NPR
College of Engineering and Technology
NBA Accredited (B.E. - CSE, ECE, EEE & Mechanical Engg.) | Accredited by NAAC with 'A' Grade
Recognized by UGC under 2 (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. Mechanical Engineering

REGULATIONS - 2025

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABUS

COLLEGE OF ENGG. & TECHNOLOGY NATHAM NPR

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),

I - Department Vision

To develop qualified mechanical engineers to compete with evolving industrial challenges

II - Department Mission

DM1: To impart quality education by best teaching techniques.

DM2: To enhance employability skills through training programs

DM3: To develop alliances with global industries to cognize prevailing technologies

DM4: To provide direction on lifelong learning for constructive career.

III - Program Name: B.E. MECHANICAL ENGINEERING

IV - Program Educational Objectives

Bachelor of Mechanical Engineering curriculum is designed to impart knowledge, skill and attitude on the graduates to

PEO1: Have a successful career in Mechanical Engineering and allied industries.

PEO2: Have expertise in the areas of Design, Thermal, Materials and Manufacturing.

PEO3: Contribute towards technological development through academic research and industrial practices.

PEO4: Practice their profession with good communication, leadership, ethics and social responsibility.

PEO5: Adapt evolving technologies through life-long learning.

V - Program Outcomes

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

PO3: 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. (WK5)

PO4: 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. (WK8).

PO5: 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. (WK2 and WK6)

PO6: 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. (WK1, WK5, and WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: 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.

PO10: 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.

PO11: 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. (WK8)

VI - Program Specific Outcomes

At the end of the program students will be able to

PSO1: Apply engineering knowledge in design & analysis tools to solve the real time problems in the areas of structural, thermal and fluid mechanics.

PSO2: Acquire knowledge and undertake or execute projects in the area of modern materials and automobiles.

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul - 624401.

NPRCET COLLEGE OF ENGG. & TECHNOLOGY NATHAM

VII - Mapping of PEOs, POs, and PSO

POs / PEOs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
PEO1	√	√	√	√	√	√	√	√	√	√	√	√	√	√
PEO2	√	√	√	√	√		√					√	√	√
PEO3	√	√	√	√	√	√		√				√	√	√
PEO4						√	√	√	√	√	√			
PEO5	√	√	√	√	√							√	√	√

VIII - Program Scope

- The scope for a B.E (Bachelor of Engineering) in Mechanical Engineering (MECH) program in broad and offers diverse career opportunities.
- Graduates can pursue careers in industries such as manufacturing, automotive, aerospace, energy, robotics, and consulting. They can work in areas such as product design, manufacturing processes, thermodynamics, fluid mechanics, solid mechanics, and control systems.
- The program equips students with necessary technical skills and knowledge to design and analyze mechanical systems, solve complex engineering problems, and contribute to innovations in various sectors.

IX - Program Specific Criteria

Lead Society: **American Society of Mechanical Engineers**

These program criteria will apply to all engineering programs that include "mechanical" or similar modifiers in their titles.

1. Curriculum

In preparation for professional practice, the curriculum must include:

a) principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations);
b) applications of these topics to modeling, analysis, design, and realization of physical systems, components or processes;
c) coverage of both thermal and mechanical systems; and
d) in-depth coverage of either thermal or mechanical systems.

2. Faculty

The program must demonstrate that faculty members responsible for the upper-level professional courses maintain currency in their specialty area (s).

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

SEMESTER I								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS 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	4	3
7	25HS102	தமிழர்மரபு/ Heritage of Tamils**	HSMC	1	0	0	1	1
PRACTICALS								
8	25BS111	Physics and 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 Lab	ESC	0	0	2	2	1
11	25BEC12	Engineering Graphics	ESC	0	0	4	4	2
TOTAL CREDITS								22

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

SEMESTER II								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	25HS201	Professional Communication	HSMC	2	0	0	2	2
2	25MA201	Statics 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	0	0	3	3
7	25HS202	தமிழர்களும் தொழில்நுட்பமும் / Tamils and Technology	HSMC	1	0	0	1	1
PRACTICALS								
8	25HS211	English Laboratory II	EEC	0	0	2	2	1
9	25BE211	Engineering Practices Laboratory	ESC	0	0	2	2	2
TOTAL CREDITS								21

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

SEMESTER III								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	25MA302	Transforms and Application of PDE	BSC	3	0	0	3	3
2	25ME301	Engineering Thermodynamics	PCC	3	1	0	4	4
3	25ME302	Strength of Materials	PCC	3	1	0	4	3
4	25ME303	Manufacturing Processes	PCC	3	0	0	3	3
5	25MEC01	Human Values and Ethics	HSMC	2	0	0	2	2
PRACTICALS								
6	25ME311	Manufacturing Process Laboratory	PCC	0	0	4	4	2
7	25ME312	Strength of Materials Laboratory	PCC	0	0	4	4	2
8	25ME313	Computer aided Drafting Laboratory	PCC	0	0	4	4	2
TOTAL CREDITS								21

COLLEGE OF ENGG. & TECHNOLOGY NPR NATHAM

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

SEMESTER IV								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	25ME401	Thermal Engineering	PCC	3	1	0	4	3
2	25ME402	Fluid Mechanics and Machinery	PCC	3	1	0	4	3
3	25ME403	Kinematics and Dynamics of Machines	PCC	3	1	0	4	4
4	25ME404	Manufacturing Technology	PCC	3	0	0	3	3
5	25ME405	Sensors and Transducer	PCC	3	0	0	3	3
PRACTICALS								
6	25ME411	Fluid Mechanics and Machines Laboratory	PCC	0	0	4	4	2
7	25ME412	Thermal Engineering Laboratory	PCC	0	0	4	4	2
8	25ME413	Kinematics and Dynamics Laboratory	PCC	0	0	4	4	2
TOTAL CREDITS								22

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

SEMESTER V								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	25ME501	Design of Machine Elements	PCC	3	1	0	4	4
2	25ME502	Heat and Mass Transfer	PCC	3	0	0	3	3
3	25ME503	Metrology and Measurements	PCC	3	0	0	3	3
4	25ME504	Mechatronics	PCC	3	0	2	5	4
5	25PME01	PE-1	PEC	3	0	0	3	3
6	25MEC02	Climate Changes and Sustainability	HSMC	2	0	0	2	2
PRACTICALS								
7	25ME511	Heat and Mass Transfer Laboratory	PCC	0	0	4	4	2
8	25ME512	Metrology and Measurements Laboratory	PCC	0	0	4	4	2
TOTAL CREDITS								23

