B. Tech. 1st Yr (2nd Semester)

Theory							
Sl. No.	**Paper Name**	**Paper Code**	**Marks**	**L**	**T**	**P**	**Credit**
1	Mathematics-II	M-202	100	3	0	0	3
2	Physics	PH-201	100	3	0	0	3
3	Basic Electrical Engineering	EE-201	100	3	0	0	3
4	English Language and Technical Communication	ENG-201	100	3	0	0	3
5	Programming for Problem Solving	CS-202	100	3	0	0	3
	Total Theory		500	15	0	0	15
Practical							
1	Physics Lab	PH-291	100	0	0	2	1
2	Basic Electrical Engineering Lab	EE-291	100	0	0	2	1
3	Workshop Practices	ME-292	100	0	0	4	2
4	Language Lab	ENG-291	100	0	0	2	1
5	Programming for Problem Solving Lab	CS-292	100	0	0	4	2
	Total Practical		500	0	0	14	7
	Total of 2nd Semester		1000	15	0	14	22
Extra Curricular Activity							
1	NSS		100				0
Total Credit in 1st Year: 43							

2nd SEMESTER SYLLABUS

Course Name: Mathematics-II
Course Code: M-202
(Semester- II)
Course Broad Category: Basic Science

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1. Course Prerequisite:

Concept of Mathematics in 10+2 standard and First Semester.

2. Course Learning Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in ordinary differential equations and complex variables. It also aims to familiarize the prospective engineers to get the knowledge to apply the concept of transform calculus in various engineering field. It aims to equip the students to deal with advanced level applied mathematics and applications that would be essential for their disciplines.

3. Teaching methodology and evaluation system for the course:

Teaching methodology –Lectures and Presentations, Interactive Discussions and Case Studies, Guest Lectures.

Evaluation System –

CIA-1 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

CIA-2 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

- **End Semester Examination (ESE): Total: 60 Marks**
- **The minimum passing marks to be secured is 40 (40%) out of allotted total 100 marks (CIA: 40 marks and ESE: 60 marks).**

4. Course Content:

Course Name: Mathematics-II
Course Code: M-202
Hours per Week: 3L:0T:0P
Credits: 3

Module	Topics	45L
7.	**Ordinary differential equations (ODE)- First order:** Exact equations, Necessary and sufficient condition of exactness of a first order and first-degree ODE (statement only), Rules for finding Integrating factors, Linear equation, Bernoulli's equation, Euler's equations. Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x. General solution of ODE of first order and higher degree (different forms with special reference to Clairaut's equation).	10L
8.	**Ordinary differential equations (ODE)- Higher order:** General linear ODE of order two with constant coefficients, Method of variation of parameters, Cauchy-Euler equations, Solution of simultaneous linear differential equations. Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.	10L
9.	**Transform calculus:** Laplace Transform, General Properties of Laplace Transform, Inverse Laplace Transform,Convolution,Application of Laplace Transform to Differential Equations with Constant Coefficients. Fourier Integral Theorem, Fourier Transform, Convolution, Fourier Sine and Cosine Transforms, Parseval's Identity for Fourier Transforms.	9L
10.	**Complex Analysis-I:** Functions of Complex variable, Limit and Continuity, Differentiation of complex functions, Cauchy-Riemann equations, Analytic functions, Harmonic functions, determination of harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithmic) and their properties; Conformal mappings, Mobius transformations and their properties.	8L
11.	**Complex Analysis-II:** Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy's integral formula (without proof), Cauchy's integral formula for Derivative, Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, Zeros of analytic functions, Singularities,Laurent's series; Residues, Cauchy residue theorem (without proof), Evaluation of definite integral involving sine and cosine. Evaluation of certain improper integrals.	8L

5. Suggested Learning Resources:

Text Book:

- B.S. Grewal-- Higher Engineering Mathematics; Khanna **Publishers.**
- Ramana B. V. --- Higher Engineering Mathematics, McGraw Hill Education**.**

Reference Books:

- Brown J.W and Churchill R.V: Complex Variables and Applications, McGraw-Hill.
- Brown J.W and Churchill R.V: Complex Variables and Applications, McGraw-Hill.
- Kreyzig E.: Advanced Engineering Mathematics, John Wiley and Sons.
- Potter M.C, Goldberg J.L and Aboufadel E.F.: Advanced Engineering Mathematics, OUP.
- James G.: Advanced Modern Engineering Mathematics, Pearson Education.
- Spiegel M. R., Lipschutz S., John J.S., and Spellman D.: Complex Variables, TMH.

6. Course Outcomes (CO):

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
M 202.1	Remember to recognize various methods of ordinary differential equations which would enable to solve different engineering problems to encounter in their profession life.	Recognize	Remember
M 202.2	Understand to explain the uses and applications of complex variables in applied sciences and engineering problems.	Explain	Understand
M 202.3	Applythe concept of conformal mapping, its relation to analytic functions, their properties, and the Cauchy-Riemann equations to illustrate problems in applied mathematics.	Illustrate	Apply
M 202.4	Analyze the basic properties of complex integration and having the ability to organize such integrals.	Organize	Analyze
M 202.5	Evaluate the Laplace transforms and inverse Laplace transforms to determine the solutions of differential and integral equations in engineering fields like network analysis and control systems.	Determine	Evaluate
M 202.6	Construct logical and analytical skills to create a new idea appreciated by academics, research & emerging trends in industry.	Construct	Create

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6
1	3	-	-	-	-	1
2	3	-	-	-	-	1
3	-	-	-	-	3	1
4	-	3	2	-	-	1
5	-	-	-	3	-	1
6	-	-	-	-	-	-

8. Mapping of the Course outcomes to Program Outcomes (PO)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
M 202.1	3	2	2	1	1	-	-	-	-	-	1
M 202.2	2	1	1	1		-	-	-	-	-	1
M 202.3	2	1	1	1		-	-	-	-	-	1
M 202.4	2	1	2	1	1	-	-	-	-	-	1
M 202.5	3	2	2	2	3	-	-	-	-	-	1
M 202.6	2	2	3	1	2	-	-	-	-	-	1

9. Mapping to Program Specific Outcome (PSO)

Course Outcome	PSO1	PSO2	PSO3
M201.CO1	1	—	—
M201.CO2	1	—	—
M201.CO3	2	—	—
M201.CO4	2	—	—
M201.CO5	2	—	—
M201.CO6	1	—	1

Course Name: PHYSICS
Course Code: PH-201
(Semester– II)
Course Broad Category: Basic Science

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1. **Course Prerequisite:**

Class-XII level knowledge of Physics and Mathematics.

