



**Uttarakhand Technical University
Dehradun**

**Evaluation Scheme and Syllabus
For**

**B. Tech. First Year
Common to All Branches**

(Effective from Session-2016-17)



Uttarakhand Technical University, Dehradun
Common to All Branches
Program: B. Tech Year: 1st Semester: I

SCHEME & EVALUATION PATTERN

S. No.	Subject/ Lab Code	Subject/ Lab Name	Credit	PERIOD			EVALUATION					Grand Total
				L	T	P	CT	A&Q	ATT	Total	External Theory / Lab Marks	
1	TMA 101	Engg. Mathematics-I	4	3	1	0	30	10	10	50	100	150
2	TPH 101 / TCY 101	Engg. Physics/Engg. Chemistry	4	3	1	0	30	10	10	50	100	150
3	TEE 101 / TME 101	Basic Electrical Engg./Basic Mechanical Engg.	4	3	1	0	30	10	10	50	100	150
4	THM 101	Basic Technical Communication	3	3	0	0	30	10	10	50	100	150
5	TCS 101/ TEC 101	Fundamentals of Computer & Programming/ Fundamental of Electronics Engg.	4	3	1	0	30	10	10	50	100	150
6	TES 201	Environmental Studies	-	2	-	-	-	-	-	-	-	-
7	PPH 101 / PCY 101	Engg. Physics Lab/ Engg. Chemistry Lab	2	0	0	2	-	15	10	25	25	50
8	PEE 101 / PME 101	Basic Electrical Engg Lab/ Basic Mechanical Engg Lab	2	0	0	2	-	15	10	25	25	50
9	PEC 101/ PCS 101	Fundamental of Electronics Engg. Lab / Computer Prog. Lab	2	0	0	2	-	15	10	25	25	50
10	PWS 101/PED 101	Workshop Practice/ Engg. Drawing	2	0	0	2	-	15	10	25	25	50
11		Language Lab	2	0	0	2	-	30	20	50		50
			28									1000

L- No. of Lecture hours per week
T- No. of Tutorial hours per week
P- No. of Practical hours per week

CT- Class Test
A&Q - Assignment & Quiz
ATT - Attendance



Uttarakhand Technical University, Dehradun
Common to All Branches
Program: B. Tech Year: 1st Semester: I

SCHEME & EVALUATION PATTERN

S.N	Subject/ Lab Code	Subject/ Lab Name	Credit	PERIOD			EVALUATION					Grand Total
				L	T	P	CT	A&Q	ATT	TOTAL	External Theory / Lab Marks	
1	TMA 201	Engg. Mathematics-II	4	3	1	0	30	10	10	50	100	150
2	TCY 201 /TPH 201	Engg. Chemistry /Engg. Physics	4	3	1	0	30	10	10	50	100	150
3	TME 201 /TEE 201	Basic Mechanical Engg. /Basic Electrical Engg.	4	3	1	0	30	10	10	50	100	150
4	THM 201	Advanced Technical Communication	3	3	0	0	30	10	10	50	100	150
5	TCS 201 /TEC 201	Fundamentals of Computer & Programming /Fundamental of Electronics Engg.	4	3	1	0	30	10	10	50	100	150
6	TES 201	Environmental Studies	-	2	-	-	-	-	-	-	-	-
7	PCY 201 /PPH 201	Engg. Chemistry Lab/ Engg. Physics Lab	2	0	0	2	-	15	10	25	25	50
8	PME 201 /PEE 201	Basic Mechanical Engg Lab/ Basic Electrical Engg Lab	2	0	0	2	-	15	10	25	25	50
9	PCS 201/ PEC 201	Computer Progm. Lab /Fundamental of Electronics Engg. Lab	2	0	0	2	-	15	10	25	25	50
10	PED201/ PWS201	Engg. Drawing /Workshop Practice	2	0	0	2	-	15	10	25	25	50
11		Discipline/ General proficiency								50		50
			28									1000

L- No. of f Lecture hours per week

T- No. of Tutorial hours per week

P- No. of Practical hours per week

CT- Class Test

A&Q - Assignment & Quiz

ATT - Attendance

Syllabus of Course

Name of the Department: **Applied Science**

1. **Subject Code:** TMA-101
2. **Subject Title:** ENGINEERING MATHEMATICS-I
3. **Credits:** 4
4. **Contact Hours:**

L	3	T	1	P	0
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5. **Examination Duration (Hrs) :**

Theory	03	Practical	00	Sessional	02
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6. **Details:**