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

SEMESTER VI								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	25ME601	Design of Transmission Systems	PCC	3	0	0	3	3
2	25ME602	Industrial Management	HMSC	3	0	0	3	3
3	25ME603	Industrial Automation	PCC	3	0	2	5	4
4	25PME02	PE-2	PEC	3	0	0	3	3
5	25PME03	PE-3	PEC	3	0	0	3	3
6	250ME01	OE-1	OEC	3	0	0	3	3
PRACTICALS								
7	25ME611	CAD CAM Laboratory	PCC	0	0	4	4	2
8	25ME612	Internship	ECC	0	0	0	0	1
TOTAL CREDITS								22

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham. Dindigul 624401

SEMESTER VII								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	25ME701	FEM applications in Mechanical Engineering	PCC	3	0	0	0	3
2	25ME702	IoT for automation	PCC	3	0	2	5	4
3	25ME703	Smart Manufacturing	PCC	3	0	0	3	3
4	25ME704	Project Management for Mechanical Engineers	HSMC	3	0	0	3	3
5	25PME04	PE-4	PEC	3	0	0	3	3
6	25PME05	PE-5	PEC	3	0	0	3	3
PRACTICALS								
8	25ME711	FEM Laboratory	PCC	0	0	4	4	2
9.	25ME712	Mini Project	EEC	0	0	4	4	2
TOTAL CREDITS								23

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

SEMESTER VIII								
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
PRACTICALS								
1	25ME811	Project Works / Internship cum Project Work	EEC	0	0	16	16	8
TOTAL CREDITS								8

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul - 624401

SUMMARY OF CREDIT DISTRIBUTION

S. No.	Category	Credits Per Semester								Total Credit	Credits in %	Range of Total Credits	
		I	II	III	IV	V	VI	VII	VIII			Min	Max
1	BSC	12	9	03						24	14.81	15%	20%
2	ESC	06	08							14	08.64	5%	10%
3	HSMC	03	03	02		02	03	03		16	09.87	10%	15%
4	PCC			16	22	18	09	12		77	47.53	45%	50%
5	PEC					03	06	06		15	9.25	5%	10%
6	EEC	01	01				01	2	8	13	08.02	5%	10%
7	OEC						03			03	1.85	5%	10%
Total		**22**	**21**	**21**	**22**	**23**	**22**	**23**	**8**	**162**	**100**	-	-

BSC - Basic Sciences Course

ESC - Engineering Sciences Course

HSMC - Humanities Sciences and Management Course

PCC - Professional Core Course

PEC - Professional Elective Course

OEC - Open Elective Course

EEC - Employability Enhancement Course

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham. Dindigul 624401

I SEMESTER

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	**3**	**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.		
		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.

COLLEGE OF ENGG. & TECHNOLOGY NATHAM NPR

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

	3. Reynolds, John. Cambridge IGCSE, 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:	1. https://swayam.gov.in 2. https://www.edx.org 3. https://learnenglish.britishcouncil.org 4. https://www.futurelearn.com

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 (K 3)
CO2	Apply grammatical structures correctly	Apply (K 3)
CO3	Improve vocabulary and word usage.	Analyze (K4)
CO4	Develop reading comprehension skills.	Understand (K 2)
CO5	Write coherent and structured texts.	Apply (K 3)

(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	PSO-3
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 (Mapping value based on usage of Action verbs in each CO)

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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.

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.

COLLEGE OF ENGG & TECHNOLOGY NATHAM NPR

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

	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_QewwqlOoBK https://youtu.be/h23P5lrlrYU?si=nu59KGFxuA-bGB91 https://youtu.be/O9okvkNlB1Y?si=XGnll_SB3MoZScWn

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 (K 3)
CO2	Formulate the real-world problems as a quadratic function model.	Apply (K 3)
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 (K 3)
CO5	Develop the identification of multivariable functions in the physical dynamical problems.	Analyse (K4)

(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	PSO-3
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 (Mapping value based on usage of Action verbs in each CO)

COLLEGE OF ENGG. & TECHNOLOGY NATHAM NPR

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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 Thermodynamic 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.

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.

COLLEGE OF ENGG. & TECHNOLOGY NPR NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

	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:	1. https://onlinecourses.nptel.ac.in/noc25_me167/preview 2. https://onlinecourses.nptel.ac.in/noc25_ch79/preview 3. https://onlinecourses.nptel.ac.in/noc20_mm13/preview 4. 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 (K 3)
CO2	Analyze free and forced mechanical oscillations in vibrational energy systems.	Understand (K 2)
CO3	Analyze the propagation of energy in mechanical systems through transverse and longitudinal waves.	Understand (K 2)
CO4	Analyze the exchange of energy and work between the system Using thermodynamic principles.	Apply (K 3)
CO5	Apply the concept of Elasticity and entropy to understand the mechanical properties of materials.	Understand (K 2)

(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	PSO-3
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 (Mapping value based on usage of Action verbs in each CO)

NPR COLLEGE OF ENGINEERING & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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**

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**

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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:	1. https://www.cambridge.org/ 2. https://www.arpansa.gov.au/understanding-radiation/what-is-radiation/ionising-radiation/atomic-structure 3. https://ncert.nic.in/textbook/pdf/kech104.pdf 4. https://www.sciencedirect.com/journal/the-journal-of-chemical-thermodynamics

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 (K 3)
CO2	Apply the concept Electrochemical Reactions and applications	Apply (K 3)
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 (K 3)
CO4	Discuss the types, properties and applications of polymers	Analyze (K 4)
CO5	Analyze whether the given matter is a solid, liquid, gas, or plasma and interpret the arrangement of atoms.	Analyze (K 4)

(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)

COLLEGE OF ENGG. & TECHNOLOGY NPR NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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	PSO-3
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 (Mapping value based on usage of Action verbs in each CO)

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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 Hours**
Communication using Mores and Braille binary codes - Digitizing letters, numbers and objects using binary codes - Performing simple operations: addition through binary codes		
Unit – II	**Computation using Computer**	**9 Hours**
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 Hours**
Little Man Computing (LMC) Model - Instruction Set - Labels - Calculation -Branching - Input - Output - Loops - Simple programs		
Unit – IV	**Operating System and Application Generation Bios**	**9 Hours**
Device Drivers - Resources - Scheduler - Applications Generation and Creation - Stages of Compilation - Linkers, Loaders and Libraries - Case Study		
Unit – V	**Software Development**	**8 Hours**
Phases of application life cycle management - Software Development Methodologies - Web Page development – Case Study		
		TOTAL: 45 Periods