2. **Course Learning Objectives:**

v. Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

vi. To compile all the knowledge acquired from the course and to apply in industry, academia, and research keeping in the mind about ethical awareness and impact in the field of pollution, social and safety.

3. **Teaching methodology and evaluation system for the course:**

Teaching methodology – Lectures and Presentations, Interactive Discussions and Case Studies.

Evaluation System –

CIA-1 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

CIA-2 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

- **End Semester Examination (ESE): Total: 60 Marks**
- **The minimum passing marks to be secured is 40 (40%) out of allotted total 100 marks (CIA: 40 marks and ESE: 60 marks).**

4. Course Content:

Course Name: PHYSICS
Course Code: PH-201
Hours per Week: 3L: 0T: 0P
Credits: 3

Module	Topics	45L
1.	Vector Algebra and Vector Calculus: Concepts of Vector Algebra, Vector calculus. Gradient, Divergence and Curl. Physical meaning of gradient, divergence and curl. Solenoidal vector (Definition only), Irrotational vector (Definition only), Conservative and non-conservative forces. Vector integration: Line Integral, Surface Integral, Volume Integral. Gauss Divergence Theorem, Stoke's Theorem.	7L
2	Oscillations: Introduction to S.H.M., Lissajous Figure, Damped Oscillations: Differential Equation and its solution, Different conditions of damping of harmonic oscillations, Logarithmic Decrement, Relaxation Time, Forced oscillations: Differential equation (Qualitative analysis only), Resonance: Amplitude and Velocity Resonance, Quality Factor, Sharpness of Resonance. Formation of Progressive wave and wave equation.	7L
3	Optics: Basic Concept of interference of light (No derivation), Types of interference, Diffraction of light, Difference between Interference and Diffraction, Difference between Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction at a single slit, Conditions for maxima and minima, Plane Transmission grating, Dispersive and Resolving power of grating. Polarization: Polarization by Reflection and refraction-Brewster's law, Polarization by double refraction, Nicol Prism, Polaroids and its uses. Retardation Plate, Circular and elliptical polarization.	5L 5 L
4	Dielectric and Magnetic Properties of Materials: Dielectric material, Polar and Non-polar Dielectric, Dielectric constant, Polarization($\vec{P}$), Electrical Susceptibility($\square_e$). Relation between Dielectric Constant(K) and Electrical Susceptibility ($\square_e$) Polarizability ($\square_e$), Applications of Dielectric. Magnetic Induction Vector or Magnetic Flux Density($\vec{B}$), Magnetic Field Intensity($\vec{H}$), Magnetization ($\vec{M}$), Magnetic Permeability(μ), Magnetic Susceptibility ($\square$), Relation between Magnetic Flux Density($\vec{B}$), Magnetic Field Intensity($\vec{H}$) and Magnetization($\vec{M}$), Classification of Magnetic Materials, Hysteresis	2L 5L

Module	Topics	45L
	Loop.	
5	Electromagnetic Induction and Maxwell's Equation: Faraday's law of electromagnetic induction, Biot-Savart Law, Ampere's Circuital Law and displacement current, Maxwell's equations - Differential and Integral forms. Electromagnetic wave equations in terms of Electric and Magnetic field, Poynting Vector, Transverse nature of electromagnetic wave. Velocity of electromagnetic wave.	7L
6	Quantum Physics: Inadequacy of classical mechanics, Blackbody radiation, Planck's Law of Radiation Demonstration of Wien's Radiation Law, Wien's Displacement Law, Rayleigh-Jean's Law and Stefan Boltzmann Law as limit. Photoelectric effect. de-Broglie's hypothesis, Phase Velocity, Group Velocity, Heisenberg's uncertainty principle.	5L 2L

5. Suggested Learning Resources:

Text Books

- Engineering Physics, Sujay Kumar Bhattacharya, McGraw Hill Education (India) Pvt. Ltd.
- Principles of Engineering Physics- 1, S P Kuila, New Central Agency (P) Ltd.
- Principles of Engineering Physics- 2, S P Kuila, New Central Agency (P) Ltd.
- Engineering Physics, Malik & Singh, Tata McGraw Hill Education Pvt. Ltd.
- Engineering Physics, Satya Prakash

Reference Books:

- Vector Analysis: Murray Spiegel (Author), Seymour Lipschutz, Dennis Spellman
- Waves and Oscillations, N. K. Bajaj, Tata McGraw-Hill
- Optics, A. K. Ghatak, McGraw Hill Education India Private Limited
- A textbook on light, Ghosh, Mazumdar
- Electrodynamics, Gupta, Kumar & Singh
- Electricity and Magnetism: D. Chattopadhyay & P. C. Rakshit
- Quantum Physics, R. Eisberg and R. Resnick, John Wiley and Sons

6. Course Outcomes (CO):

After going through this course the Students will be able to:

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
PH 201.1	Know basic concepts of vector algebra and vector calculus.	Explain	Understand
PH 201.2	Understand the concepts of oscillation	Identify, Select	Understand
PH 201.3	Elaborate the concept of optics and introduction to polarization.	Implement	Apply
PH 201.4	Impart basic knowledge of the dielectric and magnetic properties of materials.	Design	Create
PH 201.5	Rationalize the electromagnetic induction and Maxwell's equation.	Identify, Implement	Apply
PH 201.6	Familiarize with the basic of Quantum Physics	Recognize	Understand

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6
1	3	-	-	-	-	-
2	-	3	-	-	-	-
3	-	-	3	-	-	-
4	-	-	-	3	-	-
5	-	-	-	-	3	-
6	-	-	-	-	-	3

8. Mapping of the Course outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH 201.1	3	2	-	-	-	-	-	1	-	-	2
PH 201.2	3	2	-	-	-	-	-	1	-	-	2
PH 201.3	3	2	-	-	-	-	-	1	-	-	2
PH 201.4	3	2	-	-	-	-	-	1	-	-	2
PH 201.5	3	2	-	-	-	-	-	1	-	-	2
PH 201.6	3	2	-	-	-	-	-	1	-	-	2

9. Mapping to Program Specific Outcomes (PSO)

Course Outcome	PSO1	PSO2	PSO3
PH201.CO1	1	—	—
PH201.CO2	1	—	—
PH201.CO3	1	—	—
PH201.CO4	1	—	—
PH201.CO5	1	—	—
PH201.CO6	1	—	—

Course Name: BASIC ELECTRICAL ENGINEERING
Course Code: EE-201
(Semester- II)
Course Broad Category: Engineering Science

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1. Course Prerequisite:

Class-X+2 level knowledge of Physics and Mathematics.

