ltd, New Delhi, 2015.

REFERENCES

1.	Shah M.G. Kalec. M. and Patki SY, "Building Drawing", Tata Mcgraw Hill, New Delhi, 2012.
2.	Government of TamilNadu, "Tamil Nadu Combined Development And Building Rules", TamilNadu Government Gazzete, Chennai, 2019.
3.	SP 7 : 2016 - National Building Code of India 2016 (NBC 2016)



U23CE903	Energy Efficiency and Green Building	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

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

CO1:	Acquire the basics understanding of green building concept and associated resources.
CO2:	Analyze the various methods to design green building parameters.
CO3:	Understand the availability of construction materials for energy efficient construction
CO4:	Aware about the various green building rating systems prevail in the country
CO5:	Understand the role of UNFCCC and know about clean development mechanism

Pre-requisite:

Nil

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	2	3	-	-	-	-	-	-	-
CO2	3	-	-	-	-	2	3	-	-	-	-	-	-	-
CO3	3	-	-	-	2	2	3	-	-	-	-	2	-	2
CO4	3	2	2	-	2	2	3	-	-	-	-	2	2	2
CO5	3	2	2	-	2	2	3	-	-	-	-	2	2	2
SDG	7,8,9,11,12 & 13													

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)	Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)	Course end survey

UNIT-I - INTRODUCTION	09 Hours
Definition and concepts, Energy and water as a resource - Criticality of resources - Needs of modern living - Heat loss and heat gain in buildings- thermal comfort improvement methods - other building comforts - indoor air quality requirements -electrical energy conservation.	
UNIT-II - PASSIVE SOLAR HEATING AND COOLING	**09 Hours**
Zero Energy Building (ZEB) - Nearly Zero Energy Building (NZEB) - energy consumption - defining low energy buildings- opportunities and techniques for energy conservation in buildings - water conservation - water management system - water efficient landscaping - green roofing - rainwater harvesting - sanitary fixtures and plumbing systems - wastewater treatment and reuse - process water strategies - adoption to sustainable resources, process and technologies- Energy Conservation Opportunities in Public and Private Buildings.	
UNIT-III - CONSTRUCTION MATERIALS AND DAYLIGHTING	**09 Hours**
Construction materials - Embodied energy, carbon content, and emission of CO_2 - Current practice and low environmental impact alternatives. Materials, components and details – Insulation – Optical materials – Glazing materials – Day lighting,– Orientation of buildings – Sources and concepts – Daylight apertures – Light Shelves - Electric Lighting – Light Distribution – Electric Lighting control for day lighted buildings – Switching controls.	
UNIT-IV - BUILDING ASSESSMENT SCHEMES AND HEAT CONTROL	**09 Hours**
Energy efficiency ratings & ECBC - 2007 - Various energy efficiency rating systems for buildings - LEED, BEE, & GRIHA - case studies - Hourly Solar radiation – Heat insulation – Heat transmission through building sections – Thermal performance of Building sections. Ventilation – Requirements – Minimum standards for ventilation – Energy Conservation in Ventilating systems- - Energy Audit – open source software packages in energy efficient building analysis and design.	
UNIT-V - CLEAN DEVELOPMENT MECHANISM	**09 Hours**
Clean Development Mechanism - CDM Benefits for energy conservation methodology and procedure - Eligibility Criteria - UNFCCC - role of UNFCCC and Government of India.	

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs

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, (2008) 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.
REFERENCES	
1.	Residential Energy: Cost Savings and Comfort for Existing Buildings by John Krigger and Chris Dorsi, Published by Saturn Resource Management, 2013.
2.	Brown, G.Z. and DeKay, M., Sun, Wind and Light - Architectural Design Strategies, John Wiley and Sons Inc,3rd Edition, 2014.
3.	Majumdar, M (Ed), Energy - Efficient Buildings in India, Tata Energy Research Institute, Ministry of Non-Conventional Energy Sources, 2009.
4.	ECBC Code 2007 (Edition 2008) published by Bureau of Energy Efficiency, New Delhi.

