NPR
College of Engineering
and Technology
(AN AUTONOMOUS INSTITUTION)
NBA Accredited (B.E. - CSE, ECE, EEE & Mechanical Engg.) | Accredited by NAAC with 'A' Grade
Recognized by UGC under s (f) | ISO 9001:2015 Certified | Approved by All India Council for Technical Education, New Delhi
Affiliated to Anna University, Chennai
Natham, Dindigul (Dist.) - 624 401, Tamil Nadu.

B.E. – CIVIL ENGINEERING
CURRICULUM AND SYLLABUS

CHOICE BASED CREDIT SYSTEM (CBCS)

REGULATION – 2025

Chairperson-Board of Studies,
Department of Civil Engineering,
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Natham, Dindigul 624401

I - Department Vision

To inculcate students with ingenious technical knowledge and ethical skills to develop qualified Civil Engineers.

II - Department Mission

- To provide quality education with field training to create competent civil engineer.
- To develop innovative applications in the design and construction of structural works.

III - Program Name: B.E., CIVIL ENGINEERING

IV- Program Educational Objectives

Students who graduate from this Programme will be able

1. Achieve successful careers in Civil Engineering by meeting the technical and professional requirements of Indian and multinational industries.
2. Apply engineering fundamentals, analytical skills, and modern tools to solve real-world civil engineering problems effectively.
3. Work collaboratively on multidisciplinary projects and engage in lifelong learning to adapt to emerging technologies and professional advancements

V - Program Outcomes

Engineering Graduates will be able to:

1. Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in respectively to develop to the solution of complex engineering problems.
2. Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development.
3. Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required.
4. Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions.

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5. Engineering Tool usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems.
6. The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment.
7. Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws.
8. Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
9. Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
10. Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
11. Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change.

VI - Program Specific Outcomes

At the end of the program students will be able to

- Identify, examine and solve problems in the domains of Civil Engineering that needs analytical and design requirements.
- Plan, analyze, design and prepare estimate for Civil Engineering projects with professional ethics

VII - Mapping of PEOs, POs, and PSO

POs/ PEOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
I	S	M	S	M	S	M	M	M	M	S	M	S	S
II	S	S	S	S	S	M	M	M	M	M	S	S	S
III	M	M	M	M	M	M	S	S	S	M	S	S	S

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VIII - Program Scope

1. To provide strong fundamental foundation by concentrating on essential core of Scientific & Engineering basics in the Field of Civil Engineering.
2. To provide for Continuing education & Lifelong Learning.
3. To help the students to solve real time problems in the society.
4. To promote creativity, Critical Thinking, develop problem solving skill or preparing student for further education or Employment

IX - Program Specific Criteria

Curriculum:

- Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of science, consistent with the program educational objectives.
- Apply knowledge in Civil Engineering areas such as Structures, Construction techniques, Geotechnical, Geo - informatics, Transportation, Environment and Water resources and their problem identification, formulation, analysis, design and execution.
- Explain basic concepts in management, business, public policy, and leadership and explain the importance of professional licensure.

Faculty:

- The program must show that instructors of courses with a focus on design are competent to teach the subject matter either by professional licensing or field of expertise in Civil Engineering program.
- The program must show that it is not critically dependent on a single person.

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X– Curriculum - I Semester to VIII Semester

Semester – I

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25IP100	Induction Programme	-	-	-	-	-	0
THEORY								
2	25HS101	Technical Communication	HSMC	2	0	0	2	2
3	25MA101	Engineering Mathematics	BSC	3	1	0	4	4
4	25PH101	Engineering Physics	BSC	3	0	0	3	3
5	25CH101	Engineering Chemistry	BSC	3	0	0	3	3
6	25BE101	Fundamentals of Computing	ESC	3	0	0	3	3
7	25HS102	தமிழர்மரபு / Heritage of Tamil**	HSMC	1	0	0	1	1
LABORATORY								
8	25BS111	Physics & Chemistry Laboratory	BSC	0	0	4	4	2
9	25HS111	English Laboratory - I	EEC	0	0	2	2	1
10	25BE111	Basic Computing and Problem Solving Laboratory	ESC	0	0	2	2	1
11	25BEC12	Engineering Graphics	ESC	0	0	4	4	2
Total				**15**	**1**	**12**	**28**	**22**

Semester – II

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25HS201	Communicative English	HSMC	2	0	0	2	2
2	25MA201	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	25PH202	Material Physics	BSC	3	0	0	3	3
4	25BS201	Environmental Science and Sustainability	BSC	2	0	0	2	2
5	25BE201	Basics of Electrical and Electronics Engineering	ESC	3	0	0	3	3
6	25ME201	Engineering Mechanics	ESC	3	1	0	4	4
7	25HS202	தமிழர்களும் தொழில்நுட்பமும்/ Tamils and Technology	HSMC	1	0	0	1	1
LABORATORY								
8	25HS211	English Laboratory - II	EEC	0	0	2	2	1
9	25BE211	Engineering Practices Laboratory	ESC	0	0	4	4	2
		NCC Credit Course level – 1#	-	2	0	0	2	2#
Total				**21**	**2**	**6**	**25**	**22**

 # NCC Credit Course level 1 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA

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Semester – III

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25MA302	Transforms and Application of Partial Differential Equations	BSC	3	1	0	4	4
2	25CE301	Construction Materials and Technology	PCC	3	0	0	3	3
3	25CE302	Fluid Mechanics	PCC	3	0	0	3	3
4	25CE303	Strength of Materials I	PCC	3	0	0	3	3
5	25CE304	Survey and Geomatics	PCC	3	0	0	3	3
6	25CE305	Water Supply and Waste Water Engineering	PCC	3	0	0	3	3
LABORATORY								
7	25CE311	Computer-Aided Building Drawing Lab	PCC	0	0	4	4	2
8	25CE312	Survey and Geomatics	PCC	0	0	4	4	2
9	25CE313	Environmental Engineering Laboratory	PCC	0	0	4	4	2
Total				18	1	12	31	25