2. Course Learning Objectives:

i. Foundational understanding of electrical circuits, machines, and systems.
ii. DC and AC circuit analysis: Kirchhoff's laws, circuit theorems, and transient responses of RL, RC, RLC circuits.
iii. Single-phase and three-phase systems: Power calculations, resonance, star-delta connections, and power measurement.
iv. Understanding of following Electrical machines:
    - DC generators, motors, and transformers (construction, operation, and performance).
    - Three-phase induction motors (torque-speed characteristics and control methods).
v. Practical application: Real-world problem-solving using electrical engineering principles.

3. Teaching methodology and evaluation system for the course:

Teaching methodology –Lectures and Presentations, Interactive Discussions

Evaluation System –

CIA-1 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

CIA-2 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

- **End Semester Examination (ESE): Total: 60 Marks**
- **The minimum passing marks to be secured is 40 (40%) out of allotted total 100 marks (CIA: 40 marks and ESE: 60 marks).**

4. Course Content:

Course Name: Basic Electrical Engineering
Course Code: EE-201
Hours per Week: 3L: 0T: 0P
Credits: 3

Module	Topics	40L
1.	Electrical circuit elements (R, L and C), Dependent voltage and current sources, independent voltage and current sources, Star-Deltaconversion. Kirchhoff current and voltagelaws, Analysis of simple circuits with dc excitation. Superposition theorem, Nodal analysis, Mesh analysis, Thevenin theorem, Norton theorem and Maximum power transfer theorem, Time-domainanalysis offirst-order and second order RL, RC and RLC circuits.	10L
2.	Representation of sinusoidal wave forms, peak and rms values, phasor representation and analysis, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L,C,R-L,R-C,R-L-Combinations (series and parallel), resonance. Poly phase system: Phase sequence, three phase balanced circuits, voltage and current relations in star and delta connections, 3 Phase power measurement using two wattmeter method.	10L
3.	Construction, Basic concepts of winding (Lap and wave), DC generator: Principle of operation, EMF equation, characteristics (open circuit, load), DC motors: Principle of operation, Speed-torque Characteristics (shunt and series machine), 3-point starter, speed control (armature voltage and field control).	6L
4.	Magnetic materials, BH characteristics, ideal and practical transformer, Core and shell type construction, EMF equation, no-load and on load operation, phasor diagram and equivalent circuit, losses of a transformer, open and short circuit tests, regulation and efficiency calculation. Auto-transformer and three-phase transformer connections.	6L
5.	Types, Construction, Production of rotating magnetic field, Principle of operation, Equivalent circuit and phasor diagram, rating, Torque-speed characteristics (qualitative only). Starter for induction motor. Brief introduction of speed control of 3-phase induction motor (voltage control, frequency control, rotor resistance control)	8L

5. Suggested Learning Resources:

Text Book:

1. A. Chakrabarti, S. Nath, C.K. Chanda,"Basic Electrical Engineering", McGraw Hill Education, 2023.
2. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
3. Ritu Sahdev, "Basic Electrical Engineering", Khanna Book Publishing Co. (P) Ltd., Delhi.
4. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

Reference Books:

1. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

6. Course Outcomes (CO):

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
EE 201.1	Illustrate &analyse the characteristics of the electric and magneticcircuits	Analyse, Identify	Understand
EE 201.2	To study the working principles and construction of DC machines, concepts of different windings used in DC machines and their characteristics and testing	Identify, Select	Understand, Apply
EE 201.3	To study the working principles of different AC machines (Transformer, 3-phase induction motor) and their characteristics and testing	Identify, Select	Understand, Apply
EE 201.4	To study different speed control techniques and applications of different electrical motors used in different industrial applications (DC motor, 3 phase induction motor)	Identify, Select	Understand, Apply
EE 201.5	Solve numerical problems of basic electrical circuits (both dc and ac)and different electrical machines.	Identify, Implement	Apply

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5
1	3	2	-	-	3
2	3	2	-	-	3
3	2	3	-	2	3
4	3	-	3	-	3
5	3	-	3	2	3

8. Mapping of the Course outcomes to Program Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
EE201.1	1	2	–	–	–	–	–	–	–	–	–
EE201.2	1	2	3	–	2	–	–	–	–	–	1
EE201.3	1	2	3	2	2	–	–	–	–	–	1
EE201.4	1	2	3	3	2	–	–	–	–	–	2
EE201.5	1	2	2	2	–	–	–	–	–	–	–

9. Mapping to Program Specific Outcome (PSO)

Course Outcome	PSO1	PSO2	PSO3
EE201.CO1	1	—	—
EE201.CO2	1	—	—
EE201.CO3	1	—	—
EE201.CO4	1	—	1
EE201.CO5	2	—	—

Course Name: English Language and Technical Communication
Course Code: ENG-201
(Semester- II)
Course Broad Category: Humanities

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1. **Course Prerequisite:**

   Class- XII level knowledge of English grammar and reading, listening, writing skills.

2. **Course Learning Objectives:**

   i. This course introduces the concepts of sustainability in civil engineering and explores the role of construction materials in developing green infrastructure.
   ii. Students will also learn to design energy-efficient buildings, implement sustainable site planning, navigate green building certifications, and evaluate the economics and ethics of sustainable construction practices.

3. **Teaching methodology and evaluation system for the course:**

Teaching methodology – Lectures and Presentations, Interactive Discussions and Case Studies, Guest Lectures and Field Visits.

Evaluation System –

CIA-1 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

CIA-2 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

- **End Semester Examination (ESE): Total: 60 Marks**
- **The minimum passing marks to be secured is 40 (40%) out of allotted total 100 marks (CIA: 40 marks and ESE: 60 marks).**

4. **Course Content:**
   Course Name: English Language and Technical Communication
   Course Code: ENG-201
   Hours per Week: 3L: 0T: 0P
   Credits: 3

	Module	Topics	36L	COs
1.	**Introduction to LSRW**	Definition of Listening, Speaking, Reading, Writing, Types, Criteria for Effectiveness, Practice Purposes, Barriers, Effectiveness Criteria, Note Taking, Note Making, Jargon, Technical Content Reading, Visual Information Reading, Comprehension	8L	CO1
2.	**Introduction to Business Communication**	Introduction to Business Communication: types, features, process, flow, channels and criteria for effectiveness. Purposes, Barriers. Verbal, non-verbal communication, formal, informal, body language, paralanguage.	4L	CO3, CO4
3.	**Introduction to Corporate communication**	Corporate Communication, Definition, Types, Features of types, Handling Media, Barriers, Effectiveness Criteria, Office-dynamics, debate, Group discussion, Email etiquette, Telephone etiquette.	6L	CO5
4.	**Grammar**	Basic syntactical grammar for professional communication: error detection, articles, tense, preposition, subject-verb agreement, synonyms, antonyms, homonyms, homophones.	5L	CO2
5.	**Written Correspondence**	Comprehension, Business Correspondence, Technical Writing, Proposals, Technical Reports, Memo, Notice-agenda-Minutes, Email, Posters, Essay/ Precis	8L	CO5
6.	**Introduction to Soft Skills**	Critical thinking ability, Time management, Team-building skills, Time management, Conflict management.	5L	CO6