Unit	Course Contents	No of Contact Hours
Unit -I	Matrices Types of Matrices, Inverse of a matrix by elementary transformations, Rank of a matrix (Echelon & Normal form), Linear dependence, Consistency of linear system of equations and their solution, Characteristic equation, Eigen values and Eigen vectors, Cayley-Hamilton Theorem, Diagonalization, Complex and Unitary Matrices and its properties	8
Unit-II	Differential Calculus-I Successive Differentiation, Leibnitz's theorem, Limit , Continuity and Differentiability of functions of several variables, Partial derivatives, Euler's theorem for homogeneous functions, Total derivatives, Change of variables	8
Unit-III	Differential Calculus-II Taylor's and Maclaurin's Theorem, Expansion of function of several variables, Jacobian, Approximation of errors, Extrema of functions of several variables, Lagrange's method of multipliers (Simple applications).	8
Unit-IV	Multiple Integrals Double and triple integrals, Change of order of integration, Change of variables, Application of integration to lengths, Surface areas and Volumes – Cartesian and Polar coordinates. Beta and Gamma functions, Dirichlet's integral and its applications.	8
Unit-V	Vector Calculus Point function, Gradient, Divergence and Curl of a vector and their physical interpretations, Vector identities, Tangent and Normal, Directional derivatives. Line, Surface and Volume integrals, Applications of Green's, Stoke's and Gauss divergence theorems (without proof).	8
Total Lectures		40

Text Books:

1. E. Kreyszig, Advanced Engineering Mathematics, John-Wiley & Sons
2. B. V. Ramana, Higher Engineering Mathematics, Tata Mc Graw- Hill Publishing Company Ltd.
3. R. K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.

Reference Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Peter V. O' Neil, Advanced Engineering Mathematics, Thomas (Cengage) Learning.
3. Thomas & Finley, Calculus, Narosa Publishing House
4. Rukmangadachari, Engineering Mathematics – I, Pearson Education.
5. A. C. Srivastava & P. K. Srivastava, Engineering Mathematics, Vol - I, PHI Learning Pvt. Limited, New Delhi

SYLLABUS OF COURSE

NAME OF THE DEPARTMENT: **Applied Science**

1. **Subject Code:** TPH-101/201
2. **Subject Title:** ENGINEERING PHYSICS
3. **Credits:** 4
4. **Contact Hours:**

L	3	T	1	P	2
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5. **Examination Duration (Hrs) :**

Theory	03	Practical	03	Sessional	02
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6. **Details:**

Unit	Course Contents	No of Contact Hours
Unit -I	<p>RELATIVISTICS MECHANICS – Inertial and Non-Inertial frames, Postulates of Special theory of Relativity, Galilean and Lorenty Transformation, Length Contraction, Time Dilation, Addition of Velocities, Variation of Mass With Velocity, Concept of Rest Mass of Photon.</p> <p>RADIATION – Concept of Black Body, Energy Spectrum of Black Body Radiation, Compton Effect.</p>	8
Unit-II	<p>INTERFERENCE – Coherent Sources, Condition of Interference, Displacement of Fringes, Interference in Thin Films Wedge Shaped Film, Newton’s Rings.</p> <p>DIFFRACTION – Single and N-Slit Diffraction, Diffraction Grating, Raleigh’s Criterion of Resolution, Resolving Power of Grating.</p>	8
Unit-III	<p>Polarization: Phenomenon of Double Refraction, Ordinary and Extra-Ordinary Rays, Nicol Prism, Production and Analysis of Plane, Circularly and Elliptically Polarized Light, Optical Activity, Retardation Plate, Hall Effect.</p> <p>LASER – Principle of Laser Action, Spontaneous and Stimulated Emission of Radiation, Population Inversion, Einstein’s Coefficients, Construction and Working of He-Ne and Ruby Laser.</p>	8
Unit-IV	<p>ELECTROMAGNETIC – Ampere’s Law and Displacement Current, Maxwell’s Equations in Integral and Differential Forms, Electromagnetic Wave Propagation in Free Space and Conducting Media, Pointing Theorem.</p> <p>MAGNETIC PROPERTIES OF MATERIALS – Basic Concept of Para- Dia and Ferro – Magnetism, Phenomenon of Hysteresis and its Applications.</p>	8
Unit-V	<p>SUPERCONDUCTIVITY: Essential Properties of Superconductors (Zero Resistivity), London Equations, Meissner Effect, Critical Field, Critical Current Isotope Effect, Heat Capacity, Type I and Type II Superconductors, Characteristics of Superconductors in Superconducting State, Applications of Superconductors.</p> <p>WAVE MECHANICS: Wave Particle Duality, De Broglie Concept of Matter Waves, Heisenberg Uncertainty Principle, Schrödinger’s Wave Equation (Time Dependent And Time Independent) – Particle in One Dimensional Potential Box.</p>	8
Total Lectures		40

REFERENCE BOOKS:

1. Robert Resnick, Introduction To Special Theory of Relativity, Wiley
2. Wehr Richards & Adia, Physics of Atoms,
3. Halliday, Fundamentals of Physics, Wiley India
4. William Hayt, Engineering Electromagnetics, 7th Ed., TMH
5. Ashutosh Asthana, Engg. Physics, BS Publication, Hyderabad

Syllabus of Course

NAME OF THE DEPARTMENT: **Applied Science**

1. **Subject Code:** TCY-101/201
2. **Subject Title:** ENGINEERING CHEMISTRY
3. **Credits:** 4
4. **Contact Hours:**
5. **Examination Duration (Hrs) :**
6. **Details:**