COLLEGE OF ENGG. & TECHNOLOGY NATHAM NPR

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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. 3. David D. Riley & Kenny A. Hunt, "Computational Thinking for the Modern Problem Solver", CRC Press, 2014.
Reference Books:	1. Charles Petzold, "Code: The Hidden Language of Computer Hardware and Software", Microsoft Press books, 2009. 2. David D. Riley, Kennya. Hunt, "Computational thinking for the modern problem Solver", CRC Press Taylor & Francis Group, 2014.
MOOC/Web Platforms:	1. 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.	Understanding (K2)
CO2	Learn how computers handle data transfer and communicate with input/output devices	Understanding (K2)
CO3	Solve simple problems by writing and using assembly language programs.	Understanding (K2)
CO4	Understand the basic working of operating systems and system software.	Understanding (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	PSO-3
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)

COLLEGE OF ENGG. & TECHNOLOGY ★ NPR NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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 நவீனஓவியங்கள் 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, Making of musical instruments sMridhangam, Parai, Veenai, Yazh and Nadhaswaram – Role of

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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-திருவள்ளுவர் சிலை-இசைக்கருவிகள்-தமிழர்களின் சமூக பொருளாதர 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 பண்பாட்டிற்க்குத் 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 புத்தகங்களின் 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	

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

	நாகரிகம்(தொல்லியல் துறை வெளியீடு.) 4. Journey of Civilization Industo Vaigai (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. 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:	1. https://www.tnarch.gov.in/ta/epigraphy/ 2. https://www.tamildigitallibrary.in/admin/assets/book 3. https://www.tamilhistory.co.in/2020/05/heroic-games-ancient-tamils-jallikattu-silambam.html 4. https://www.tamilvu.org/ta/courses-degree-a061-a0611-html-a0611313-10334 5. https://tamil.samayam.com/others-news/independence-day-2016/news/freedom-fighters-of-india/articleshow/53666058.cms 6. https://www.tamildigitallibrary.in/admin/assets/book 7. 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 (K 1)
CO2	Relate the art and culture in Tamil language	Apply (K 2)
CO3	Explain the importance of music, dance and martial arts that were derived from Tamil Culture	Apply (K 2)
CO4	Understand the poetic mode or theme of classical language	Analyze (K 2)
CO5	Relate the contribution of Tamils to Nation building	Analyze (K 3)

(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)

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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	PSO-3
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 (Mapping value based on usage of Action verbs in each CO)

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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.

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 (K 2)
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 (K 3)
CO3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	Apply (K 3)

COLLEGE OF ENGG. & TECHNOLOGY NATHAM NPR

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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 (K 4)
CO5	Estimate the velocity of sound and compressibility of liquid relating the mechanical and acoustic properties of the medium.	Understand (K 2)

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 Na_2CO_3 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.

Reference Books:	1. Vogel's Textbook of Quantitative Chemical Analysis (8th edition, 2014).
MOOC/Web Platforms:	1. https://www.youtube.com/watch?v=5b2LNdsfQdQ 2. 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 (K 4)

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 (K 4)
CO4	Understand the environmental and industrial significance of the chemical parameters such as hardness, alkalinity, chloride, DO and metal ion content.	Understand (K 2)
CO5	Demonstrate Laboratory Safety and good laboratory practices and scientific reporting skills while conducting all experiments.	Analyze (K 4)

(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	PSO-3
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 (Mapping value based on usage of Action verbs in each CO)

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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 15 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. 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

COLLEGE OF ENGG. & TECHNOLOGY ★ NPR ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

Web Sources	1. www.studyladder.com 2. www.fluentu.com 3. www.esl-lab.com 4. www.wordsworthelp.com

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Demonstrate improved listening comprehension skills.	Apply (K 3)
CO2	Practice correct pronunciation, stress, rhythm and intonation	Analyze (K 4)
CO3	Engage in oral communication tasks	Apply (K 3)
CO4	Deliver short Oral Presentation	Create (K 6)
CO5	Use Language lab tools, software and digital resources	Apply (K 3)

(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	PSO-3
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 (Mapping value based on usage of Action verbs in each CO)

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I - Course Name: 25BE111 - Basic Computing and Problem-Solving Laboratory

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

III – Course Content

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.

List of Experiments:

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

TOTAL: 30 Hours

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.	Apply (K3)
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)

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

V- Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO 1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2
CO-1	3	2	2	1	1	1	-	-	-	1	-	1	2	1
CO-2	3	2	2	1	1	1	-	-	-	1	-	1	2	1
CO-3	3	2	2	1	1	1	-	-	-	-	-	1	2	1
CO-4	3	2	3	1	2	1	-	-	1	-	-	1	3	2
CO-5	3	2	3	2	2	1	-	-	1	1	-	1	3	2

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

NPR COLLEGE OF ENGINEERING & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I – Course Name: 25BEC12 Engineering Graphics

Prerequisite	Course Name	Sem	Category	L	T	P	C
Nil	B.E. – Common to Civil & Mech	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 Hours

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 Hours

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 Hours

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 Hours

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 Hours

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

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.

COLLEGE OF ENGG. & TECHNOLOGY NATHAM NPRCET

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

Reference Books:	1. K Venugopal, Engineering Drawing and Graphics, Sixth edition, New Age International, 2013. 2. Basant Agarwal, Mechanical drawing, Tata McGraw-Hill Education, 2013. 3. 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.	Applying (BL 3)
CO2	Illustrate the projection of points and lines.	Applying (BL 3)
CO3	Apply principles of projection drawings to project planes and simple solids	Applying (BL 3)
CO4	Create the sectional drawing of solids and develop the surfaces.	Applying (BL 3)
CO5	Construct the orthographic projection from isometric view and vice versa	Applying (BL 3)

(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	PO-12	PSO-1	PSO-2
CO-1	3	-	-	-	2	-	-	1	2	2	-	-	2	2
CO-2	3	-	-	-	2	-	-	1	2	2	-	-	2	2
CO-3	3	-	-	-	2	-	-	1	2	2	-	-	2	2
CO-4	3	-	-	-	2	-	-	1	2	2	-	-	2	2
CO-5	3	-	-	-	2	-	-	1	2	2	-	-	2	2

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

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

II SEMESTER

I - Course Name: 25HS201 – Professional Communication

Prerequisites	Program Name	Sem	Category	L	T	P	C
-	B.E./B.TECH. COMMON TO ALL	II	HSC	2	0	0	2

II - Course Objectives

1.	Develop advanced reading skills that enable students to comprehend, infer and critically analyze academic, technical and professional texts.
2.	Strengthen grammar proficiency and vocabulary range through systematic practice in word-building, collocations, sentence structures, conditional clauses and discourse markers.
3.	Enhance students' ability to write clear, concise and well-structured professional documents such as emails, memos, minutes, agendas, business letters, brochures and manuals.
4.	Equip learners with the skills to interpret data, identify trends and accurately express information using graph-specific and technical vocabulary.
5.	Cultivate academic writing competencies, including summarizing, proofreading, reviewing research papers and composing argumentative, cause-effect and persuasive writing.