5. **Suggested Learning Resources:**

Text Book:

- Effective Technical Communication. Dr. Bharti Kukreja, Dr. Anupam Jain. Katson Books. First Edition 2019, Reprint 2023.
- Effective Technical Communication. (Late) M. Ashraf Rizvi, Priyadarshi Patnaik. McGraw Hill.
- Communication Skills. Sanjay Kumar, Pushp Lata. Rainbow Book Distributors.

Reference Books:

- Practical English Usage Fully Revised International Edition. Michael Swan. Oxford.

6. Course Outcomes (CO):

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
ENG 201.1	Develop basic idea of LSRW in English professionally.	Develop	L1
ENG 201.2	Improve concept of grammar and vocabulary for professional communication.	Improve/ Understand	L2
ENG 201.3	Apply English language skills in professional situations.	Apply	L3
ENG 201.4	Analyze different listening, reading and speaking contents.	Analyze	L4
ENG 201.5	Evaluate the instructions and reciprocate properly.	Evaluate	L5
ENG 201.6	Create an ambience to effectively communicate in general and professional settings.	Create	L6

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6
1	3	2	2	2	2	2
2	2	3	3	3	3	2
3	3	2	3	2	2	3
4	2	2	2	3	2	3
5	3	3	3	2	3	2
6	3	3	3	2	2	2

8. Mapping of the Course outcomes to Program Outcomes (PO)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
ENG 201.1	3	1	1	1	1	1	1	1	1	3	1
ENG 201.2	3	2	2	1	1	1	1	1	3	3	2
ENG 201.3	1	2	2	1	1	1	1	3	3	3	1
ENG 201.4	3	3	3	3	1	2	1	2	3	3	3
ENG 201.5	2	3	3	2	2	2	2	2	3	3	3
ENG 201.6	3	3	3	2	1	1	1	1	2	3	2

9. Mapping to Program Specific Outcome (PSO)

Course Outcome	PSO1	PSO2	PSO3
ENG201.CO1	—	1	—
ENG201.CO2	—	1	—
ENG201.CO3	—	1	—
ENG201.CO4	—	1	—
ENG201.CO5	—	1	—
ENG201.CO6	—	1	1

Course Name: Programming for Problem Solving
Course Code: CS-202
(Semester– II)
Course Broad Category: Engineering Science

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1. Course Prerequisite:

Basic knowledge of computers and general mathematical operations.

2. Course Learning Objectives:

i. Students will gain an understanding of core programming concepts, including the basic components of a computer system, algorithms, and program execution.
ii. They will develop problem-solving skills by translating algorithms into code using control structures such as conditionals, loops, and functions.
iii. Students will also learn to implement and optimize basic data structures like arrays and strings, as well as algorithms for searching and sorting.
iv. Additionally, they will work with advanced programming features like recursion, structures, pointers, and file handling to solve more complex problems.

3. Teaching methodology and evaluation system for the course:

Teaching methodology –Lectures and Presentations, Interactive Discussions and Case Studies.

Evaluation System –

CIA-1 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

CIA-2 (Total: 40 Marks)

- **Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)**
- **Assignment: 10 Marks**
- **Attendance: 5 Marks**

- **End Semester Examination (ESE): Total: 60 Marks**
- **The minimum passing marks to be secured is 40 (40%) out of allotted total 100 marks (CIA: 40 marks and ESE: 60 marks).**

4. Course Content:

Course Name: Programming for Problem Solving
Course Code: CS-202
Hours per Week: 3L: 0T: 0P
Credits: 3

Module	Topics	Lectures
1	**Introduction to Programming** (4 lectures) Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) - (1 lecture). Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples. (1 lecture) From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code-(2lectures)	8
2	**Arithmetic expressions and precedence** (2lectures)	2
3	**Conditional Branching and Loops** (6lectures) Writing and evaluation of conditionals and consequent branching (3 lectures) Iteration and loops (3 lectures)	6
4	**Arrays**(6lectures)Arrays(1-D,2-D), Character arrays and Strings	6
5	**Basic Algorithms** (6 lectures) Searching, Basic Sorting Algorithms (Bubble, Insertion andSelection),Findingrootsofequations,notionoforderofcomplexitythrough example programs (no formal definition required)	6
6	**Function** (5 lectures) Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference	5
7	**Recursion** (4 -5 lectures) Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.	5
8	**Structure**(4lectures)Structures,DefiningstructuresandArrayofStructures	4
9	**Pointers**(2lectures) Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)	2
10	**File handling** (only if time is available, otherwise should be one as part of the lab)	

5. Suggested Learning Resources:
Text & Suggested Learning Resources: Books:

- R. S. Salaria, Computer Concepts and Programming in C, Khanna Publishers
- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India(India)

6. Course Outcomes (CO):

After going through this course the Students will be able to:

Course Outcomes	Details	Action Verb	Knowledge Level
CS 202.1	Analyze the problem and formulate algorithms for them.	Analyze	K4
CS 202.2	Translate the algorithms to programs (in language).	Understand	K2
CS 202.3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
CS 202.4	Apply array and pointer to solve problem.	Apply	K3
CS 202.5	Understand the use of function, recursion.	Understand	K2
CS 202.6	Build analytical skill.	Create	K6

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6
1	3	-	-	-	-	-
2	-	3	-	-	-	-
3	-	-	3	-	-	-
4	-	-	-	3	-	-
5	-	-	-	-	3	-
6	-	-	-	-	-	3

8. Mapping of the Course outcomes to Program Outcomes (PO)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CS 202.1	3	3	3	3	2	1	1	1	1	1	2
CS 202.2	3	3	3	3	-	1	1	1	1	1	2
CS 202.3	3	3	3	3	-	-	-	-	1	1	-
CS 202.4	3	3	3	3	-	-	-	-	1	1	-
CS 202.5	3	3	3	3	-	-	-	-	1	1	-
CS 202.6	3	3	3	3	-	-	-	-	1	1	-
AVG.	3	3	3	3	2	1	1	1	1	1	2

9. Mapping to Program Specific Outcome (PSO)

Course Outcome	PSO1	PSO2	PSO3
CS202.CO1	3	—	—
CS202.CO2	2	3	—
CS202.CO3	2	2	—
CS202.CO4	3	2	—
CS202.CO5	2	2	—
CS202.CO6	2	—	1

Course Name: PHYSICS LAB
Course Code: PH-291
(Semester– II)
Course Broad Category: BASIC SCIENCE

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1. Course Prerequisite:

Class-XII level knowledge of Physics Practical.