L	3	T	1	P	2
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Theory	03	Practical	03	Sessional	02
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Unit	Course Contents	No of Contact Hours
Unit -I	GENERAL & ORGANIC CHEMISTRY Valence bond theory, Molecular orbital theory and its application, liquid crystals & its application, Reaction intermediates, Attacking reagents, inductive effect, electromeric, mesomeric (resonance) effect, Hyper conjugation, reaction intermediates, Types of organic reaction (substitution, addition, elimination reaction & organic rearrangements), Optical isomerism, E-Z nomenclature, R-S configuration, Band Theory of solids, Saytzeff's Rule, Fullerenes & Their application. Bragg's Law.	8
Unit-II	PHYSICAL & WATER CHEMISTRY Rate of reaction, order & molecularity of reaction, Zero order, First Order, Second order reaction, Steady state approximation, concept of activation energy, cell potential, liquid junction potential, conductance & its variation with dilution, Nernst distribution law and its application, Corrosion and its type, Mechanism & control, Hardness of water, Disadvantage of hard water, Water softening methods (Lime-Soda process, Ion exchange process, Zeolite process, Reverse osmosis, Calgon Process), Treatment of boiler feed water. Concepts of nano-materials and its applications	8
Unit-III	CHEMISTRY OF ENGINEERING MATERIALS Introduction & classification of polymers, Types of Polymerization, Rubber, vulcanization, Resins (Phenol Formaldehyde), Conducting and Biodegradable polymers, Pyroceramics, Toughened glass, Strengthening of glass, Refractories, Nano Composites, Fe, Al, Cu, Pb & Zn alloys, Setting and hardening of cement, applications of cement. Plaster of Paris.	8
Unit-IV	FUELS & COMBUSTION Classification of Fuels, calorific value of fuel, gross & net calorific value, determination of calorific value using Bomb calorimeter, Coal, Biomass and Biogas, Bio Fuel, Introduction of Lubricants, Mechanism of Lubrication, Classification of Lubricant, Bio Lubricant, Flash and Fire Point, Pour Point, Cloud Point, Aniline point, Viscosity index.	8
Unit-V	ANALYTICAL METHODS AND APPLICATIONS Titrimetric analysis with reference to acid-base, redox, precipitation and complexometric titrations. Elementary ideas and simple applications of UV, visible, mass and NMR spectral techniques, Differential Thermal Analysis (DTA), Differential scanning Calorimetry (DSC) and Thermo gravimetry (TGA).	8
Total Lectures		40

REFERENCE BOOKS

1. Sivasankar, Engineering Chemistry, TMH, New Delhi.
2. Morrison & Boyd, Organic Chemistry, Pearson Publication.
3. Loudon, Organic Chemistry, Oxford University Press.
4. Engineering Chemistry – Wiley India
5. C Parameswara Murthy, C V Agrawal and etal., Engineering Chemistry, BS Publication, Hyderabad

Syllabus of Course

NAME OF THE DEPARTMENT: **Electrical Engineering**

1. **Subject Code:** TEE-101/201
2. **Subject Title:** BASIC ELECTRICAL ENGINEERING
3. **Credits:** 4
4. **Contact Hours:**
5. **Examination Duration (Hrs) :**
6. **Details:**

L	3	T	1	P	2
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Theory	03	Practical	03	Sessional	02
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Unit	Course Contents	No of Contact Hours
Unit -I	<p>D.C. Network Theory : Circuit theory concepts-Mesh and node analysis. Network Theorems-Super-position theorem. Thevenin's theorem, Norton's theorem, Maximum, Power Transfer theorem, Star Delta transformation. Energy Conservation basics.</p> <p>Steady State Analysis of A.C. Circuits : Sinusoidal and phasor representation of voltage and current: single phase A.C. circuit behavior of resistance, inductance and capacitance and their combination in series & parallel and power factor, series parallel resonance-band width and quality factor : magnetic circuit.</p>	8
Unit-II	<p>Measuring Instruments: Construction and principle of operation of voltage and current measuring instruments; introduction to power and energy meters, Construction and working principles of PMMC and moving iron type voltmeters & ammeters, Single phase dynamometer wattmeter, Use of shunts and multipliers (Simple numerical problems on shunts and multipliers), Basics of digital energy meter.</p>	8
Unit-III	<p>Transformer: Principle of operation, types of construction, phasor diagram, equivalent circuit, efficiency and voltage regulation of single phase transformer, O.C. and S.C. tests.</p>	8
Unit-IV	<p>D.C. Machines Principle of electromechanical energy conversion, types of DC. machines, E.M.F. equation, Magnetization and load characteristics, losses and efficiency, Starter and speed control of D.C. motors, their applications.</p> <p>Synchronous Machines: Principle of Operation of Alternator and synchronous motor 2</p>	8
Unit-V	<p>Three phase induction Motor Principle of operation, types and methods of starting, slip-torque characteristics, applications.</p> <p>Single phase Motors: Principle of operation and methods of starting of induction motor.</p>	8
Total Lectures		40