Semester – IV

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25CE401	Strength of Materials II	PCC	3	0	0	3	3
2	25CE402	Geotechnical Engineering I	PCC	3	0	0	3	3
3	25CE403	Applied Hydraulic Engineering	PCC	3	0	0	3	3
4	25CE404	Concrete Technology	PCC	3	0	0	3	3
5	25CE405	Construction Management	PCC	3	0	0	3	3
6	25CE406	Robotics, Automation and Artificial Intelligence in Civil Engineering	PCC	3	0	0	3	3
LABORATORY								
7	25CE411	Hydraulic Engineering Laboratory	PCC	0	0	4	4	2
8	25CE412	Strength of Materials Laboratory	PCC	0	0	4	4	2
		NCC Credit Course level – 2#	-	2	0	0	2	2#
Total				18	0	8	26	22

NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

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Semester – V

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25CE501	Design of RCC Elements	PCC	3	0	0	3	3
2	25CE502	Structural Analysis - I	PCC	3	0	0	3	3
3	25CE503	Geotechnical Engineering-II	PCC	3	0	0	3	3
4	25CE504	Highway Engineering	PCC	3	0	0	3	3
5	-	Programme Elective I	PEC	3	0	0	3	3
6	-	Programme Elective II	PEC	3	0	0	3	3
7		Mandatory Course	MC	3	0	0	3	0*
LABORATORY								
8	23CE511	Concrete and Highway Engineering Laboratory	PCC	0	0	4	4	2
9	23CE512	Geotechnical Engineering Laboratory	PCC	0	0	4	4	2
Total				**18**	**0**	**8**	**26**	**22**

Semester – VI

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25CE601	Design of Concrete structures	PCC	3	0	0	3	3
2	25CE602	Structural Analysis - II	PCC	3	0	0	3	3
3	25CE603	Design of Steel Structural Elements	PCC	3	0	0	3	3
4	25CE604	Railways, Airports, Harbour Engineering	PCC	3	0	0	3	3
5	-	Programme Elective III	PEC	3	0	0	3	3
6		Programme Elective IV	PEC	3	0	0	3	3
7	-	Open Elective I	OEC	3	0	0	3	3
LABORATORY								
8	25CE611	Summer Internship	EEC	0	0	0	0	1
9	25CE612	Structural Drawing Laboratory	PCC	0	0	4	4	2
Total				**21**	**0**	**4**	**25**	**24**

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Semester – VII

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25CE701	Engineering Entrepreneurship Development	HSMC	2	0	2	4	3
2	25CE702	Climate Change and Sustainability	HSMC	2	0	0	2	2
3	25CE703	Estimation, Costing and Valuation	PCC	3	0	0	3	3
4	25CE704	Prestressed Concrete Structures	PCC	3	0	0	3	3
5	25CE705	Irrigation Engineering and Drawings	PCC	2	0	1	3	3
6	-	Programme Elective V	PEC	3	0	0	3	3
7	-	Open Elective II	OEC	3	0	0	3	3
LABORATORY								
8	25CE711	Mini Project	EEC	0	0	4	4	2
			Total	**18**	**0**	**7**	**26**	**22**

Semester –VIII

S/N.	Course Code	Course Title	Curricular Category	Period Per Week			Total Contact Periods	Credits
				L	T	P		
1	25CE811	Project Work / Internship cum Project Work	EEC	0	0	16	16	8
			Total	**0**	**0**	**16**	**16**	**8**

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III - Programme Elective Courses: Verticals

VERTICAL I (Structures)	VERTICAL II (Construction techniques and Practices)	VERTICAL III (Geotechnical)	VERTICAL IV (Water Resources & Geo-Informatics)	VERTICAL V (Transportation Infrastructure)	VERTICAL VI (Environment)
Concrete Structures	Formwork Engineering	Geo-Environmental Engineering	Groundwater Engineering	Traffic Engineering and Management	Air and Noise Pollution Control Engineering
Prefabricated Structures	Construction Equipment and Machinery	Ground Improvement Techniques	Integrated Water Resources Management	Urban Planning and Development	Environmental Impact Assessment
Repair and Rehabilitation of Structures	Construction Management and Safety	Soil Dynamics and Machine Foundations	Hydrology and Water Resources Engineering	Smart cities	Industrial Wastewater Management
Dynamics and Earthquake Resistant Structures	Advanced Construction Techniques	Tunnel Engineering	Remote Sensing Concepts	Intelligent Transport Systems	Solid and Hazardous Waste Management
Introduction to Finite Element Method	Energy Efficient Buildings	Pile Foundation	Cartography And GIS	Pavement Engineering	Environment, Health and Safety

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XV Summary of Curriculum Components with Credits

S/N.	Curricular Components	Semester wise								Total Credits	Credit Weightage
		I	II	III	IV	V	VI	VII	VIII		
1	HSMC	3	3					5		11	6.59
2	BSC	12	9	4						25	14.97
3	ESC	6	9							15	8.98
4	PCC			21	22	16	14	9		82	49.10
5	PEC					6	6	3		15	8.98
6	OEC						3	3		6	3.59
7	EEC	1	1				1	2	8	13	7.78
8	MC (NON – CREDIT)									-	-
	TOTAL	**22**	**22**	**25**	**22**	**22**	**24**	**22**	**8**	**167**	**100**

HSMC – Humanities and Social Science including Management courses
BSC – Basic Science Courses
ESC – Engineering Science Courses
PCC – Professional Core Courses
PEC – Professional Elective Courses
OEC – Open Elective Courses
EEC – Employability Enhancement Courses
MC – Mandatory Courses

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SEMESTER -I

I - Course Name: 25HS101 TECHNICAL COMMUNICATION

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E./B.TECH. COMMON TO ALL	I	HSMC	2	0	0	2

II - Course Objectives

1	To Enhance consciousness regarding grammar in both spoken and written communication
2	To Augment verbal capabilities in both formal and casual settings
3	To Elevate reading fluency and expand vocabulary.

III - Course Content

Preamble:

The Technical communication course aims to establish a solid groundwork in the English language for students ranging from beginner to intermediate levels. This course emphasizes the critical skills of reading, writing, listening, and speaking, allowing participants to express themselves clearly and with confidence in both every day and professional contexts.