2. Course Learning Objectives:

i. .Expose students to various experimental skills and tools

ii. To gain practical knowledge by applying experimental methods to correlate with the theory. Apply the analytical techniques and graphical analysis to the experimental data.

3. Teaching methodology and evaluation system for the course:

Teaching methodology: Instruction: This method recognizes that students have different learning styles, abilities, and backgrounds, and aims to create a learning environment that accommodates these differences.

Evaluation System –

A. Internal Assessment (PCIA): (60 Marks)- Formative Continuous Assessment [Continuous Assessment; Note Book (30 Marks), Viva Voce (20 Marks), Attendance (10 Marks)]

B. End-Semester Examination: (40 Marks)- Summative Assessment.

- **The minimum passing marks to be secured is 50 (50%) out of allotted total 100 marks (PCIA: 60 marks and ESE: 40 marks).**

4. Course Content:

Course Name: PHYSICS LAB
Course Code: PH-291
Hours per Week: 0L: 0T: 2P
Credits: 1

Module	Topics	10P
1.	**Experiments in General Properties of matter:** 1. Determination of Young's modulus of material of a bar by Flexure Method. 2. Determination of modulus of rigidity of the material of a rod by static method. 3. Determination of rigidity modulus of the material of a wire by dynamic method. 4. **Determination of coefficient of viscosity by**	3P

Module	Topics	10P
	Poiseuille's capillary flow method	
2.	**Experiments in Optics:** 1. Determination of dispersive power of the material of a prism. 2. Determination of the wavelength of a given laser / mercury lamp source by diffraction method. 3. Specific rotation of Sugar Solution using polarimeter.	1P
3.	**Electricity & Magnetism experiments:** 1. Determination of dielectric constant of a given dielectric material. 2. Determination of the thermo-electric power at a certain temperature of the given thermocouple. 3. Study of series resonance of LCR circuit. 4. Determination of specific charge (e/m) of electron by J J Thompson's Method. 5. Determination of unknown resistance using Carey Foster's bridge.	2P
4.	**Quantum Physics Experiments:** 1. Determination of Planck's constant using photoelectric cell. 2. Determination of Stefan's radiation constant. 3. Verification of Bohr's atomic orbital theory through Frank-Hertz experiment. 4. Determination of Hall co-efficient of semiconductors. 5. Determination of band gap of semiconductors by four probe method. 6. To study current-voltage characteristics, load response, areal characteristics and spectral response of photo voltaic solar cells.	4P

Minimum of eight experiments to be performed taking at least one from each module mentioned above.

5. Suggested Learning Resources:

Text books

- Advanced Practical Physics (vol.1 and vol.2) B. Ghosh and K. G. Mazumdar.
- Advanced course in practical physics D. Chattopadhyay and P. C. Rakshit.

Reference Books

- Optics –Eugene Hecht Pearson Education India Private Limited.
- Introduction to Electrodynamics, David J. Griffiths, Pearson Education India Learning Private Limited.

- Waves and Oscillations by N.K. Bajaj.
- Principles of Physics, 10ed, David Halliday, Robert Resnick Jearl Walker, Wiley.
- Electricity, Magnetism, and Light, Wayne M. Saslow, Academic Press.
- Optics, Ghatak, McGraw Hill Education India Private Limited.

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6. Course Outcomes (CO):

After going through this course the Students will be able to:

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
PH 291.1	To Understand the general property of matters like Viscosity, Young's Modulus and Modulus of Rigidity	Explain	Understand
PH 291.2	To Know the concepts of optics	Identify, Select	Understand
PH 291.3	To Measure the electrical parameters.	Implement	Apply
PH 291.4	To Understand Quantum Physics with the help of experiments like Energy band gap of semiconductor, Planck constant and Characteristics of Solar Photovoltaic cell.	Design	Create
PH 291.5	To Analyze Electricity and Magnetism with the help of experiments like Hall Effect of Semiconductors.	Identify, Implement	Apply
PH 291.6	To Measure the Specific charge of electron	Recognize	Understand

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6
1	3	-	-	-	-	-
2	-	3	-	-	-	-
3	-	-	3	-	-	-
4	-	-	-	3	-	-
5	-	-	-	-	3	-
6	-	-	-	-	-	3

8. Mapping of the Course outcomes to Program Outcomes (PO)

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO11
PH 291.1	3	1	-	-	-	-	-	2	-	-	2
PH 291.2	3	1	-	-	-	-	-	2	-	-	2
PH 291.3	3	1	-	-	-	-	-	2	-	-	2
PH 291.4	3	1	-	-	-	-	-	2	-	-	2
PH 291.5	3	1	-	-	-	-	-	2	-	-	2
PH 291.6	3	1	-	-	-	-	-	2	-	-	2

9. Mapping to Program Specific Outcome (PSO)

Course Outcome	PSO1	PSO2	PSO3
PH291.CO1	1	—	—
PH291.CO2	1	—	—
PH291.CO3	1	—	—
PH291.CO4	1	—	—
PH291.CO5	1	—	—
PH291.CO6	1	—	—

Course Name: Basic Electrical Engineering Laboratory
Course Code: EE-291
(Semester II)
Course Broad Category: Engineering Science

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1. Course Prerequisite:

Class-X+2 level knowledge of Physics and Mathematics.

2. Course Learning Objectives:

i. Understand the basic demonstration and application of electrical instruments and machines.
ii. Calibrate electrical instruments and verify network theorems.
iii. Analysesteady state responseand evaluate resonance conditions of R-L-C circuit.
iv. Measure power in three phase unbalanced circuit by two wattmeter method.
v. Determine efficiency, regulation and parameters of single-phase transformer.
vi. Analyse the operational behaviour of DC machine and three phase induction motor.