REFERENCE BOOKS

1. V. Del Toro., Principles of electrical Engineering, Prentice hall International.
2. W.H. Hayt & J.E. Kemmerly, Engineering Circuit Analysis, Mc Graw Hill.
3. I.J. Nagrath, Basic Electrical Engineering, Tata Mc. Graw Hill.
4. A.E. Fitzgerald, D.E., Higginbotham and A Gabel, "Basic Electrical Engineering, McGraw Hill.
5. H. Cotton, Advanced Electrical Technology, Wheeler Publishing

Syllabus of Course

NAME OF THE DEPARTMENT: **Mechanical Engineering**

1. **Subject Code:** TME-101/201
2. **Subject Title:** BASIC MECHANICAL ENGINEERING
3. **Credits:** 4
4. **Contact Hours:**
5. **Examination Duration (Hrs) :**
6. **Details:**

L	3	T	1	P	2
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Theory	03	Practical	03	Sessional	02
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Unit	Course Contents	No of Contact Hours
Unit -I	<p>Fundamental Concepts and Definitions: Definition of thermodynamics, System, Surrounding and universe, Phase, Concept of continuum, Macroscopic & microscopic point of view. Density, Specific volume, Pressure, temperature. Thermodynamic equilibrium, Property, State, Path, Process, Cyclic and non cyclic processes, Reversible and irreversible processes, Quasi static process, Energy and its forms, Enthalpy. Zeroth law: Zeroth law, Different temperature scales and temperature measurement. First law: First law of thermodynamics. Processes - flow and non-flow, Control volume, Flow work and non-flow work, Steady flow energy equation.</p>	8
Unit-II	<p>Second law: Limitations of first law of thermodynamics, Essence of second law, Thermal reservoir, Heat engines. COP of heat pump and refrigerator. Statements of second law and their equivalence, Carnot cycle, Carnot theorem, Concept of entropy, Application of Thermodynamics and Thermodynamic temperature scale, Clausius inequality.</p>	8
Unit-III	<p>Internal Combustion Engines: Classification of I.C. Engines and their parts, working principle and comparison between 2 stroke and 4 stroke engine, difference between SI and CI engines. Pv and T-s diagrams of Otto and Diesel cycles, comparison of efficiency, Comparison of Auto & Diesel Engine. Properties of Pure Substance: P-v, T-s and h-s diagram, dryness fraction and steam tables. Rankine Cycle.</p>	8
Unit-IV	<p>Force system and Analysis Basic concept: Review of laws of motion, transfer of force to parallel position, resultant of planer force system, Free Body Diagrams, Equilibrium. Concept of Centre of Gravity, Centroid Area and Moment of Inertia- Perpendicular axis theorem and Parallel axis theorem Friction: Introduction, Laws of Coulomb friction, Equilibrium of bodies involving dry friction, Ladder Friction. Structure Analysis Beams: Types of beams, Statically Determinate Beams, Shear force and bending moment in beams, Relationships between loads, Theory of shear and bending moment. Trusses: Introduction, Simple Trusses, Determination of forces in simple truss members, Method of joints</p>	8
Unit-V	<p>Stress and Strain Analysis Simple stress and strain: Introduction, Normal shear stresses, Stress-strain diagrams for ductile and brittle materials, Elastic constants, One dimensional loading of members of varying cross section, Strain energy, Thermal stresses. Pure Bending of Beams: Introduction, Simple bending theory, Stress in beams of different cross sections.</p>	8
Total Lectures		40

REFERENCE BOOKS:

1. Agarwal, Basic Mechanical Engineering, Wiley India
2. J.P. Holman, Thermodynamics, Mc Graw Hill
3. Onkar Singh, S.S. Bhavikatti, Suresh Chandra, Introduction to Mechanical Engineering: Thermodynamics, Mechanics and Strength of Materials, New Age International Publishers
4. R. Yadav, Thermodynamics and Heat Engines, Vol I & II (SI Edition) Central Publishing House

Syllabus of Course

NAME OF THE DEPARTMENT: **Humanities**

1. **Subject Code:** THM-101
2. **Subject Title:** Basic Technical Communication
3. **Credits:** 3
4. **Contact Hours:**

L	3	T	0	P	0
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5. **Examination Duration (Hrs) :**

Theory	03	Practical	00	Sessional	02
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6. **Pre-requisite (if any): Relevance of Technical Communication for Technocrats:**

English Communication is an integral part of today's life. The advent of new technologies has led to the rapid development of a global village. A budding technocrat must be equipped with English language proficiency so that he / she can make a mark in this global village. Engineering students come from different backgrounds with different mother tongues. It is Imperative for them to overcome their native accentual patterns and gain proficiency in speaking Standard English. They also need to acquire optimum writing skills. Hence proper training in English speaking and writing is necessary. This goes hand in hand with the development of reading and listening skills. The course of Basic Technical Communication will help in the development and improvement of the communication skills and linguistic competence of engineering students.