III - Course Content

Preamble:
This course equips engineering students with essential communication skills through advanced reading, writing, grammar and vocabulary training. It prepares learners to handle academic, technical and workplace communication with clarity, accuracy and confidence.

Unit – I	**Reading & Professional Communication**	**6 Periods**
Reading- Importance of Good Communication- Inference and Reading for facts vs opinions - **Grammar and Vocabulary**- Conditional clauses- Hypothetical questions and Answers Synonyms and Antonyms, Selecting Words, **Writing**-Email Etiquette- Email Writing- Responding to Emails.		
Unit – II	**Vocabulary Expansion & Academic Writing**	**6 Periods**
Prefixes and Suffixes- Numerical Adjectives, Collocations, Compound Nouns, **Writing** – Recommendations- Suggestions- Writing- Cause and Effect, Argumentative, Persuasive. Checklist.		
Unit – III	**Reading Skills & Workplace Documentation**	**6 Periods**
Reading – Skimming – Reading to Summarize- Abbreviations, Acronyms and Short-forms- Phrasal Verbs- Cloze test using verbs-**Writing** -Memorandum - Minutes of Meeting- Agenda-Transcoding – Identifying Trends and Patterns in Graphs and Expressing with Graph Specific Vocabulary		
Unit – IV	**Applied Reading & Business Correspondence**	**6 Periods**
Reading - Case Studies- Winning Strategies excerpts from *You Can Win*-Determiners-**Writing-** Business letters- Call For Quotation- creating brochures-catalogues-manuals-		

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

Unit – V	Academic & Career Communication	6 Periods
Reading Newspaper Articles- Interpreting and Analyzing a Research Paper- Approaches to Review paper-Discourse Markers- Job Application letters-Resume building.		
		Total 30 Periods
Books for study & Reference:	• Raman, Meenakshi and Sangeeta Sharma. Technical Communication: Principles and Practice. Oxford University Press, 2015. • Rizvi, M. Ashraf. Effective Technical Communication. Tata McGraw Hill Education, 2017. • Murphy, Raymond. English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students with Answers. Cambridge University Press, 2019. • Lewis, Norman. Word Power Made Easy. Goyal Publishers / Penguin Random House, 2014. • Khera, Shiv. *You Can Win: A Step-by-Step Tool for Top Achievers*. Bloomsbury India, 2014.	
MOOC/Web Platforms:	https://swayam.gov.in https://www.edx.org https://learnenglish.britishcouncil.org https://www.futurelearn.com	

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Interpret and analyze academic, technical and professional texts using suitable reading strategies.	Analyse (BL 4)
CO2	Apply appropriate grammatical structures and discourse markers for accurate and coherent communication.	Apply (BL 3)
CO3	prepare professional documents such as emails, memos, minutes, agendas, business letters, brochures and manuals.	Understand (BL 2)
CO4	Use an enhanced range of vocabulary, collocations and word-formation techniques in professional contexts.	Apply (BL 3)
CO5	Compose structured essays, summaries, reviews, job applications and resumes using effective writing techniques.	Apply (BL 3)

(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	-	-	-	-	-	-	-	2	3	-	2	-	-
CO-2	-	-	-	-	-	-	-	2	3	-	2	-	-

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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

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

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I - Course Name: 25MA201 Statistics and Numerical Methods

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B. E / B. TECH. COMMON FOR CIVIL, MECH AND AI & DS	II	BSC	3	1	0	4

II - Course Objectives

1.	To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems
2.	To Introduce the Design of Experiments concepts using ANOVA of solving real-world engineering problems in manufacturing and quality.
3.	To introduce the basic concepts of solving algebraic and transcendental equations.
4.	To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
5.	To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

III - Course Content

Preamble:
This course is applied to analyse the ground water, pollutants in civil engineering, automatic control systems, fluid mechanics, gas dynamics, heat and mass transfer, thermodynamics, vibrations, data communication, data computing, etc.

Unit – I	**TESTING OF HYPOTHESIS**	**12 Periods**

Statistical hypothesis – Small sample Tests based on t -test, F - test – Chi square test for goodness of fit – Independence of attributes - large sample tests based on Normal distribution for single mean and difference of means.

Unit – II	**DESIGN OF EXPERIMENTS**	**12 Periods**

One way and two-way classifications - Completely randomized design – Randomized block design – Latin square design.

Unit – III	**SOLUTION OF EQUATIONS**	**12 Periods**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations –direct method (Gauss elimination method, Gauss Jordan method) – Iterative methods (Gauss Jacobi and Gauss Seidel methods).

Unit – IV	**INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION**	**12 Periods**

Forward and backward difference operators – Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

Unit – V	**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**	**12 Periods**

Introduction to ODE – Standard types – Single step methods: Taylor's series method – Euler's method – Modified Euler's method – Fourth order Runge – Kutta method for solving first order differential

COLLEGE OF ENGG. & TECHNOLOGY NPR NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

equations – Multi step methods: Milne's predictor corrector methods for solving first order differential equations.
Total: 60 Periods

Text Books:	[1] Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015. [2] Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
Reference Books:	[1] Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016. [2] Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014. [3] Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020. [4] Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill Edition, 4th Edition, 2012.
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/noc21_ma74/preview

IV - Course Outcome

On completion of the course, the students will be able to		**Bloom's Level Mapped**
CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	Apply (BL 3)
CO2	Apply the basic concepts of classifications of design of experiments using ANOVA of solving real-world engineering problems in manufacturing and quality.	Apply (BL 3)
CO3	Apply the basic concepts and Techniques of solving algebraic and transcendental equations.	Apply (BL 3)
CO4	Understand the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	Understand (BL 2)
CO5	Solve the ordinary differential equations with initial conditions by using certain techniques with engineering applications.	Analyse (BL 4)

(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	3	1	1	1	-	-	-	2	-	2	-	-
CO-2	3	3	1	1	1	-	-	-	2	-	2	-	-
CO-3	3	3	1	1	1	-	-	-	2	-	2	-	-

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul - 624401

CO-4	2	3	1	1	1	-	-	-	2	-	2	-	-
CO-5	3	3	1	1	1	-	-	-	2	-	2	-	-

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

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I – Course Name: 25PH202 Material Physics

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E. MECHANICAL & CIVIL	II	BSC	3	0	0	3

II - Course Objectives

1	To provide fundamental knowledge of conducting, semiconducting, and magnetic materials.
2	To introduce modern engineering materials and their relevance in mechanical and civil systems.
3	To develop and understanding of advanced materials and their synthesis, properties and their industrial applications.