Unit – I	**ENGLISH FOR COMMUNICATION**	6 Periods
Introduction to communication- Parts of speech- Questions & its types -Tenses- Be Verbs-Subject Verb Agreement-Reading Comprehension.		
Unit – II	**VOCABULARY BUILDING**	6 Periods
Vocabulary-Formation of words- Articles- Sentence Completion-Types of Sentences-Jumbled Sentences/Paragraph- Paragraph writing.		
Unit – III	**FORMAL CORRESPONDENCE**	6 Periods
Active & Passive Voice-Conjunction-Punctuation-Formal letters/emails: Business Letters –One-word Substitution.		
Unit – IV	**DESCRIPTIVE WRITING**	6 Periods
Prepositions-Adjectives-Idioms and Phrases- Homophones/Homonyms-Picture/Process Description.		
Unit – V	**EFFECTIVE WRITING**	6 Periods
Modal verbs-Simple, Compound & Complex- Sentence Pattern- Note Making/Note Taking- Spot the Error-Writing Instructions.		

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	Total: 30 Periods
Text Books:	1. Murphy, Raymond. English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students: with Answers. Cambridge: Cambridge University Press, 1985. 2. Prasad, Hari Mohan. A Handbook of Spotting Errors. McGraw Hill Education, 2010. 3. Reynolds, John. Cambridge JGCSE, First Language English. 2018th ed., Hodder Education, 2018.
Reference Books:	1. Wren & Martin – High School English Grammar & Composition, S. Chand Publishers, 2023. 2. Michael Swan – Practical English Usage, Oxford University Press, 4th Ed., 2016.
MOOC/Web Platforms:	https://swayam.gov.in https://www.edx.org https://learnenglish.britishcouncil.org

IV - Course Outcome

On completion of the course, the students will be able to		**Bloom's Level Mapped**
CO1	Demonstrate proficiency in basic language skills.	Apply (K3)
CO2	Apply grammatical structures correctly	Apply (K3)
CO3	Improve vocabulary and word usage.	Analyze (K4)
CO4	Develop reading comprehension skills.	Understand (K2)
CO5	Write coherent and structured texts.	Apply (K3)

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V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	-	-	-	-	-	-	-	-	2	3	2	-	-
CO 2	-	-	-	-	-	-	-	-	2	3	2	-	-
CO 3	-	-	-	-	-	-	-	-	2	3	2	-	-
CO 4	-	-	-	-	-	-	-	-	2	3	2	-	-
CO 5	-	-	-	-	-	-	-	-	2	3	2	-	-

Mapping: 1-Low, 2-Medium, 3-High

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I - Course Name: 25MA101 ENGINEERING MATHEMATICS

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B. E / B. TECH. COMMON TO ALL BRANCHES	I	BSC	3	1	0	4

II - Course Objectives

1	To impart mathematical modeling to describe and explore real-world phenomena and data.
2	To provide basic understanding on Linear, quadratic, power and polynomial, exponential, and multi variable models.
3	Summarize and apply the methodologies involved in framing the real world problems related to fundamental principles of polynomial equations.

III - Course Content

Preamble:
This course covers mathematical modeling with linear, quadratic, polynomial, power, exponential, and multivariable functions. It blends theoretical foundations such as vector spaces, eigen values, orthogonality, and series convergence—with practical methods like least squares, regression, and optimization. The focus is on applying these models to solve real-world problems in engineering, science, and related fields.

Unit – I	MATHEMATICAL MODELING OF LINEAR FUNCTIONS	12 Periods
The geometry of linear equations - Formation of linear equations for the given data (x_i, y_i): Method of least squares and method of regression - Vector spaces: Basic concepts with examples - Linear Transformation- Eigen values and vectors.		
Unit – II	**MATHEMATICAL MODELING OF QUADRATIC FUNCTIONS**	**12 Periods**
General form of a quadratic function - Basic relationships between the equation and graph of a quadratic function - Sum of squares error and the quadratic function of best fit - Quadratic forms: Matrix form - Orthogonality - Canonical form and its nature.		
Unit – III	**MATHEMATICAL MODELING OF POWER AND POLYNOMIAL FUNCTIONS**	**12 Periods**
Characteristics of the graphs of power and polynomial functions - Fitting of power and polynomial functions using the method of least squares - Local maxima and local minima of power and polynomial functions - Tests of convergence for series of positive terms - comparison test, ratio test - Power series of functions with real variables, Taylors series, radius and interval of convergence		
Unit – IV	**MATHEMATICAL MODELING OF EXPONENTIAL FUNCTIONS**	**12 Periods**
Concept of exponential growth - Graphs of exponential functions - Relationship between the growth factor and exponential growth or decline - Exponential equations have a variable as an exponent and take the form $y = ab^x$ through least square approximation - Calculus of exponential functions - Exponential series.		

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Unit – V	MATHEMATICAL MODELING OF MULTIVARIABLE FUNCTIONS	12 Periods
Graphing of functions of two variables - Partial derivatives - Total derivatives - Jacobians - Optimization of multivariable functions without constraints- Optimization of multivariable functions with constraints – Lagrangian multipliers method.		
		Total: 60 Periods

Text Books:	1. Erwin Kreyszig, Advanced Engineering Mathematics, Tenth Edition, Wiley India Private Limited, New Delhi 2016 2. B. S. Grewal, Numerical Methods in Engineering & Science: With Programs in C, C++ & MATLAB, Khanna, 2014 3. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons 2020
Reference Books:	1. Thomas and Finney, Calculus and analytic Geometry, Fourteenth Edition, by Pearson Paperback, 2018. 2. S.S. Sastry, Introductory Methods of Numerical Analysis, 5th edition, 2012, PHI Publication.
MOOC/Web Platforms:	https://youtu.be/h5urBuE4Xhg?si=i9bDuZp0O1OnOdzA https://youtu.be/2DX8Vp1Q2-0?si=2mD7I_QewwqIOoBK https://youtu.be/h23P5lrlrYU?si=nu59KGFxuA-bGB91 https://youtu.be/O9okvkNlB1Y?si=XGnll_SB3MoZScWn https://youtu.be/6aRiifsZGns?si=Fnsp5aMk68Mo3mWl

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Implement the concepts of mathematical modeling based on linear functions in Engineering.	Apply (K3)
CO2	Formulate the real-world problems as a quadratic function model.	Apply (K3)
CO3	Apply integral calculus and multiple integral tools in solving various application Problems.	Apply (K3)
CO4	Apply the concept of mathematical modeling of exponential functions in Engineering.	Apply (K3)
CO5	Develop the identification of multivariable functions in the physical dynamical problems.	Analyze (K4)

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V - Mapping Table- Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	2	3	-	-	-	-	-	-	-	-	2	-	-
CO 2	2	3	-	-	-	-	-	-	-	-	2	-	-
CO 3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO 4	2	3	-	-	-	-	-	-	-	-	2	-	-
CO 5	2	3	-	-	-	-	-	-	-	-	2	-	-

Mapping: 1-Low, 2-Medium, 3-High

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I - Course Name: 25PH101 ENGINEERING PHYSICS

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E./B.TECH. COMMON TO ALL	I	BSC	3	0	0	3

II - Course Objectives

1	To Understand the concept and principle of energy possessed by mechanical system.
2	To Exemplify the propagation and exchange of energy.
3	To Identify the properties of materials based on the energy possession.