7. **Objectives of the Course:**

- a) To help students perform better in all academic subjects through greater command over the English language.
- b) To promote efficiency in English language with the development of the four skills of communication i.e., LSRW (Listening, Speaking, Reading and Writing).
- c) To prepare students face the challenges of their professional lives in an increasingly globalized world.

8. **Details:**

Unit	Course Contents	No of Contact Hours
Unit -I	<p>COMMUNICATION</p> <ol style="list-style-type: none"> 1) Communication – Definition. Process of communication, 2) Types of communication—Verbal and Non-Verbal communication; Formal and Informal communication (grapevine) and their significance. 3) Barriers to Communication—Semantic barriers, Physical barriers, Psychological barriers, Interpersonal barriers and Organizational barriers. Language as a tool of communication. 4) Importance of communication with reference to students, professionals business etc. 5) Style of Technical Communication. Features of Technical Writing. <p>Note: Classroom teaching should be activity based. The teachers should ask the students to communicate in English and various activities can be given in the classroom. The students can be asked to speak on any given topic and peer evaluation should be done.</p>	8
Unit-II	<p>READING SKILLS</p> <ol style="list-style-type: none"> 1. Importance of Reading Skills, Types of Reading Skills, Methods of Improving Reading Skills, Objectives of Improving Reading Skills 2. Vocabulary Building: Antonyms, Synonyms, Homophones, Word formation (Prefixes and Suffixes). One Word substitution, 3. Jargon/Technical Terminology – Use of Jargon and examples of Jargon. 4. Paragraph: Definition. Requirements of a paragraph -- Understanding, Unity, Coherence and Emphasis in a paragraph. Identifying the Topic Sentence. Development of a Paragraph using Deductive order, Inductive order, Chronological Order (Time Order), Spatial Order (Space Order), Expository Order, Question and Answer Order, Comparison and Contrast Order. Devices used to impart Coherence and Emphasis in a Paragraph. 5. Analysis of a given Paragraph in terms of Unity, Coherence and Emphasis. 	8

	<p>6. Developing Reading Skills and Reading Comprehension through the study of thematic and value based critical reading of the following essays –</p> <p>A. Wings of Fire by Dr. A.P.J. Abdul Kalam B. The Language of Literature and Science by A. Huxley C. Man and Nature by J. Bronowski D. Science and Survival by Barry Commoner E. The Mother of the Sciences by A.J. Bahm.</p> <p>Note: the students should be given various topics to develop paragraphs so that their writing skills are developed</p>	
Unit-III	<p>WRITING SKILLS.</p> <p>1) Importance of Writing Skills, Types of Writing Skills, Methods for Improving Writing Skills, Objectives of Improving Writing Skills 2) Functional Grammar- Parts of Speech, Tenses, Verb, Conditional Sentences 3) Common Grammatical Errors: Errors of Syntax, Concord etc. 4) Précis Writing 5) Letter writing: Formal and Informal Letters. 6) Developing Writing Skills through the study of thematic and value based critical reading of the following short stories–</p> <p>A. After Twenty Years by O. Henry B. The Open Window by Saki (H.H. Munro)</p> <p>Note: Emphasis should be on activities in the classroom..</p>	8
Unit-IV	<p>LISTENING SKILLS</p> <p>1) Importance of Listening Skills, Process of listening, listening and hearing, Active and Passive Listening. Types of Listening: Academic listening, Appreciative listening, Attentive Listening, Critical Listening, and Discriminative listening etc. 2) Methods for Improving Listening Skills, Objectives of Improving Listening Skills. 3) Barriers to listening: Semantic barriers, Physical barriers, and Psychological barriers. 4) Listening Comprehension: Identifying general content, Identifying specific information. 5) Listening for Note taking and drawing inferences. 6) Developing listening skills and listening comprehension through the study of thematic and value based critical reading of the following one-act play.</p> <p>A. The Refund by Fritz Karinthy B. Poems by Ravindra Nath Tagore from Geetanjali (i) Mind Without Fear (ii) Leave This (iii) Lamp of Love</p> <p>7) Practice of Listening Skills through Language Laboratory</p> <p>1. Listening to a recording of a telephone conversation for identifying specific information as well as details. 2. Listening to a recording of a railway / airport announcement for selective listening and identifying specific information. 3. Listening to a recording of a radio / television news bulletin for identifying specific as well as over-all information 4. Listening to a recording of the description of a place, event or incident for note-taking, identifying details, descriptions and overall idea. 5. Listening to a recording of a lecture / talk on for note taking and identifying facts and drawing conclusions. 6. Listening to a recording of a television panel discussion on any topic for identifying facts, analyzing those drawing inferences and explaining the conclusion of the discussion in a logical manner. 7. Listening to passages that are read out for practicing note taking and identifying general and detailed content. 8. Listening to dialogues that are read out for identifying specific, general and detailed content.</p>	8