III - Course Content

Preamble:
Students who successfully complete this course will have a better grasp in conducting, semiconducting, magnetic, composite and advanced engineering materials and their application.

Unit – I	**Conducting Materials**	**9 Periods**
Free electron theory - Electrical and thermal conductivity - Wiedemann–Franz law - Fermi–Dirac statistics - Density of states - Energy bands - Effective mass of electron - Applications of conducting materials.		
Unit – II	**Semiconducting Materials**	**9 Periods**
Intrinsic and extrinsic semiconductors - Direct and indirect bandgap materials - Carrier concentration and Fermi level – Drift – diffusion – mobility - Hall effect - Ohmic and Schottky contacts - LED and solar cell.		
Unit – III	**Magnetic Materials**	**9 Periods**
Magnetic moments - Permeability and susceptibility - Types of magnetic materials: diamagnetic – paramagnetic – ferromagnetic – antiferromagnetic – ferrimagnetic - Magnetic domains - B–H curve - Hysteresis; Hard and soft magnetic materials - Giant magnetoresistance (GMR) sensor.		
Unit – IV	**Composite Materials**	**9 Periods**
Composites - Introduction: definition and need for composites; constitution: matrix materials (Polymer matrix, metal matrix and ceramic matrix) and reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: metal matrix composites (MMC) - ceramic matrix composites and polymer matrix composites.		
Unit – V	**Advanced Engineering Materials.**	**9 Periods**
Smart materials- Shape memory alloy - phases – types - characteristics metallic glass- preparation – types - properties- applications- piezo electric materials - ferro electric materials- nano materials- thermo electric materials.		
		Total: 45 Periods

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

Text Books:	1. Hugh D. Young, Roger A. Freedman, University Physics with Modern Physics, 15th Edition, Pearson, 2022. 2. Raymond A.Serway, Jewett, Physics for scientist and Engineers with Modern Physics, Cengage learning India, 2017. 3. S.O. Pillai, Solid State Physics, 10th Edition, New Age Publications, 2022.
Reference Books:	1. Sidney H. Avner, Introduction to Physical Metallurgy, McGraw-Hill, 2007. 2. C.P. Poole and F.J. Owens, Introduction to Nanotechnology, John- Wiley Publications, New Delhi ,2015. 3. Bhattacharya D.K. & Poonam T., Engineering Physics, Oxford University Press, 2018.
MOOC/Web Platforms:	1. https://eolss.net/Sample-Chapters/C05/E6-36-02-01.pdf 2. https://www.britannica.com/science/semiconductor 3. https://www.scribd.com/document/577777248/UNIT-1-Conducting- 4. https://www.xometry.com/resources/3d-printing/composite/ 5. https://pmc.ncbi.nlm.nih.gov/articles/PMC7216214/

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Apply the free electron theory to conducting materials and study the electron behaviour.	Apply (K 3)
CO2	Analyse semiconductor behaviour, carrier transport mechanisms and basic device operation.	Analyse (K 4)
CO3	Apply the magnetic behaviors of materials and enrich the performance of modern engineering devices.	Apply (K 3)
CO4	Analyse the composite materials and identify their suitability for replacement of conventional materials.	Apply (K 3)
CO5	Apply the properties of new engineering materials and describe the applications in engineering industries.	Apply (K 3)

(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	-	3
CO-2	3	2	-	-	-	-	-	-	-	-	2	-	3
CO-3	3	2	-	-	2	-	-	-	-	-	2	-	3

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

CO-4	3	3	2	-	1	-	-	-	-	-	2	-	3
CO-5	3	3	2	-	3	-	-	-	-	-	3	-	3

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

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I - Course Name: 25BS201 Environmental Sciences and Sustainability

Prerequisites	Program Name	Sem	Category	L	T	P	C
NIL	B.E. /B.TECH. COMMON FOR ALL	II	BSC	3	0	0	2

II - Course Objectives

1.	To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
2.	To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and waste management.
3.	To study the dynamic processes and understand the features of the earth's interior and surface.
4.	To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
5.	To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyzes the role of sustainable urbanization.

III - Course Content

Preamble:
The objective of this course is intended to make the students to understand the basic concepts of environment, ecology and pollution of the current environmental issues and to participate in various activities on conserving and protecting the environment.

Unit – I	Environment and Biodiversity	6 Periods

Definition, scope and importance of environment – need for public awareness. Eco-system and energy flow – Ecological Pyramids - ecological succession - Types of biodiversity: genetic, species and ecosystem diversity – values of biodiversity - India as a mega-diversity nation – hot-spots of biodiversity – 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.

Unit – II	Environmental Pollution and waste management	6 Periods

Causes, effects and preventive measures of water pollution, soil pollution, air pollution and noise pollution - Solid waste: Industrial- hazardous- Biomedical and e-waste management- Case studies on occupational health and safety management system (OHASMS) - Environmental protection - environmental protection acts.

Unit – III	Social issues and the Environment	6 Periods

Water conservation, rain water harvesting, watershed management- Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion-nuclear accidents and holocaust- case studies.

Unit – IV	Renewable sources of Energy	6 Periods

Solar – Wind – Hydro - Geothermal, Biomass, and Ocean: Tidal -Wave energy - Hydrogen Fuel Cells - principles, applications (electricity, heating, transport) - advantages (clean, sustainable) - challenges (storage, cost) - clean alternatives to fossil fuels - modern energy transition.

Unit – V	Sustainability Practices	6 Periods

COLLEGE OF ENGG & TECHNOLOGY NATHAM NPR

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

Sustainable Development Goals- targets -Zero waste and 3R and 5R concepts – linear economy - circular economy - ISO 14000 series - material life cycle assessment, environmental impact assessment- Sustainable habitat: green buildings - green materials - energy efficiency - Sustainable transports. Sustainable energy: non-conventional sources- energy cycles carbon cycle - emission and sequestration - green engineering: sustainable urbanization - socio economical and technological change.
Total: 30 Periods

Text Books:	1. Anubha Kaushik and C. P. Kaushik's 'Perspectives in Environmental Studies', 6th Edition, New Age International Publishers, 2018. 2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2017. 3. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004. 4. Allen, D. T. and Shonnard, D. R., 'Sustainability Engineering: Concepts, Design and Case Studies', Prentice Hall. 1st Edition, 2011. 5. Bradley. A.S; Adebayo, A.O., Maria, P. 'Engineering applications in sustainable design and development', Cengage learning. 1st Edition, 2015. 6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
Reference Books:	1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media, 2010. 2. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015. 3. Erach Bharucha 'Textbook of Environmental Studies for Under graduate Courses' Orient Blackswan Pvt. Ltd. 2021.
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/