III - Course Content

Preamble:

The aim of the Engineering Physics course is to offer students a solid background in the fundamentals of Physics and to impart that knowledge in engineering disciplines. The program is designed to develop scientific attitudes and enable the students to correlate the concepts of Physics with the core programmes.

Unit – I	MECHANICS AND ENERGY CONSERVATION	9 Periods

Concept of energy - types of energy-conservation of energy - mechanical energy: - translation - rotation - vibration – kinetic energy and potential energy - conservation of linear momentum, angular momentum and energy -Newton's laws of motion - minimization of potential energy - equilibrium - dissipative systems – friction- static and kinetic.

Unit – II	OSCILLATORY MOTION AND RESONANT SYSTEMS	9 Periods

Periodic Motion - simple Harmonic Motion - energy of the Simple Harmonic Motion - pendulum types- simple Pendulum- compound Pendulum -torsional Pendulum – damped and forced oscillations Non-linear Oscillations and Chaos Theory -natural frequency-tuning fork – resonance.

Unit – III	PROPAGATION OF ENERGY	9 Periods

Transfer of energy - material medium - transverse wave - longitudinal wave - standing wave – interference - Doppler effect - sound waves and its characteristics-infrasonic sound-audible sound-ultrasonic sound– piezo electric oscillator-SONAR - human voice - reflection - refraction-beats.

Unit – IV	PHASE TRANSFORMATION OF THEMODYNAMIC SYSTEM	9 Periods

Energy in transit - heat - temperature - measurement - specific heat capacity of solid and water - thermal expansion –heat transfer processes-thermodynamics: thermodynamic systems and processes - laws of thermodynamics –isothermal and adiabatic change- entropy - entropy on a microscopic scale -maximization of entropy- thermodynamic properties of Gases and Liquids.

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Unit – V	MATERIAL STRENGTH AND ELASTIC DEFORMATION	9 Periods
Elastic energy - structure and bonding - stress - strain –types of modulus – elasticity in wire- Tension-bending moment of beam-expansion and compression - elastic limit - stress - strain diagram –factors affecting elasticity - ductility – brittleness-plasticity - rubber elasticity and entropy.		
		Total: 45 Periods

Text Books:	1. CJ Fischer, The energy of Physics Part I: Classical Mechanics and Thermodynamics, Cognella Academic Publishing, 2019. 2. PG Hewitt, Conceptual Physics, Pearson education, 2017. 3. RA Serway and JW Jewitt, Physics for Scientists and Engineers, Thomson Brooks / Cole, 2019.
Reference Books:	1. J Walker, D Halliday and R Resnick, Principles of Physics, John Wiley and Sons, Inc, 2018. 2. HC Verma, Concepts of Physics (Vol I & II), Bharathi Bhawan Publishers & Distributors, New Delhi, 2017.
MOOC/ Web Platforms:	https://onlinecourses.nptel.ac.in/noc25_me167/preview https://onlinecourses.nptel.ac.in/noc25_ch79/preview https://onlinecourses.nptel.ac.in/noc20_mm13/preview https://archive.nptel.ac.in/courses/115/104/115104109/

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Apply the work-energy theorem to analyze and optimize mechanical system performance.	Apply (K3)
CO2	Analyze free and forced mechanical oscillations in vibrational energy systems.	Understand (K2)
CO3	Analyze the propagation of energy in mechanical systems through transverse and longitudinal waves.	Understand (K2)
CO4	Analyze the exchange of energy and work between the system Using thermodynamic principles.	Apply (K3)
CO5	Apply the concept of Elasticity and entropy to understand the mechanical properties of materials.	Understand (K 2)

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V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	3	2	1	1	-	-	-	2	-	-	3	-	-
CO 2	3	2	1	2	-	-	-	2	-	-	3	-	-
CO 3	3	2	2	1	-	-	-	2	-	-	3	-	-
CO 4	3	2	2	1	-	-	-	2	-	-	2	-	-
CO 5	3	2	2	1	-	-	-	2	-	-	1	-	-

Mapping: 1-Low, 2-Medium, 3-High

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I - COURSE NAME: 25CH101 ENGINEERING CHEMISTRY

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E./B.TECH. COMMON TO ALL	I	BSC	3	0	0	3

II - Course Objectives

1	To understand the origin of elements from the universe.
2	To understand the electrochemical cell and its reactions.
3	To understand the origin of elements in the universe.
4	To understand the types, properties and applications of polymers.
5	To learn the different States of Matter and it's applications.

III - Course Content

Preamble:

The aim of the Engineering Chemistry course is to offer students a solid background in the fundamentals of Chemistry and to impart that knowledge in engineering disciplines. The program is designed to develop scientific attitudes and enable the students to correlate the concepts of Chemistry with the core programmes.

Unit – I	WATER AND ITS TREATMENT	9 Periods

Water: sources and impurities, water quality parameters: colour, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, flouride and arsenic. Desalination of brackish water: reverse osmosis. Boiler troubles: scale and sludge, boiler corrosion, caustic embrittlement, priming & foaming. Treatment of boiler feed water: internal treatment (phosphate, colloidal, and calgon conditioning) and external treatment: ion exchange demineralisation and zeolite process.