Unit-V	<p>SPEAKING SKILLS.</p> <ol style="list-style-type: none"> 1. Importance of Speaking Skills, Types of Speaking, Methods for Improving Speaking Skills, Objectives of Improving Speaking Skills 2. Organs of Speech, Mechanism of Speech. 3. Phonetics: Classification of English Sounds, Vowel (short vowels and long vowels), Consonants, Diphthongs, Phonemes, Allophones, Phonetic transcription. 4. Syllable: Definition, Types of Syllable. Monosyllabic, Polysyllabic words etc. 5. Stress, Rhythm, Intonation: Rising Tone, Falling Tone and Rising-Falling Tone. 6. Everyday Conversation: Tips and characteristics of a good conversation. Common manners and etiquette. 7. Debate, Making a speech, Role play, 8. Extempore, JAM Session (just a minute session). 	8
Total Lectures		40

SUGGESTED REFERENCES BOOKS:

1. Tyagi & Misra: Basic Technical Communication, PHI, New Delhi.
2. Rizvi, Effective Technical Communication, TMH, New Delhi
3. Arora & Chandra, Improve your Writing, OUP, New Delhi.
4. A.S Hornby, Guide to Patterns & Usage in English, OUP, New Delhi.
5. Suresh Kumar & Sreehari, A Handbook for English Language, Cambridge
6. Norman Lewis, Word Power Made Easy, W.R Goyal Pub. & Distributors.
7. A Ruther Ford, Basic Communication Skills, Person Education, N. Delhi
8. Michael Swan, Practical English Usage, OUP, New Delhi.
9. Joans Daniel, English Pronouncing Dictionary, Cambridge
10. John Seely, The Oxford Guide to Writing and Speaking, OUP, Delhi
11. Mohammad Aslam, Introduction of English Phonetics and Phonology, Cambridge

Syllabus of Course

NAME OF THE DEPARTMENT: **Electronics Engineering**

1. **Subject Code:** TEC-101/201

2. **Subject Title:** FUNDAMENTALS OF ELECTRONICS ENGINEERING

3. **Credits:** 4

4. **Contact Hours:**

L	3	T	1	P	2
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5. **Examination Duration (Hrs) :**

Theory	03	Practical	03	Sessional	02
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6. **Details:**

Unit	Course Contents	No of Contact Hours
Unit -I	SEMICONDUCTOR MATERIALS AND PROPERTIES: Group-IV materials, Covalent bond, Electron-hole concepts Basic concepts of energy bands in materials, Concepts of forbidden gap, Intrinsic and Extrinsic semiconductors, Donors and Acceptors impurities P-N JUNCTION DIODE: P-N junction, depletion layer, V- I characteristics, Diode resistance, Capacitance diode ratings (average current, repetitive peak current, non-repetitive current, peak-inverse voltage).	8
Unit-II	DIODE APPLICATIONS: Rectifiers (half wave and full wave), calculation of transformer utilization factor and diode ratings, Filter (C – filter), Calculation of ripple factor and Load regulation, Clipping circuits, Clamping circuits, Voltage multipliers. BREAKDOWN DIODES: Breakdown mechanisms (Zener and Avalanche), Breakdown characteristics, Zener resistance, Zener diode ratings, Zener diode application as shunt regulator	8
Unit-III	BIPOLAR JUNCTION TRANSISTOR: Basic construction, Transistor action, CB, CE and CC configurations, Input/output Characteristics, Concept of Biasing of transistors- fixed bias, Emitter bias, Potential divider bias. TRANSISTOR AMPLIFIER: Graphical analysis of CE amplifier, Concept of voltage gain, Current gain, r_e model (low frequency), Computation of A_i , A_v , R_i , R_O of single transistor CE and CC amplifier configurations.	8
Unit-IV	FIELD EFFECT TRANSISTOR: JFET: Basic construction, Transistor action, Concept of pinch off, Maximum drain saturation current, Input and Transfer characteristics, Characteristics equation CG, CS and CD configurations, Introduction to self and fixed biasing Computation of A_v , R_i , R_o , of single FET amplifiers using CS configuration. MOSFET: Depletion and Enhancement type MOSFET Construction, operation and Characteristics.	8
Unit-V	SWITCHING THEORY AND LOGIC DESIGN: Number systems, Conversions of bases, Boolean algebra, Logic gates, Concept of universal gate, Concept of K- Map (upto four variable). Operational Amplifiers Introduction and Block diagram of Op-Amp, Concept of Ideal Operational Amplifier, Ideal Op-Amp parameters, Ideal and practical characteristics of Op-Amp, Practical Op-Amp Circuits (Inverting Amplifier, Non-Inverting Amplifier, Unity Gain Amplifiers, Summing amplifier. Integrator, Differentiator)	8
Total Lectures		40

SUGGESTED REFERENCES BOOKS:

1. Tyagi & Misra: Basic Technical Communication, PHI, New Delhi.
2. Rizvi, Effective Technical Communication, TMH, New Delhi
3. Arora & Chandra, Improve your Writing, OUP, New Delhi.
4. A.S Hornby, Guide to Patterns & Usage in English, OUP, New Delhi.
5. Suresh Kumar & Sreehari, A Handbook for English Language, Cambridge
6. Norman Lewis, Word Power Made Easy, W.R Goyal Pub. & Distributors.
7. A Ruther Ford, Basic Communication Skills, Person Education, N. Delhi
8. Michael Swan, Practical English Usage, OUP, New Delhi.
9. Joans Daniel, English Pronouncing Dictionary, Cambridge
10. John Seely, The Oxford Guide to Writing and Speaking, OUP, Delhi
11. Mohammad Aslam, Introduction of English Phonetics and Phonology, Cambridge