3. Teaching methodology and evaluation system for the course:

Teaching methodology –Practical

Evaluation System

A. Internal Assessment (PCIA): (60 Marks)- Formative Continuous Assessment [Continuous Assessment; Note Book (30 Marks), Viva Voce (20 Marks), Attendance (10 Marks)]

B. End-Semester Examination: (40 Marks)- Summative Assessment.

- **The minimum passing marks to be secured is 50 (50%) out of allotted total 100 marks (PCIA: 60 marks and ESE: 40 marks).**

4. Course Content:

Course Name: Basic Electrical Engineering Laboratory
Course Code: EE-291
Hours per Week: 0L: 0T: 2P
Credits: 1

Exp. No	Title
1.	Introduction to Basic Electrical Lab (Do's and Don'ts), Familiarization of measuring Instruments (Voltmeter, Ammeter, Multimeter, Wattmeter), circuit parameters (real life resistors with colour code, capacitors, inductors and autotransformer).

Exp. No	Title
2.	i) Verification of Superposition Theorem. ii) Verification of Norton's Theorem.
3.	**I) Verification of Thevenin's Theorem.** II) **Verification of Maximum power Transfer Theorem.**
4.	Calibration of Ammeter and Wattmeter.
5.	**Determination of steady state response of R-L, R-C and R-L-C circuit and calculation of impedance and power factor.**
6.	**Determination of resonance frequency and quality factor of series and parallel R-L-C circuit.**
7.	**Measurement of power in a three-phase unbalanced circuit by two wattmeter method.**
8.	**Open circuit and short circuit test of a single-phase transformer.**
9.	**Load test of a single-phase transformer and determination of efficiency and regulation.**
10.	**No load characteristics of DC Separately Excited Generator.**
11.	**Determination of Torque-Speed characteristics of separately excited DC motor.**
12.	**Determination of Torque-speed characteristics and observation of direction reversal by change of phase sequence of connection of Induction motor.**

5. Suggested Learning Resources:

Text Book:

1. A. Chakrabarti, S. Nath, C.K. Chanda, "Basic Electrical Engineering", McGraw Hill Education, 2023.
2. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
3. Ritu Sahdev, "Basic Electrical Engineering", Khanna Book Publishing Co. (P) Ltd., Delhi.
4. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

Reference Books:

1. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

6. Course Outcomes (CO):

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
EE 291.1	To understand the basic demonstration and application of electrical instruments.	Identify	Understand
EE 291.2	To calibrate electrical instruments and verify network theorems.	Calibrate, verify	Apply
EE 291.3	To analyse steady state response of R-L, R-C and R-L-C circuit and calculate circuit parameters, and evaluate resonance conditions in series and parallel R-L-C configurations.	Analyse, Evaluate	Analyse
EE 291.4	To measure power in three phase unbalanced circuit by two wattmeter method.	Identify, Measure	Understand
EE 291.5	To determine efficiency, regulation and parameters of single-phase transformer	Identify, Select	Analyse
EE 291.6	To analyse the operational behaviour of DC machine and three phase induction motor.	Analyse, Implement	Analyse

7. Mapping of course outcomes to experiments

EXP. No.	CO1	CO2	CO3	CO4	CO5	CO6
EXP1	3	-	-	-	-	-
EXP2	2	3	-	-	-	-
EXP3	2	3	-	-	-	-
EXP4	2	3	-	-	-	-
EXP5	2	-	3	-	-	-
EXP6	2	-	3	-	-	-
EXP7	2	-	-	3	-	-
EXP 8	3	-	-	-	3	-
EXP 9	3	-	-	-	3	-
EXP 10	2	-	-	-	-	3
EXP 11	2	-	-	-	-	3
EXP 12	-	-	-	-	-	3

8. Mapping of the Course outcomes to Program Outcomes (PO)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
EE 291.1	3	-	-	-	-	-	-	2	-	-	2
EE 291.2	3	2	2	-	-	-	-	2	-	-	2
EE 291.3	3	2	2	1	-	-	-	2	-	-	2
EE 291.4	3	2	-	-	-	-	-	2	-	-	2
EE 291.5	3	2	3	2	-	-	-	2	-	-	2
EE 291.6	3	2	3	2	-	-	-	2	-	-	2

9. Mapping to Program Specific Outcome (PSO)

Course Outcome	PSO1	PSO2	PSO3
EE291.CO1	1	—	—
EE291.CO2	1	—	—
EE291.CO3	2	—	—
EE291.CO4	1	—	—
EE291.CO5	1	—	—
EE291.CO6	1	—	—

Course Name: WORKSHOP PRACTICES
Course Code: ME-292
(Semester- II)
Course Broad Category: Engineering Science

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1. Course Prerequisite:

Class-XII level knowledge of Physics and Mathematics.

2. Course Learning Objectives:

a. Understand and Apply Fundamental Workshop Practices:
To comprehend the principles of basic manufacturing processes (moulding, casting, forming, joining, machining), workshop safety rules, and the use of tools and machines across various workshops, while fostering ethical and safety-conscious behavior on the shop floor.

b. Develop Practical Skills in Fabrication and Machining:
To acquire hands-on experience in machining, welding, fitting, forging, carpentry, pattern-making, and sheet metal fabrication, enabling students to manufacture components and assemblies as per specified dimensions and quality standards.

3. Teaching methodology and evaluation system for the course:

Teaching methodology –Theoretical Instruction, Demonstration, Hands-on Practice, Guided Group Activities, Assessment & Feedback, Interactive Learning Methods, Documentation & Reporting.

Evaluation System –

A. Internal Assessment (PCIA): (60 Marks)- Formative Continuous Assessment [Continuous Assessment; Note Book (30 Marks), Viva Voce (20 Marks), Attendance (10 Marks)]

B. End-Semester Examination: (40 Marks)- Summative Assessment.

- **The minimum passing marks to be secured is 50 (50%) out of allotted total 100 marks (PCIA: 60 marks and ESE: 40 marks).**

4. Course Content:

Course Name: Workshop Practices
Course Code: ME 292
Hours per Week: 0L: 0T: 4P
Credits: 2

Module	Topics	44hrs
1.	General: Introduction to workshop practice, Safety precautions, Shop floor ethics, Basic First Aid knowledge. Study of mechanical tools, components and their applications **Machine Shop** a. Study of Lathe, Shaper and Milling machine and their operations b. To make a threaded pin from a mild steel rod in a lathe c. To make V- slot in a shaping and a rectangular slot in milling machine in a block of cast iron or mild steel	8
2.	**Fitting Bench Working Shop** a. Study of tools and operations b. Making a Gauge (V-Fit) from MS plate involving drilling/tapping/dieing	8
3.	**Black Smithy Shop** a. Study of tools and operations b. A simple job of making a square rod from a round bar	4
4.	**Welding Shop** a. Study of Arc welding & Gas welding b. To join two thick (approx 6mm) MS plates by manual metal arc c. To join two thin mild steel plates or sheets by gas welding	8
5.	**Sheet Metal Shop** a. Study of tools and Operations b. Fabrication of tool box/ tray with soldering	4
6.	**Carpentry Shop** a. Study of tools and Operations and carpentry joints. b. To prepare T- lap joint/Cross Lap Joint.	8
7.	**Foundry** a. Study of tools and operations b. Making a mould using single piece pattern.	4