Unit – II	ELECTROCHEMISTRY	9 Periods

Electrochemical cell - redox reaction, electrode potential- origin of electrode potential- oxidation potential- reduction potential, measurement and applications – standard hydrogen gas electrode - electrochemical series and its significance - Nernst equation derivation

Unit – III	EVOLUTION OF ELEMENTS	9 Periods

Hydrogen- Isotopes – Properties and Applications – Hydrogen Bonding-The sun and its Elements – fusion – hypernova vs. supernova – A cosmic comparison –Stellar Evolution: The Death Phase – man – made elements – Heavy Water, Hydrogen Peroxide Preparation and Properties- H_2 Fuel Cell - Hydrogen: Fuel of the Future

Unit – IV	POLYMERS	9 Periods

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Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Condensation and copolymerization. Properties of polymers: Tg, Tacticity, Molecular weight – weight average, number average. Techniques of polymerization: Bulk, emulsion, solution and suspension. Preparation, properties and uses of Nylon 6,6, and Epoxy resin, Teflon, PVC		
Unit – V	**PHASES OF MATTER**	**9 Periods**
Solid – liquid – gas – plasma – Quantum dots –Atomic and Molecular arrangement in different states of matter - Applications of Plasma in Industry - Applications of Quantum Dots in Electronics and Medicine- Liquification of Gases- Critical Temperature-Viscosity		
		Total: 45 Periods
Text Books:	1. Rose Marie Gallagher and Author Paul Ingram, Complete Chemistry Cambridge IGCSE, 2nd Edition, Oxford university press, 2020. 2. P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th Edition, 2018. 3. Peter Atkins, Julio D Paula and James Keeler, Atkins' Physical Chemistry, 12thEdition, Oxford University press, 2019.	
Reference Books:	1. Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,) Chennai, 4thEdition, 2021. 2. D Tabor, Gases, liquids and solids and other states of matter, 3rd Edition, Oxford University press, 2018. 3. P L Soni, Text book of inorganic chemistry, Chand publishers, New Delhi, 2017. 4. J.D. Lee, Concise inorganic chemistry, 5th edition (Reprint), Blackman Science Ltd, France, Wiley-India, 2016	
MOOC/Web Platforms:	https://www.cambridge.org/ https://www.arpansa.gov.au/understanding-radiation/what-is-radiation/ionising-radiation/atomic-structure https://ncert.nic.in/textbook/pdf/kech104.pdf https://www.sciencedirect.com/journal/the-journal-of-chemical-thermodynamics https://www.grc.nasa.gov/www/k-12/airplane/state.html	

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IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Summarize the water related problems in boilers and their treatment techniques.	Apply (K3)
CO2	Apply the concept Electrochemical Reactions and applications	Apply (K3)
CO3	Apply the principles of nuclear fusion and stellar evolution to explain the process of hydrogen fusion in stars and the creation of elements	Apply (K3)
CO4	Discuss the types, properties and applications of polymers	Analyze (K4)
CO5	Analyze whether the given matter js a solid, liquid, gas, or plasma and interpret the arrangement of atoms.	Analyze (K4)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	2	1	1	-	-	-	-	-	-	-	2	-	-
CO 2	2	1	1	-	-	-	-	-	-	-	2	-	-
CO 3	2	1	1	-	-	-	-	-	-	-	2	-	-
CO 4	2	1	1	-	-	-	-	-	-	-	2	-	-
CO 5	3	2	2	-	-	-	-	-	-	-	3	-	-

Mapping: 1-Low, 2-Medium, 3-High

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I - Course Name: 25BE101- FUNDAMENTALS OF COMPUTING

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B. E / B. TECH. COMMON TO ALL	I	ESC	3	0	0	3

II - Course Objectives

1.	To understand the foundational concepts of computer systems, binary codes, and data representation.
2.	To learn how computers perform computations and communicate through input and output devices.
3.	To develop the ability to write and analyze simple programs using assembly language.
4.	To understand the functioning of operating systems, system software components, and application generation.
5.	To apply software development methodologies and basic web technologies for solving real-world problems.

III - Course Content

Preamble: This course enables the student to learn the fundamental principles of computing and the way computers process, store, and represent information. Students will be able to understand binary codes, computational operations, and the interaction between hardware and software components. Concepts of assembly language, operating systems, and software development equip them to design simple programs and apply basic computing methods to real-world problem solving.		
Unit – I	**CODES AND COMBINATIONS**	**8 Periods**
Communication using Mores and Braille binary codes - Digitizing letters, numbers and objects using binary codes - Performing simple operations: addition through binary codes		
Unit – II	**COMPUTATIONUSING COMPUTER**	**9 Periods**
Communication to computing devices through various input sources - Computational operation - flow, functions and controls - Communication to output devices - Basic communication protocol		
Unit – III	**ASSEMBLY LANGUAGE PROGRAMMING**	**11 Periods**
Little Man Computing (LMC) Model - Instruction Set - Labels - Calculation -Branching - Input - Output - Loops - Simple programs		
Unit – IV	**OPERATING SYSTEM AND APPLICATION GENERATION BIOS**	**9 Periods**
Device Drivers - Resources - Scheduler - Applications Generation and Creation - Stages of Compilation - Linkers, Loaders and Libraries - Case Study		
Unit – V	**SOFTWARE DEVELOPMENT**	**8 Periods**
Phases of application life cycle management - Software Development Methodologies - Web Page development – Case Study		
		TOTAL: 45 Periods

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Text Books:	1. Charles Petzold, "Code: The Hidden Language of Computer Hardware and Software", Microsoft Press, 2009. 2. Peter Norton, "Introduction to Computers", McGraw-Hill, 7th Edition.
Reference Book:	1. David D. Riley & Kenny A. Hunt, "Computational Thinking for the Modern Problem Solver", CRC Press, 2014.
MOOC/Web Platforms:	https://www.khanacademy.org/computing

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Understand how computers use codes and combinations to represent information.	Understand (K2)
CO2	Learn how computers handle data transfer and communicate with input/output devices	Understand (K2)
CO3	Solve simple problems by writing and using assembly language programs.	Understand (K2)
CO4	Understand the basic working of operating systems and system software.	Understand (K2)
CO5	Apply software development methods to real-world problems.	Apply (K3)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	3	2	2	1	-	-	-	2	-	-	-	-	-
CO-2	3	3	2	1	-	-	-	2	-	-	-	-	-
CO-3	2	3	3	2	-	-	-	2	-	-	-	-	-
CO-4	3	2	2	1	-	-	-	2	-	-	-	-	-
CO-5	2	2	3	2	-	-	-	3	-	-	-	-	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 25HS102 HERITAGE OF TAMILS - தமிழர்மரபு

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E./B.TECH. COMMON TO ALL	I	HSMC	1	0	0	1

II - Course Objectives

1	Appreciate Tamil art, culture and literature Learn the history and culture of Tamil language
2	Relate to various art forms and their relevance to development
3	Acknowledge the rich heritage and significant achievements of the Tamils
4	Tamils Appreciate the contribution of Tamils to nation building
5	Summarize the contribution of Tamil in Indian culture.