Syllabus of Course

NAME OF THE DEPARTMENT: **Electronics Engineering**

1. **Subject Code:** TEC-101/201

2. **Subject Title:** FUNDAMENTALS OF ELECTRONICS ENGINEERING

3. **Credits:** 4

4. **Contact Hours:**

L	3	T	1	P	2
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5. **Examination Duration (Hrs) :**

Theory	03	Practical	03	Sessional	02
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6. **Details:**

Unit	Course Contents	No of Contact Hours
Unit I	Introduction to Computer & Basics of Programming: Introduction to Computer: CPU organization, ALU, registers & memory. Number systems, binary, octal & hexadecimal codes and their inter conversions. Data representation, representation of signed & unsigned numbers in memory, IEEE representation of float numbers. Introduction to Programming: Introduction to algorithm, flow chart & program. Programming languages, High level, middle level & low level language. Introduction to the program editing tools such as vi or MS-VC editors. Compilers & interpreters, The idea of program execution at micro level. Introduction to operating systems such as DOS, Windows, UNIX etc. Generations of Computer.	8
Unit II	C Programming (Data Types, Variables, Operators, Control Statements): Data types, Identifiers, Storage class, Constant, Operators, Binary arithmetic, Expression, Statements, Console I/O statements, Decision control statements: if-else, switch-case, Loop/Iteration control statements: while, do-while & for. Jump control statements: return, go to, break, continue and comments.	8
Unit III	Pointers: Memory addresses, Byte addressable memory, pointer variables, pointer operator, pointer expression, pointer arithmetic, multiple indirection of pointers, Application of pointer. Function: Importance of function in program/software development, function prototype, function calls, call by value & call by reference/addresses, recursion, Dynamic memory allocation/de-allocation functions (malloc, realloc, calloc and free), pointers to functions, preprocessor directives.	8
Unit IV	Array: Importance of array in programming, single dimensional arrays, two dimensional arrays, multidimensional arrays & variable length arrays. Array of pointers & pointer to an array, passing array to the function as an argument. String: Definition of string, gets & puts function for string, string handling using library functions (strlen, strcpy, strcmp, strcat, strdup, strdupr, strdupl, etc), Array of strings, String with pointers.	8
Unit V	Structure: Importance of structure, Declaration, assignment & accessing members of structure, structure within structure, array of structures, pointer to structure, passing structure to the function as an argument. Union: Comparison of union with structure, role of union in programming, Limitation with union. Enumeration: Importance of enumeration in programming. File Handling: Importance of file handling in software development, Streams and files, File system basics, Representation of file in memory, Programs to read, write and update files using library functions like fgetc, fputc, fread, fwrite, fseek, fprintf, fscanf, etc.	8
Total Lectures		40

List of References /Text Books

1. Dennis M. Ritchie, The C Programming Language
2. V. Rajaraman, [Computer Basics and C Programming, PHI
3. Yashwant Kanetkar, Let Us C, BPB
4. K.R. Venugopal, S.R. Prasad, Mastering C, TMH
5. A Behrouz, Forouzan & Richard F. Gilberg, Computer Science- A Structured Programming Approach Using C, Thomson, [India Edition]
6. MK Sharma & MP Thapliyal, Fundamental of Computers & Concepts in C Programming, Firewall Media, Delhi

PHYSICS PRACTICALS

(PPH-101/201)

List of Experiments

2. To determine the wavelength of monochromatic light by Newton's ring.
3. To determine the wavelength of monochromatic light with the help of Fresnel's biprism.
4. To determine the focal length of two lenses by nodal slide and locate the position of cardinal points.
5. To determine the wavelength of spectral lines using plane transmission grating.
6. To determine the specific resistance of the material of given wire using Carey Foster's bridge.
7. To determine the variation of magnetic field along the axis of a current carrying coil and then to estimate the radius of the coil.
8. To calibrate the given ammeter and voltmeter.
9. To study the Hall effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall-effect set up.
10. To determine energy band gap of a given semiconductor material.
11. To determine E.C.E. of copper using Tangent or Helmholtz galvanometer.
12. To draw hysteresis curve of a given sample of ferromagnetic material and from this to determine magnetic susceptibility and permeability of the given specimen.
13. To determine the ballistic constant of a ballistic galvanometer.
14. To determine the viscosity of a liquid.

Note : Additional experiments may be added based on contents of syllabus.