5. Suggested Learning Resources:

Text Book:

- Hajra Choudhury S. K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

Reference Books:

- "Workshop Technology, Vol. I" by W A J Chapman
- Kalpakjian S. and Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.
- Gowri P. Hariharan and A. Suresh Babu,"Manufacturing Technology – I" Pearson Education, 2008.
- Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.
- Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

6. Course Outcomes (CO):

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
ME 292.1	Discuss workshop safety rules and manufacturing methods namely, moulding, casting, forming, joining, machining.	Discuss	Understand
ME 292.2	Acquire skill set of machining on Lathe, milling and shaping as per given dimensions.	Acquire	Apply
ME 292.3	Build wooden pattern and sand mould using pattern and moulding tools.	Build	Apply
ME 292.4	Fabricate components of given dimensions using Arc and Gas welding	Fabricate	Apply
ME 292.5	Make jobs as per given dimensions in fitting and forging shops.	Make	Apply
ME 292.6	Demonstrate sheet metal work.	Demonstrate	Apply

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6
1	3	3	-	-	-	-
2	-	-	-	-	3	-
3	-	-	-	-	3	-
4	-	-	-	3	-	-
5	-	-	-	-	-	3
6	-	-	3	-	-	-
7	-	-	3	-	-	-

8. Mapping of the Course outcomes to Program Outcomes (PO)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
ME 292.1	3	2	1	-	-	-	1	1	1	-	1
ME 292.2	2	3	2	-	-	-	1	1	1	-	1
ME 292.3	2	3	2	-	-	-	1	1	1	-	1
ME 292.4	2	3	2	-	-	-	1	1	1	-	1
ME 292.5	2	3	2	-	-	-	1	1	1	-	1
ME 292.6	2	3	1	-	-	-	1	1	1	-	1

9. Mapping to Program Specific Outcomes (PSO)

Course Outcome	PSO1	PSO2	PSO3
ME292.CO1	—	—	—
ME292.CO2	—	—	—
ME292.CO3	—	—	—
ME292.CO4	—	—	—
ME292.CO5	—	—	—
ME292.CO6	—	—	—

Course Name: Language Lab
Course Code: ENG-291
(Semester- II)
Course Broad Category: HUMANITIES

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1. Course Prerequisite:

Class- XII level knowledge of English grammar and reading, listening, writing skills.

2. Course Learning Objectives:

i. This course introduces the concepts of sustainability in civil engineering and explores the role of construction materials in developing green infrastructure.
ii. Students will also learn to design energy-efficient buildings, implement sustainable site planning, navigate green building certifications, and evaluate the economics and ethics of sustainable construction practices.

3. Teaching methodology and evaluation system for the course: Teaching methodology – Lectures and Presentations, Interactive Activities

Evaluation System –
A. Internal Assessment (60 Marks)-
B. End-Semester Exam (40 Marks)- Summative Assessment.

4. Course Content:

Course Name: Language Lab
Course Code: ENG-291
Hours per Week: 2P
Credits: 1

Module	Topics	30 L
1.	**Listening** (Telephonic Communication, Motivational Speeches)	4
2.	**Speaking** (Self Introduction, Role Playing, JAM, Extempore, News reading)	6
3.	**Presentation** (Poster + Audio Visual + short skits)	12
4.	**Body Language** (Debate, Group Discussion, Public speaking)	6
5.	**Professional Etiquette** (Conducting a programme, Presentation)	2

5. Suggested Learning Resources:

Text Book:

- Effective Technical Communication. Dr. Bharti Kukreja, Dr. Anupam Jain. Katson Books. First Edition 2019, Reprint 2023.
- Effective Technical Communication. (Late) M. Ashraf Rizvi, Priyadarshi Patnaik. McGraw Hill.
- Communication Skills. Sanjay Kumar, Pushp Lata. Rainbow Book Distributors.

Reference Books:

- Practical English Usage Fully Revised International Edition. Michael Swan. Oxford.

6. Course Outcomes (CO):

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
ENG 291.1	Acquire basic proficiency in English, including reading, listening comprehension, writing, and speaking skills, and demonstrate a basic understanding of English.	Application	Understand
ENG 291.2	Communicate confidently in English, using appropriate grammar, vocabulary, and syntax, and demonstrate effective speaking and presentation skills in different contexts.	Application	Apply, create
ENG 291.3	Communicate appropriately in professional and social situations, using appropriate language.	Application	Apply
ENG 291.4	Improve teamwork, leadership skills, and problem-solving skills through group activities.	Understand	Apply
ENG 291.5	Organize and write business correspondence properly and correctly, using appropriate knowledge of language.	Understand,	Apply
ENG 291.6	Develop active listening skills, including effective listening strategies and note-taking.	Understand	Apply

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6
1	3	2	2	2	2	2
2	2	3	3	3	3	2
3	3	2	3	2	2	3
4	2	2	2	3	2	3
5	3	3	3	2	3	2

8. Mapping of the Course outcomes to Program Outcomes (PO)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
ENG 291.1	3	1	1	1	1	1	1	1	1	3	1
ENG 291.2	3	2	2	1	1	1	1	1	3	3	2
ENG 291.3	1	2	2	1	1	1	1	3	3	3	1
ENG 291.4	3	3	3	3	1	2	1	2	3	3	3
ENG 291.5	2	3	3	2	2	2	2	2	3	3	3
ENG 291.6	3	3	3	2	1	1	1	1	2	3	2

9. Mapping to Program Specific Outcome (PSO)

Course Outcome	PSO1	PSO2	PSO3
ENG291.CO1	—	1	—
ENG291.CO2	—	1	—
ENG291.CO3	—	1	—
ENG291.CO4	1	—	1
ENG291.CO5	—	1	—
ENG291.CO6	—	1	—

Course Name: Programming for Problem Solving Lab
Course Code: CS-292
(Semester –II)
Course Broad Category: Engineering Science

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1. Course Prerequisite:

- Basic knowledge of computers and general mathematical operations.
- And/ Or ESC-CS 191

2. Course Learning Objectives:

i. Students will gain an understanding of core programming concepts, including the basic components of a computer system, algorithms, and program execution.
ii. They will develop problem-solving skills by translating algorithms into code using control structures such as conditionals, loops, and functions.
iii. Students will also learn to implement and optimize basic data structures like arrays and strings, as well as algorithms for searching and sorting.
iv. Additionally, they will work with advanced programming features like recursion, structures, pointers, and file handling to solve more complex problems.