IV - Course Outcome

On completion of the course, the students will be able to		**Bloom's Level Mapped**
CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation	Remember (BL 1)
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures and waste management in the society.	Understand (BL 2)
CO3	To identifythe causes, effects of natural disasters and contribute to the preventive measures in the society.	Apply (BL 3)
CO4	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	Understand (BL 2)
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	Apply (BL 3)

(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)

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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	-	-	-	2	3	-	1	-	2	-	-
CO-2	3	2	-	-	-	3	3	-	1	-	2	-	-
CO-3	3	1	1	-	-	2	2	-	-	-	2	-	-
CO-4	3	1	1	1	-	2	2	-	1	-	2	-	-
CO-5	3	2	1	-	-	2	2	-	1	-	1	-	-

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

NPRCET COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I - Course Name: 25BE201 - Basics of Electrical and Electronics Engineering

Prerequisites	Programme Name	Sem	Category	L	T	P	C
NIL	**Common to Civil & Mechanical Engineering**	II	ESC	3	0	0	3

II - Course Objectives

1	Understand the fundamentals of electrical power generation, transmission, distribution, wiring systems, earthing, protective devices, and domestic electrical load calculations.
2	Apply basic electrical laws to analyze simple DC and AC circuits and understand power, energy, and AC parameters used in practical applications.
3	Identify, classify, and select suitable electrical motors for civil and mechanical engineering applications with emphasis on energy efficiency and safety.
4	Understand the principles and applications of sensors, automation, and control systems used in buildings and industrial processes.
5	Gain introductory knowledge of electronic systems and their applications in motor control, automation, renewable energy systems, and smart infrastructure.

III - Course Content

Preamble: This course introduces the basic principles of electrical and electronics engineering. It helps students understand simple electrical circuits, fundamental electronic components, and the basic operation of electrical machines, enabling them to apply these concepts in practical engineering situations.

Unit – I	**Electrical Supply Systems & Safety**	**9 Periods**

Electrical power generation – Conventional and renewable sources – Transmission and distribution systems – Single line diagram – Types of wiring systems – Electrical safety practices – Earthing methods – Protective devices (MCB, MCCB, ELCB, RCCB, fuses) – Domestic electrical load calculations and energy consumption estimation.

Unit – II	**DC and AC Electric Circuits**	**9 Periods**

Basic electrical quantities: voltage, current, EMF, resistance, power and energy – Ohm's Law – Kirchhoff's Laws and applications – Series and parallel circuits – Voltage and current division – Alternating EMF generation – RMS value, average value, peak factor and form factor – Real, reactive and apparent power – Power factor and its significance.

Unit – III	**Motors and its Applications**	**9 Periods**

Classification of electrical motors – DC motors and AC motors – Single phase and three phase induction motors – Motors used in pumps, elevators, escalators, cranes, compressors, conveyors, HVAC systems, machine tools, and construction equipment – Motor selection criteria – Energy consumption, efficiency, safety, and maintenance considerations.

Unit – IV	**Sensors and Controls**	**9 Periods**

Basics of sensors and transducers – Building automation systems – Smart lighting and HVAC control – Water level control systems – Industrial process monitoring – Safety, alarm and protection systems – Introduction to basic control concepts used in civil and mechanical applications.

Unit – V	**Electronics and its Applications**	**9 Periods**

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

Introduction to electronic components and systems – Lighting control systems – Motor speed control using electronic drives – Automated pumping systems – Industrial motor control panels – Introduction to renewable energy systems integration in buildings – Smart factories and smart infrastructure.		
		45 Periods

Text Books:	T. K. Nagsarkar and M. S. Sukhija, Basic Electrical Engineering, Oxford University Press, 2nd Edition, 2011.
	A. Sudhakar and Shyammohan S. Palli, Circuits and Networks: Analysis and Synthesis, Tata McGraw Hill, 3rd Edition, 2010.
	G. K. Dubey, Fundamentals of Electrical Drives, Narosa Publishing House, 2nd Edition, 2012.
	Allan R. Hambley, Electrical Engineering: Principles and Applications, Pearson Education, 7th Edition, 2019.
	V. K. Mehta and Rohit Mehta, Principles of Power System, S. Chand, 3rd Edition, 2005.
Reference Books:	1.John Bird, Electrical Circuit Theory and Technology, Routledge Publications, 5th edition, 2013.
	2.Smarjith Ghosh, Fundamentals of Electrical and Electronics Engineering, Prentice Hall of India Pvt. Ltd., 2010.
	3.R. S. Sedha, A Textbook of Applied Electronics, S. Chand & Company Ltd., 2010.
MOOC/Web Platforms:	Fundamentals Of Electrical Engineering, By Prof. Debapriya Das, IIT Kharagpur.

IV - Course Outcome

On completion of the course, the students will be able to		**Bloom's Level Mapped**
CO1	Understand electrical power generation, transmission, distribution systems, wiring methods, and electrical safety practices.	Understand K2
CO2	Apply basic electrical laws to analyze DC and AC circuits and power calculations	Analyze K4
CO3	Identify and select appropriate electrical motors for civil and mechanical engineering applications.	Apply K3
CO4	Understand the working and applications of sensors, automation, and control systems in buildings and industries.	Understand K2
CO5	Apply basic electronics concepts to applications such as motor control, automation, renewable energy, and smart infrastructure.	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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	2	2	2	-	2	-	-	2	-	-

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

CO2	3	3	2	-	-	-	-	2	-	-	2	-	-
CO3	3	3	3	2	2	2	2	-	2	-	2	-	-
CO4	2	3	2	2	2	2	1	-	2	-	2	-	-
CO5	2	3	2	2	2	2	3	-	2	-	2	-	-

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

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I – Course Code & Name: 25ME201 - Engineering Mechanics

Program Name	B.E. – MECHANICAL ENGINEERING	Sem	Category	L	T	P	C
Prerequisites	-	II	ESC	3	0	0	3

II - Course Objectives

1.	To understand the fundamental principles and laws of mechanics governing particles and rigid bodies.
2.	To solve engineering problems involving friction and determine forces in practical applications.
3.	To Determine centroids, centers of gravity, and moments of inertia for simple and composite bodies.
4.	Apply kinematics principles to study the motion of particles in rectilinear and curvilinear paths.
5.	To Apply kinetics principles, including Newton's laws, work-energy, and impulse-momentum, to analyze particle motion.

III - Course Content

Preamble: This course introduces the fundamental principles of engineering mechanics, covering the behavior of particles and rigid bodies under forces. It provides a basic understanding of statics and dynamics essential for solving engineering problems.