U23GE402	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	L	T	P	J	C
		2	0	0	0	0

	Course Outcomes
	At the end of the course, the student will be able to
CO1:	Analyze the basics of Indian Traditional knowledge in modern scientific perspectives.
CO2:	Explain the basics of Vedic science and its applications in modern days.
CO3:	Discuss the introduction and objectives of modern science.
CO4:	Describe the contribution of Noble laureates for India's achievements in Science and Technology.
CO5:	Analyze the various traditional practices for holistic health care of human beings.
	Pre-requisite:

CO/PO, PSO Mapping

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

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2			2	-							2	2
CO2	2	2	2			2	-							2	2
CO3	2	2	2			2	-							2	2
CO4	2	2	2			2	-							2	2
CO5	2	2	2			2	-							2	2

Course Assessment methods

Direct			Indirect
CIE test I (30) - Theory CIE test II (30) - Theory CIE test III (40)- Theory	Total CIE: **100 marks** Semester End Examination – **NIL**		Course end survey

Unit 01: BASIC STRUCTURE OF INDIAN KNOWLEDGE SYSTEM		6 Hours
Indian Traditional Scriptures, Exposure to 4 – Vedas (the Rigveda, the Yajurveda, the Samaveda and the Atharvanaveda), 4 – Upavedas (Ayurveda, Dhanurveda, Gandharvaveda, Sthapatya, etc.), 6 – Vedangas (Shiksha, Kalp, Nirukta, Vyakaran, Jyotish).		

Unit 02: INDIAN KNOWLEDGE SYSTEM AND MODERN SCIENCE		6 Hours
Relevance of Science and Spirituality, Science and Technology in ancient India, Superior intelligence of Indian sages and scientists.		

Unit 03: INDIAN TRADITION AND CULTURE		**6 Hours**
The Indian way of life, Introduction to Indian tradition, The Scientific Outlook and Human Values – Basics of Applied Vedic Science – modern day application of Vedas and procedure – Ancient Indian Scientific thoughts.		
Unit 04: INDIAN ARTISTIC TRADITION		**6 Hours**
Introduction and overview of significant art forms in ancient India such as painting, sculpture, Civil Engineering, Architecture, Music, Dance, Literature, etc.		
Unit 05: YOGA AND HOLISTIC HEALTH CARE		**6 Hours**
Fundamentals of yoga and holistic health – Human biology – Importance and Practice of Yoga, Pranayama and other prevailing health care techniques – Diet and nutrition – Life management – Contemporary yogic models – case study.		

Theory: 30	Tutorial: --	Practical: --	Project:--	Total Hours: 30 Hrs

REFERENCES

1. Sivaramakrishnan, V., Cultural Heritage of India- Course Material, Bharatiya Vidya Bhavan, Mumbai, 5 th Edition, 2014.
2. Capra F., Tao of Physics, Shambhala, 2010
3. Chatterjee S.C. and Datta D.M., An Introduction to Indian Philosophy, University of Calcutta, 1984.
4. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016.
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN: 9781988207049.
6. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan.

20-12-2024

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U23GE401	SOFT SKILLS AND APTITUDE – II	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

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

CO1:	Demonstrate capabilities in additional soft-skill areas using hands-on and/or case-study approaches
CO2:	Solve problems of increasing difficulty than those in SSA-I in given areas of quantitative aptitude and logical reasoning and score 65-70% marks in company-specific internal tests
CO3:	Demonstrate greater than SSA-I level of verbal aptitude skills in English regarding the given topics and score 65-70% marks in company-specific internal tests

Pre-requisite:

CO/PO, PSO Mapping

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

CO-PO Mapping	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12
CO1	1	1	1	1	1	2	2	3	3	3	1	3
CO2	3	3	3	2	2	2	1	3	3	2	1	3
CO3	1	1	1	1	1	1	1	3	3	3	1	3

Course Assessment methods

Direct		Indirect
CIE test I (15) Quiz I (5) CIE test II (15) Quiz II (5)	RTPS (10) Record (10) Total CIE marks : 60 marks Semester End Examination : 40 marks	Course end survey

1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics:** a. SWOT b. Goal setting c. Time management d. Stress management e. Mindfulness f. Interpersonal and Intrapersonal skills g. Presentation skills h. Group discussions

2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. Logarithm b. Progression c. Time & Work d. Simple Interest e. Compound Interest f. Time Speed & Distance g. Plane Geometry h. Mensuration for 2D i. Mensuration for 3D j. Syllogism
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Critical reasoning b. Theme detection c. Verbal analogy d. Prepositions e. Articles f. Cloze test g. Company specific aptitude questions

Theory: 0	**Tutorial: 0**	**Practical: 30hrs**	**Project: 0**	**Total Hours: 30hrs**

12/12/2025

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