3. Teaching methodology and evaluation system for the course:

Teaching methodology –Lectures and Presentations, Interactive Discussions and Case Studies.

Evaluation System –

A. Internal Assessment (60 Marks)- Formative Continuous Assessment
B. End-Semester Exam (40 Marks)- Summative Assessment.

4. Course Content:

Course Name: Programming for Problem Solving Lab

Course Code: CS-292

Hours per Week: 0L: 0T: 4P

Credits: 2

Unit	Content
1	Problem solving using computers: Familiarization with programming environment
2	Variable types and type conversions: Simple computational problems using arithmetic expressions
3	Branching and logical expressions: Problems involving if- then -else structures
4	Loops, while and for loops: Iterative problems e.g., sum of series
5	1D Arrays: searching, sorting: 1DArray manipulation
6	2D arrays and Strings: Matrix problems, String operations

7	Functions, call by value: Simple functions
8	Numericalmethods(Rootfinding,numericaldifferentiation,numericalintegration): Programming for solving Numerical methods problems
9	Recursion, structure of recursive calls: Recursive functions
10	Pointers, structures and dynamic memory allocation: Pointers and structures
11	File handling: File operations

5. Suggested Learning Resources:

Text & Suggested Learning Resources: Books:

- R. S. Salaria, Computer Concepts and Programming in C, Khanna Publishers
- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India(India)

6. Course Outcomes (CO):

After going through this course the Students will be able to:

Course Outcomes	Details	Action Verb	Knowledge Level
CS 292.1	Familiarize with the programming environment and use computers for problem-solving.	Familiarize, Solve	Knowledge, Application
CS 292.2	Solve simple computational problems using arithmetic expressions, understanding variable types and type conversions.	Solve, Understand	Comprehension, Application
CS 292.3	Implement branching and logical expressions for problems involving if-then-else structures.	Implement, Solve	Application, Analysis
CS 292.4	Solve iterative problems using loops, such as calculating the sum of series.	Solve, Calculate	Application, Analysis
CS 292.5	Manipulate 1D and 2D arrays, perform searching, sorting, matrix problems, and string operations.	Manipulate, Perform	Application, Synthesis
CS 292.6	Understand and implement numerical methods (root finding, numerical differentiation, and numerical integration) to solve problems using programming.	Understand, Implement	Application, Analysis
CS 292.7	Apply pointers, structures, and dynamic memory allocation concepts for efficient data management and implement file operations for real-world applications.	Apply, Implement	Application, Synthesis

7. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5	CO6	CO7
1	3	-	-	-	-	-	
2	-	3	-	-	-	-	
3	-	-	3	-	-	-	
4	-	-	-	3	-	-	
5,6	-	-	-	-	3	-	
7,8	-	-	-	-	-	3	
9,10,11							3

8. Mapping of the Course outcomes to Program Outcomes (PO)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CS 292.1	2	2	2	2	-	-	-	-	-	-	-
CS 292.2	2	2	2	2	-	-	-	-	-	-	-
CS 292.3	2	2	2	2	-	-	-	-	-	-	-
CS 292.4	2	2	2	2	-	-	-	-	-	-	-
CS 292.5	2	2	2	2	-	-	-	-	-	-	-
CS 292.6	2	2	2	2	-	-	-	-	-	-	-
CS 292.7	2	2	2	2	-	-	-	-	-	-	-

9. Mapping to Program Specific Outcomes (PSO)

Course Outcome	PSO1	PSO2	PSO3
CS292.CO1	2	2	—
CS292.CO2	3	2	—
CS292.CO3	3	2	—
CS292.CO4	3	2	—
CS292.CO5	3	2	—
CS292.CO6	3	2	—
CS292.CO7	3	3	1

Course Name: National Service Scheme (NSS)
(Semester- II)
Course Category: Extra Curricular Activity

……..……

1. **Course Prerequisite:** NA
2. **Course Learning Objectives:**

   i. The course helps students to understand the community in which they work and identify the needs and problem of the community and their solutions.
   ii. Develop capacity to meet emergencies and natural disasters
   iii. Practice national integration and social harmony

3. **Teaching methodology and evaluation system for the course:**

Teaching methodology –
Practical learning through different activities in community immersion programmes throughout the semester. One orientation seminar conducted by a guest lecturer.

Evaluation System –

i. Participation and organizing in community immersion programmes (2 for each student); Each programme contains maximum 25 marks)
ii. Project report submission on activities done (50 marks)

4. **Course Content:**

Course Name: National Service Scheme (NSS)
Course Code:
Hours per Week: 0
Credits: 0

Module	Topics	No.
1.	Orientation Seminar	1
2.	Activities generating environmental awareness	2
3.	Activities focusing on health and hygiene improvement of community	2
4.	Activities generating literacy awareness	2
5.	Activities enabling youth and gender empowerment	2

5. Course Outcomes (CO):

Course Outcomes	Details/Statement	Action Verb	Knowledge Level
CO-1	Understand the meaning NSS and its importance in society.	Explain	Understand
CO-2	Identify and implement solutions to environmental hazards	Identify, Implement	Create
CO-3	Implementation of basic activities, method and adaptation done by NSS	Implement	Apply
CO-4	Uphold the concept of volunteerism & leadership among youth and women	Design	Apply
CO-5	Be able to identify organizational structure and responsibilities	Identify, Select	Analysis

6. Mapping of course outcomes to module / course content

Module	CO1	CO2	CO3	CO4	CO5
1	3	-	-	-	-
2	-	3	2	-	-
3	-	-	2	-	-
4	-	-	2	-	2
5	-	-	2	3	2

7. Mapping of the Course outcomes to Program Outcomes (PO)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	1	-	-	-	2	-	2	1	-	2
CO2	-	1	-	-	-	2	3	2	1	-	2
CO3	-	1	-	-	-	2	-	2	1	-	2
CO4	-	1	-	-	-	2	-	2	1	-	2
CO5	-	1	-	-	-	2	-	2	1	-	2

9. Mapping to Program Specific Outcomes (PSO)

Course Outcome	PSO1	PSO2	PSO3
CO1	—	—	—
CO2	—	—	—
CO3	—	—	—
CO4	—	—	—
CO5	—	—	—

***** End of 1st Year Syllabus*****