Unit – I	Statics of Particles and Rigid Bodies	9 Periods

Statics of Particles: Fundamental principles and concepts – Laws of mechanics – Principle of Transmissibility – Parallelogram, Triangle and Polygon law of forces – Resultant of concurrent and non-concurrent coplanar forces. Static Equilibrium – Conditions of equilibrium in statics – Lami's Theorem – Free body Diagram – Reactions. 3D Statics – Forces in space; Statics of Rigid Bodies: Moment of a force – Varignon's theorem – Force Couple System-Support Reactions

Unit – II	Friction	9 Periods

Friction: Role of frictional force – Types of friction – Limiting friction – Coefficient of friction and angle of friction – Coulomb's law of friction – Angle of Repose – Wedge friction – Belt friction.

Unit – III	Distributed Forces	9 Periods

Distributed Forces: Centroid and Centre of Gravity – Simple and Composite plane figures and solid bodies – Pappus and Guldinus Theorem. Area Moment of Inertia – Parallel and Perpendicular Axis Theorem – Polar Moment of Inertia – Radius of gyration – Mass Moment of Inertia – Simple and Composite plane figures and solid bodies

Unit – IV	Dynamics of Particles: Kinematics	9 Periods

Dynamics of Particles: Kinematics of Particles: Rectilinear Motion – Uniform and Variation acceleration – Motion of particle under gravity – Relative motion. Curvilinear motion

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

Unit – V	Dynamics of Particles: Kinetics	9 Periods
Kinetics of Particles: Newton's Second Law of motion – D'Alembertz Principle. Work energy principle – Conservation of energy. Impulse-Momentum principle – Conservation of linear momentum – Motion of singular body and connected bodies.		
		Total: 45 Periods

Text Books:	1. Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, Sanjeev Sanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education., 12thEdition, 2022. 2. Timoshenko, S., Young, D. H., Rao, J. V., & Pati, S., Engineering Mechanics (In SI Units), 5th Edition, McGraw Hill Education (India), New Delhi, 2016.
Reference Books:	1. Vela Murali, "Engineering Mechanics-Statics and Dynamics", Oxford University Press, 2020. 2. Meriam, J. L., & Kraige, L. G. (2018). Engineering Mechanics: Statics and Dynamics. Wiley. 3. Pytel, A., & Kiusalaas, J. (2014). Engineering Mechanics (Indian Edition). Cengage Learning India.
MOOC/Web Platforms:	https://nptel.ac.in/courses/112106286

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Apply fundamental principles and laws of mechanics to analyze force systems acting on particles.	Applying (BL 3)
CO2	Apply principles of friction to solve engineering problems.	Applying (BL 3)
CO3	Apply concepts of centroids and moments of inertia to engineering bodies	Applying (BL 3)
CO4	Apply kinematics principles to analyze the motion of particles in rectilinear and curvilinear paths.	Applying (BL 3)
CO5	Apply kinetics principles to solve problems in particle motion	Applying (BL 3)

(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	2	-	1	-	-	-	1	2	3	-
CO-2	3	3	2	2	-	1	-	-	-	1	2	3	-

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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-3	3	3	2	2	-	1	-	-	-	1	2	3	-
CO-4	3	3	2	2	-	1	-	-	-	1	2	3	-
CO-5	3	3	2	2	-	1	-	-	-	1	2	3	-

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

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson - Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham. Dindigul

I - Course Name: 25HS202-Tamils and Technology

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

II - Course Objectives

1	To understand the technological knowledge of ancient Tamils in weaving, pottery, manufacturing, agriculture, irrigation, and maritime activities from the Sangam period onwards.
2	To study the evolution of Tamil architectural and design technologies, including temples, palaces, domestic structures, and Indo-Saracenic buildings across different historical periods.
3	To analyze the production technologies of the Tamils such as shipbuilding, metallurgy, coin minting, bead-making industries, and their archaeological and literary evidences.
4	To examine the agricultural, irrigation, and water-management technologies of the Tamils, along with their knowledge of animal husbandry, fisheries, pearl diving, and ocean science.
5	To explore the growth of Scientific Tamil and Computational Tamil, focusing on digital publishing, Tamil software development, online learning platforms, and electronic Tamil resources.

III - Course Content

Preamble:
The Tamil civilization has demonstrated a profound harmony between knowledge, innovation, and human progress. Rooted in a rich legacy of language, science, mathematics, medicine, architecture, and maritime trade, Tamils have long embraced technology as a means to enhance life while upholding ethical values and social responsibility. The spirit of inquiry found in classical Tamil literature reflects a culture that values learning, adaptation, and forward thinking.

Unit – I	நெசவு மற்றும் பானைத் தொழில் நுட்பம்	**3 Periods**
சங்ககாலத்தில் நெசவுத் தொழில்-பானைத் தொழில் நுட்பம்- கருப்பு சிவப்பு பாண்டங்கள்-பாண்டங்களில் கீறல் குறியீடுகள்		
Unit – II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	**3 Periods**
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்ககாலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் -சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்-மாமல்லபுரச் சிற்பங்களும், கோவில்களும்- சோழர்கால பெருங்கோயில்களும் மற்றும் பிற வழிபாட்டுத் தலங்கள்-நாயக்கர் காலக் கோயில்கள்-மாதிரி கட்டமைப்புகள் பற்றி அறிதல்,மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றம் திருமலை நாயக்கர் மஹால்-செட்டிநாட்டு வீடுகள்-பிரிட்டிஸ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.		
Unit – III	உற்பத்தித் தொழில் நுட்பம்	**3 Periods**
கப்பல் கட்டும் கலை-உலோகவியல்-இரும்புத் தொழிற்சாலை-இரும்பை உருக்குதல்,எஃகு-வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் அச்சடித்தல்- மணி உருவாக்கும்		