III - Course Content

Preamble:

This course provides an overview of the rich cultural, literary, artistic, and historical heritage of the Tamil people. It introduces the evolution of the Tamil language within the Dravidian family, the ethical foundations in Sangam literature, and the management principles found in the Thirukkural. It explores Tamil epics, the influence of Jain and Buddhist traditions, the rise of Bhakti literature, and the contributions of poets like Bharathi and Bharathidasan to modern Tamil writing. The course further examines traditional and modern art forms, sculpture, folk arts, heroic games, and the socio-economic role of temples. It also highlights ancient landscapes (thinai) and their cultural significance. trade, education, and maritime achievements of the Sangam age.

Unit – I	மொழி மற்றும் இலக்கியம் Language And Literature	3 Periods

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.

இந்திய மொழிக் குடும்பம்-திரவிடமொழி-சங்க இலக்கியம்-அறம்-சமயச் சார்பற்ற நதன்மை-திருக்குறலளில் மேலாண்மைக் கருத்துக்கள்-தமிழ் காப்பியங்கள்-சமண பௌத்த சமயங்களின் தாக்கம்-பக்தி இலக்கியம் ஆழ்வார்கள் நாயன்மார்கள்-சிற்றிலக்கியங்க்கள்-நவீன இலக்கியத்தின் வளர்ச்சி-தமிழ் இலகியவளர்ச்சியில் பாரதியார் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

Unit – II	மரபு-பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை:சிற்பக்கலை Rock Art Paintings To Modern Art – Sculpture	3 Periods

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,

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Making of musical instruments sMridhangam, Parai, Veenai, Yazh and Nadhaswararm – Role of Temples in Social and Economic Life of Tamils. நடுகல் முதல் நவீன சிற்பங்கள் வரை-ஐம்பொன்சிலைகள்-பழங்குடியினர் தயாரிக்கும்கைவினைப் பொருட்கள்-பொம்மைகள்-தேர் செய்யும் கலை-சுடுமண் சிற்பங்கள்-நாட்டுப்புறத் தெய்வங்கள்-திருவிழாக்கூடும் சிலை-இசைக்கருவிகள்-தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோயில்களின் பங்கு.		
Unit – III	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்: **Folk And Martial Arts**	3 Periods
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance – Sports and Games of Tamils. தெருக்கூத்து-கரகாட்டம்-வில்லுப்பாட்டு-கணியன் கூத்து-ஒயிலாட்டம்-தோல்பாவைக்கூத்து-சிலம்பாட்டம்-வளரி-புலியாட்டம்-தமிழர்களின் விளையாட்டு.		
Unit – IV	தமிழர்களின் திணைக் கோட்பாடுகள் **Thinai Concept Of Tamils**	3 Periods
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. தமிழகத்தின் தாவரங்களும் விளங்குகளும்-தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள்-தமிழர்கள் பொற்றிய அறக்கோட்பாடுகள்-சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும்-சங்ககால நகரங்களும் துறைமுகங்களும் சங்க இலக்கியத்தில் ஏற்றுமதி மற்றும் இறக்குமதி-கடல் கடந்த நாடுகளின் சோழர்களின் வெற்றி.		
Unit – V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: **Contribution Of Tamils To Indian National Movement And Indian Culture**	3 Periods
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. இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு-இந்தியாவின்பிற்பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம்-சுயமரியாதை இயக்கம்-இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு-கல்வெட்டுகள்-கையெழுத்துப்படிகள்-தமிழ்ப் பத்தகங்களின் அச்சு வரலாறு.		
		Total: 15 Periods
Text Books:	1. தமிழர்மரபு / Heritage of Tamils- Poobalan - VRB Publishers Pvt. Ltd. 2. பொருநை- ஆற்றங்கரை நாகரிகம்.(தொல்லியல் துறை வெளியீடு.) 3. கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்(தொல்லியல் துறை வெளியீடு.) 4. JourneyofCivilizationIndustoVaigai(R.Balakrishnan)(Publishedby:RMRL)–	
Reference Books:	1. Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 2. 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.	

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	Thirunavukkarasu),Published by: International Institute of Tamils Studies. 4. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
MOOC/Web Platforms:	https://www.tnarch.gov.in/ta/epigraphy/ https://www.tamildigitallibrary.in/admin/assets/book https://www.tamilhistory.co.in/2020/05/heroic-games-ancient-tamils-jallikattu-silambam.html https://www.tamilvu.org/ta/courses-degree-a061-a0611-html-a0611313-10334 https://tamil.samayam.com/others-news/independence-day-2016/news/freedom-fighters-of-india/articleshow/53666058.cms https://www.tamildigitallibrary.in/admin/assets/book https://www.scribd.com/document/646362880/Text-book

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Understand the significance of Tamil as a classical language	Apply (K1)
CO2	Relate the art and culture in Tamil language	Apply (K2)
CO3	Explain the importance of music, dance and martial arts that were derived from Tamil Culture	Apply (K2)
CO4	Understand the poetic mode or theme of classical language	Analyze (K2)
CO5	Relate the contribution of Tamils to Nation building	Analyze (K3)

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V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	-	-	-	-	-	1	1	-	-	-	1	-	-
CO 2	-	-	-	-	-	1	1	-	-	-	1	-	-
CO 3	-	-	-	-	-	1	1	-	-	-	1	-	-
CO 4	-	-	-	-	-	1	1	-	-	-	1	-	-
CO 5	-	-	-	-	-	1	1	-	-	-	1	-	-

Mapping: 1-Low, 2-Medium, 3-High

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I - Course Name: 25BS111 PHYSICS AND CHEMISTRY LABORATORY

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E./B.TECH. COMMON TO ALL	I	BSC	0	0	4	2

II - Course Objectives

1	To learn the correct usage of several types of physics lab equipment.
2	To learn, how to gather, present, and understand facts in a simple and succinct manner.
3	To learn Physics-related problem-solving abilities and experimental data interpretation.
4	To identify experimental measurement error and the methods used to reduce it
5	To encourage active participation from the learner in all aspects of the lab exercises.

III - Course Content

Preamble:

This course aims to provide practical training in the estimation of physical parameters like ultrasound velocity, liquid compressibility, thin wire thickness, Young's modulus, and knowledge of the operation of Laser, as well as to provide project-based skills development.

PHYSICS LABORATORY:

1. Non-uniform Bending– Determination of young's modulus.
2. Simple harmonic oscillations of cantilever.
3. Torsional pendulum – Determination of rigidity modulus of wire and moment of inertia of disc.
4. Air wedge – Determination of thickness of a thin sheet/wire.
5. Laser- Determination of the wave length of the laser using grating.
6. Ultrasonic Interferometer – determination of the velocity of sound and compressibility of liquids.
7. Particle size determination using LASER.

Total: 30 Periods

IV - Course Outcome (Physics Laboratory)

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Apprehend the concepts of Young's modulus (Y) of a material using the principle of non-uniform bending and understand the relationship between load, depression, and material stiffness.	Understand (K2)
CO2	Apply the principles of interference due to a thin sheet or wire with high precision using the phenomenon of interference as demonstrated in the Air Wedge experiment.	Apply (K3)

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CO3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	Apply (K3)
CO4	Experiment the relationship between the light and matter & determine the size of microscopic particles, demonstrating the application of optics in materials science and nanotechnology.	Analyze (K4)
CO5	Estimate the velocity of sound and compressibility of liquid relating the mechanical and acoustic properties of the medium.	Understand (K2)

II - Course Objectives (CHEMISTRY LABORATORY)

1	To inculcate experimental skills in handling laboratory equipment, chemicals, and standard analytical technique to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper.
2	To induce the students to familiarize with electroanalytical techniques such as, Conductivity experiments.
3	To make the student to acquire practical skills conductometry in the determination of impurities in aqueous solutions.

III - Course Content

Preamble:

This course aims to provide the students, a basic practical knowledge in chemistry. The objective of this course is to develop intellectual and psychomotor skills of the students by providing hands on experience in quantitative, electrochemical and photo-chemical analysis.

CHEMISTRY LABORATORY:

1. Estimation of HCl using Na2CO3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by EDTA method.
6. Determination of strength of acids in a mixture of acids using conductivity meter.
7. Conductometric titration of strong acid vs strong base.

Total: 30 Periods

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Reference Books:	1. Vogel's Textbook of Quantitative Chemical Analysis (8th edition, 2014).
MOOC/Web Platforms:	https://www.youtube.com/watch?v=5b2LNdsfQdQ https://www.youtube.com/watch?v=k8GDv-uhlyU

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Apply standard analytical and instrumental techniques to estimate various water quality parameters and metal ions accurately.	Analyze (K4)
CO2	Determine the titrations and conductometric analysis with proper use of indicators instruments and laboratory equipment.	Apply (K3)
CO3	Analyse experimental data to determine concentration, evaluate errors and ensure precision and reliability in results.	Analyze (K4)
CO4	Understand the environmental and industrial significance of the chemical parameters such as hardness, alkalinity, chloride, DO and metal ion content.	Understand (K2)
CO5	Demonstrate Laboratory Safety and good laboratory practices and scientific reporting skills while conducting all experiments.	Analyze (K4)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	3	1	-	-	-	-	1	3	2	-	-	-	-
CO 2	3	1	-	-	-	-	1	2	1	-	-	-	-
CO 3	3	3	-	-	-	-	2	2	1	-	-	-	-
CO 4	3	2	-	-	-	-	1	3	2	-	-	-	-
CO 5	3	2	-	-	-	-	2	1	2	-	-	-	-

Mapping: 1-Low, 2-Medium, 3-High

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I - Course Name: 25HS111 ENGLISH LABORATORY I

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E./B.TECH. COMMON TO ALL	I	BSC	0	0	2	1

II – Course Objectives

1	To implement English Vocabulary at command and ensure language proficiency.
2	To achieve better technical writing and Presentation skills.
3	Identify the common errors in speaking and writing English.

III – Course Content

List of Experiments:

1. Listening for data, for specific information, for opinion.
2. Listening to Ted Talks-Listening for specific information.
3. Self-Introduction - Recreating interview scenarios -Haptics - Gestures -Proxemics- Facial expressions- Paralinguistic / Vocalic- Body Language- Appearance-Eye Contact-Artefacts.
4. Short Speeches - Making short formal and informal speeches
5. Speaking: Tendering verbal apologies, and explanations, persuading a listener/ audience-Hierarchy in Business correspondence.
6. Active reading- Newspaper, short paragraphs, excerpts, articles, magazines and editorials
7. Identifying the central themes/ crux-Interpreting tone - formal/informal/semi-formal-Note-taking
8. Narrative Expression- Travelogue and Story Telling Technique
9. Summary writing, selective summary, paraphrasing, opinion pieces-Finding synonyms in the context Paraphrasing
10. Descriptive Expression-Process Description and Blog Writing

Total: 30 Periods

Text Books:	1. Sasikumar, V, et.al. A Course in Listening & Speaking Foundation Books, 2005. 2. Murphy, Raymond. English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students: with Answers. Cambridge: Cambridge University Press, 1985.