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

தொழிற்சாலைகள்-கல்மணிகல்,கண்ணாடி மணிகள்-சுடுமணிகள்-சங்கு மணிகள்-எழும்பு துண்டுகள்-தொல்லியல் சான்றுகள்-சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.		
Unit – IV	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	**3 Periods**
அணை,ஏரி,குளங்கள்,மதகு-சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம்-கால்நடை பராமரிப்பு-கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள்-வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்தசெயல்பாடுகள்-கடல்சார் அறிவு-மீனவளம் – முத்து மற்றும் முத்துக்குளித்தல்-பெருங்கடல் குறித்த பண்டைய அறிவு-அறிவுசார் சமூகம்.		
Unit – V	அறிவியல் தமிழ் மற்றும் கணித்தமிழ்	**3 Periods**
அறிவியல் தமிழின் வளர்ச்சி-கணித்தமிழ் வளர்ச்சி-தமிழ் நூல்களை மின்பதிப்பு செய்தல்-தமிழ் மென்பொருட்கள் உருவாக்கம்-தமிழ் இணையக் கல்விக்கழகம்-தமிழ் மின் நூலகம்-இணையத்தில் தமிழ் அகராதிகள்-சொற்குவைத் திட்டம்		
		Total: 15 Periods
Books for study & Reference:	1.தமிழக வரலாறு-மக்களும் பண்பாடும்-கே.கே..பிள்ளை (வெளியீடு:தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்) 2. கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்(தொல்லியல் துறை வெளியீடு.) 3. பொருநை- ஆற்றங்கரை நாகரிகம்.(தொல்லியல் துறை வெளியீடு.)	
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 (K 1)
CO2	Relate the art and culture in Tamil language	Apply (K 2)
CO3	Explain the importance of music, dance and martial arts that were derived from Tamil Culture	Apply (K 2)
CO4	Understand the poetic mode or theme of classical language	Analyze (K 2)
CO5	Relate the contribution of Tamils to Nation building	Analyze (K 3)

(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)

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

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 (Mapping value based on usage of Action verbs in each CO)

COLLEGE OF ENGG. & TECHNOLOGY NATHAM NPRCET

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I - Course Name: 25HS211- English Laboratory II

Prerequisites	Program Name	Sem	Category	L	T	P	C
-	B.E./B.TECH. COMMON TO ALL	II	HSC	0	0	2	1

II - Course Objectives

1.	Develop students' ability to communicate confidently through structured speaking tasks such as self-introduction, discussions, role plays, and presentations.
2.	Strengthen oral interaction skills required in professional contexts including interviews, group discussions, telephonic conversations, and small talk.
3.	Enhance listening comprehension skills through note-taking from discussions and spoken observations.

III - Course Content

List of Experiments:

1. Speaking: Introducing Oneself- Discussion on Social Media
2. Speaking: Role Play
3. Speaking: Narrating an Incident, Discussing tourist Destinations
4. Writing: Job Application
5. Writing: Report Writing
6. Making an oral presentation
7. Listening: Taking notes From a Discussion
8. Speaking: Small Talk and Telephonic Conversation
9. Mock Interview
10. Group Discussion

Total 30 Periods

Books for study & Reference:	• Sasikumar, V, et.al. A Course in Listening & Speaking Foundation Books, 2005. • Murphy, Raymond. English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students: with Answers. Cambridge: Cambridge University Press, 1985. • Prasad, Hari Mohan. A Handbook of Spotting Errors. Mcgraw Hill Education, 2010 • Reynolds, John. Cambridge IGCSEA, First Language English. 2018th ed., Hodder Education, 2018. • Wiggins, Grant P., and Jay McTighe. Understanding by Design. Association for Supervision and Curriculum Development, 2008.
Web Sources	• www.studyladder.com • www.fluentu.com • www.esl-lab.com

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Introduce themselves clearly and participate in discussions on familiar topics such as social media and tourist destinations.	Understand (BL 2)
CO2	Perform effective role plays, telephonic conversations, and small-talk interactions using appropriate language and tone.	Apply (BL 3)
CO3	Retell incidents and make structured oral presentations with clarity and coherence.	Apply (BL 3)
CO4	Write job applications and reports relevant to workplace needs.	Apply (BL 3)
CO5	Demonstrate listening skills by taking accurate notes from discussions.	Analyse (BL 4)

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

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

NPR COLLEGE OF ENGG. & TECHNOLOGY ★ NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

I - Course Name: 25BE211 - Engineering Practices Laboratory

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

II - Course Objectives

1	To provide the hands-on training for starters.
2	To gain the skills for making fitting joints and household pipe line connections using suitable tools.
3	To develop the skills for making simple electrical wiring connections using suitable tools.
4	To develop the skill for trouble shooting and maintenance of home appliances.

III - Course Content

Preamble:
This laboratory gives basic hands-on experience in mechanical, electrical, and electronic practices used in engineering.

GROUP – A (CIVIL & MECHANICAL)

PART 1	CIVIL ENGINEERING PRACTICES	30 Periods

Plumbing Work:

a. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
b. Preparing plumbing line sketches.
c. Laying pipe connection to the suction side of a pump
d. Laying pipe connection to the delivery side of a pump.
e. Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

Wood Work:

a. Sawing,
b. Planing
c. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

MECHANICAL ENGINEERING PRACTICES

Welding Work:

a. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
b. Practicing gas welding.

Basic Machining Work:

a. Turning.
b. Drilling.
c. Tapping.

Sheet Metal Work:

a. Making of a square tray

Foundry Work:

a. Demonstrating basic foundry operations.

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology
(Autonomous),
Natham, Dindigul 624401

GROUP – B (ELECTRICAL AND ELECTRONICS)		
PART 2	**ELECTRICAL ENGINEERING PRACTICES**	**30 Periods**
a. Basic Electrical Components and Safety Devices b. Electrical Lighting Systems c. Staircase Lighting Control d. Introduction to CFL and LED lamps e. Measurement of energy using single phase energy meter. f. Motor Control and Protection using DOL Starter		
	ELECTRONIC ENGINEERING PRACTICES	
a. Study of Electronic components and equipments – Resistor, colour coding b. Soldering Practice c. PCB Assembly and Testing d. Logic gates operations AND, OR, EX-OR and NOT		
		Total: 60 Periods

IV - Course Outcome

On completion of the course, the students will be able to,		Bloom's Level Mapped
CO1	Use basic workshop tools safely to perform fitting, carpentry, plumbing, and wiring tasks.	Apply K3
CO2	Perform simple house wiring, troubleshoot common electrical faults, and identify electrical components.	Apply K3
CO3	Demonstrate basic machining operations such as turning, drilling, and shaping.	Apply K3
CO4	Build simple electronic circuits using breadboards, devices, and measuring instruments.	Apply K3
CO5	Apply basic engineering practices to create small mechanical/electrical assemblies and solve real-time practical 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	PO10	PO11	PSO 1	PSO 2
CO1	3	2	3	2	2	-	-	2	3	2	2	-	-
CO2	3	2	3	2	2	-	-	2	3	2	2	-	-
CO3	3	2	3	2	2	-	-	2	3	2	2	-	-
CO4	3	2	3	2	2	-	-	2	3	2	2	-	-
CO5	3	2	3	2	2	-	-	2	3	2	2	-	-

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

NPR COLLEGE OF ENGG. & TECHNOLOGY NATHAM

Chairperson – Board of Studies,
Department of Mechanical Engineering,
NPR College of Engineering & Technology,
(Autonomous),
Natham, Dindigul 624401