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	3. Prasad, Hari Mohan. A Handbook of Spotting Errors. Mcgraw Hill Education, 2010.
Reference Books:	1. Reynolds, John. Cambridge IGCSEA, First Language English. 2018th ed., Hodder Education, 2018. 2. Wiggins, Grant P., and Jay McTighe. Understanding by Design. Association for Supervision and Curriculum Development, 2008

MOOC/Web Platforms:	www.studyladder.com www.fluentu.com www.esl-lab.com www.wordsworthelp.com

On completion of the course, the students will be able to		**Bloom's Level Mapped**
CO1	Demonstrate improved listening comprehension skills.	Apply (K3)
CO2	Practice correct pronunciation, stress, rhythm and intonation	Analyze (K4)
CO3	Engage in oral communication tasks	Apply (K3)
CO4	Deliver short Oral Presentation	Create (K6)
CO5	Use Language lab tools, software and digital resources	Apply (K3)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PSO 1**	**PSO 2**
CO 1	3	1	-	-	-	-	-	3	2	-	3	-	-
CO 2	3	1	-	-	-	-	-	3	2	-	3	-	-
CO 3	3	3	-	-	-	-	-	3	2	-	3	-	-
CO 4	3	2	-	-	-	-	-	3	2	-	3	-	-
CO 5	3	2	-	-	-	-	-	3	2	-	3	-	-

Mapping: 1-Low, 2-Medium, 3-High

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I - Course Name: 25BE111 BASIC COMPUTING AND PROBLEM SOLVING LABORATORY

Prerequisites	Program Name	Sem	Category	L	T	P	C
Nil	B.E./B.TECH. COMMON TO ALL	I	ESC	0	0	2	1

II - Course Objectives

1.	To enable students to understand the basics of programming constructs such as input/output operations, expressions, and decision-making.
2.	To develop logical thinking through hands-on implementation of iterative structures and pattern-generation problems.
3.	To provide the ability to handle arrays and strings for real-time data processing applications.
4.	To Introduce modular programming concepts using functions to design structured programs.
5.	To familiarize students with dynamic data handling and memory management using pointers.

III – List of Experiments

Note: The lab instructor is expected to design problems based on the topics listed. The Examination shall not be restricted to the sample experiments designed.

1. Basic Calculator Using Input/Output and Expressions
2. Simple Voting System Using Decision Making Constructs
3. Number Pattern Generator Using Loops
4. Student Marks Management Using Arrays
5. Text Processing Tool Using String Handling
6. Library Management System Using Functions
7. Contact Management System Using Pointers

LIST OF EQUIPMENTS:

Tools: Turbo C/Turbo C++/GCC

TOTAL: 30 PERIODS

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IV - Course Outcomes

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Demonstrate knowledge on C programming concepts using input and output expressions.	Understand (K2)
CO2	Develop programs in C using basic constructs	Apply (K3)
CO3	Develop programs in C using loops	Apply (K3)
CO4	Develop applications in C using arrays	Apply (K3)
CO5	Develop applications in C using string handling and pointers	Apply (K3)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	3	2	2	1	1	1	-	-	-	1	1	-	-
CO-2	3	2	2	1	1	1	-	-	-	1	1	-	-
CO-3	3	2	2	1	1	1	-	-	-	-	1	-	-
CO-4	3	2	3	1	2	1	-	-	1	-	1	-	-
CO-5	3	2	3	2	2	1	-	-	1	1	1	-	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I – Course Code & Name: 25BEC12 ENGINEERING GRAPHICS

Program Name	B.E. – MECHANICAL ENGINEERING	Sem	Category	L	T	P	C
Prerequisites	Nil	1	ESC	0	0	4	2

II - Course Objectives

1.	To provide knowledge on fundamentals of engineering drawings and conic sections.
2.	To impart skill on orthographic projections of points and lines.
3.	To familiarize on projection of planes and simple solids.
4.	To provide knowledge on section of solids and development of surfaces of simple solids.
5.	To impart skill on conversion of isometric view to orthographic projection and vice versa.

III - Course Content

Preamble: The course involves the creation and interpretation of technical drawing and models that conveys the design, dimensions, and specification of engineering components and systems.

Unit – I	**FUNDAMENTALS OF ENGINEERING DRAWING**	**12 Periods**

Definition, standards, drawing tools, drawing sheets, scales, line and its types. Practices on lettering, numbering, dimension of drawings. Construction of conic sections - ellipse, parabola and hyperbola using eccentricity method.

Unit – II	**PROJECTION OF POINTS AND LINES**	**12 Periods**

Principles of projection, projection of points in four quadrants, first angle projection of straight lines - perpendicular to one plane, parallel and inclined to both planes.

Unit – III	**PROJECTION OF PLANES AND SOLIDS**	**12 Periods**

Projection of simple planes and projection of simple solids - parallel, perpendicular and inclined to one plane using change of position method, inclined to both the planes.

Unit – IV	**SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES**	**12 Periods**

Section of Solids - simple position with cutting plane parallel, perpendicular and inclined to one plane with true shape of section. Development of surfaces - simple and truncated solids.

Unit – V	**ORTHOGRAPHIC PROJECTIONS AND ISOMETRIC VIEW**	**12 Periods**

Orthographic projections and isometric view of components used in engineering applications.

Total: 60 Periods

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Text Books:	1. N. D. Bhatt and V. M. Panchal, Engineering Drawing, Charotar Publishing House Pvt. Limited,2019. 2. K.V. Natarajan, A Text Book of Engineering Graphics, Dhanalakshmi Publishers, 2013.
Reference Books:	3. K Venugopal, Engineering Drawing and Graphics, Sixth edition, New Age International, 2013. 4. Basant Agarwal, Mechanical drawing, Tata McGraw-Hill Education, 2013. 5. Engineering Drawing Practice for Schools & Colleges, Bureau of Indian Standards-Sp46, 2013.
MOOC/Web Platforms:	1. https://nptel.ac.in/

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Apply the engineering drawing concepts as per industrial standards.	Apply (K3)
CO2	Illustrate the projection of points and lines.	Apply (K3)
CO3	Apply principles of projection drawings to project planes and simple solids	Apply (K3)
CO4	Create the sectional drawing of solids and develop the surfaces.	Apply (K3)
CO5	Construct the orthographic projection from isometric view and vice versa	Apply (K3)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	3	-	-	-	2	-	-	1	2	2	-	-	2
CO 2	3	-	-	-	2	-	-	1	2	2	-	-	2
CO 3	3	-	-	-	2	-	-	1	2	2	-	-	2
CO 4	3	-	-	-	2	-	-	1	2	2	-	-	2
CO 5	3	-	-	-	2	-	-	1	2	2	-	-	2

Mapping: 1-Low, 2-Medium, 3-High

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