CHEMISTRY PRACTICALS
(PCY-101/201)

List of Experiments

1. Determination of alkalinity in the given water sample.
2. Determination of temporary and permanent hardness in water sample using EDTA as standard solution.
3. Determination of available chlorine in bleaching powder.
4. Determination of chloride content in the given water sample by Mohr's method.
5. Determination of iron content in the given ore by using external indicator
6. Viscosity of an addition polymer like polyster by Viscometer.
7. Determination of iron concentration in sample of water by colorimetric method. The method involves the use of KCNS as colour developing agent and the measurements are carried out at λ_{max} 480 nm. Note : The general procedure of estimation is given on pp653-8 of the textbook of Quantitative Chemical Analysis by A.I. Vogel 6th Edition, Publisher : Pearson education Ltd. 2000)
8. Determination of heat of neutralization of Hydrochloric acid and Sodium hydroxide
9. Determination of amount of dissolved oxygen in water
10. Separation of metal ions by paper chromatography
11. Preparation of iodoform from acetone
12. Preparation of Sodium Cobaltinitrile salt.
13. Preparation of Resins
14. Element detection & functional group identification in organic compounds

Note : Additional experiments may be added based on contents of syllabus.

FUNDAMENTALS OF ELECTRICAL ENGINEERING PRACTICALS

(PEE-101/201)

List of Experiments

1. Verification of Network Theorems.
2. Study of diode characteristics. Study of phenomenon of resonance in RLC series and parallel circuit.
3. Measurement of power in a three phase circuit by two wattmeter method.
4. Measurement of efficiency of a single phase transformer by load test.
5. Determination of parameters and losses in a single phase transformer by OC and SC test.
6. Study of characteristic of DC shunt Motor.
7. Study of characteristic of AC Motor.
8. DC generator characteristics.
9. Speed control of dc shunt motor.
10. Study running and reversing of a three phase induction motor.
11. Study of a single phase energy meter.

*Note: Additional experiments may be added based on contents of syllabus.
Wherever necessary use Breadboard.*

MECHANICAL ENGINEERING PRACTICALS
(PME-101/201)

List of Experiments

1. Study of Steam engine and steam turbine models.
2. Study of 2-stroke and 4-stroke I.C.E. models.
3. Study of Fiat engine and/ or Diesel engine prototype.
4. Study of a vapour compression Refrigeration unit tutor/refrigerator.
5. Study of a window type air conditioner.
6. To conduct the tensile test on a UTM and determine ultimate Tensile strength, percentage elongation for a steel specimen.
7. To conduct the compression test and determine the ultimate compressive strength for a specimen.
8. To conduct the Impact test (Izod / Charpy) on the Impact testing machine and to find the impact strength.
9. To determine the value of acceleration due to gravity by Atwood's Machine apparatus.
10. To verify the principle of moment by Bell Crank Lever Apparatus
11. To determine the moment of inertia of a flywheel apparatus about its axis of rotation
12. To verify Newton's second law of motion by Fletcher's Trolley apparatus
13. To find out coefficient of friction by combined inclined plane & friction slide apparatus
14. To determine the velocity ratio, mechanical advantage & efficiency of a single purchase crab apparatus & draw graph between load vs effort, mechanical advantage and efficiency.
15. To determine the velocity ratio, mechanical advantage & efficiency of a double purchase crab apparatus.

FUNDAMENTALS OF ELECTRONICS ENGINEERING PRACTICALS

(PEC-101/201)

List of Experiments

1. Study of diode characteristics.
2. To study a half wave and full wave rectifier circuit.
3. Determination of ripple factor of capacitive and non capacitive filter for HW and FW diode rectifier circuit.
4. Study of characteristics of Zener Diode as constant voltage.
5. Verification of Application of Zener Diode as shunt regulator.
6. Study of Clipper and Clamper Circuit with different waveforms.
7. Determination of characteristics of BJT in CB and CE configuration.
8. Determination of characteristics of FET in CS and CD configuration.
9. Study of BJT as single stage amplifier and determination of A_i , V_i , R_i and R_o .
10. Study of AND, NAND, OR, NOR and EXOR gates.
11. Verification of Universal gates.

Note: These practicals are to be implemented with bread board

FUNDAMENTALS OF COMPUTER & PROGRAMMING PRACTICALS
(PCS-101/PCS-201)

List of Experiments

SN	PRACTICAL TOPIC	PROGRAM	BASED ON	
1	DOS Commands	Practice of internal DOS commands	Unit-1	
		Practice of external DOS commands		
2	Simple Arithmetic operations using various data types	Write a program (WAP) in C to convert a temperature (entered from the keyboard) from Fahrenheit to Celsius and vice versa.	Unit-2	
		WAP in C to swap any two numbers entered from the keyboard (with and without using third variable)		
3	Operator	WAP in C using conditional operator to determine whether an entered year is leap year or not.		
4	Decision Control Statement	WAP in C to enter the marks of any five subjects of a student and print the division secured by the students using if-else statement.		
		WAP in C to print corresponding days of a week using switch case statement.		
5	Loop Control Statement	WAP in C to convert a decimal number to binary number and vice versa using while loop.		
		WAP in C to print the factorial of a number entered from the keyboard using do-while loop.		
		WAP in C to find out whether an entered number is prime or not using for loop.		
6	Pointer	WAP in C to swap any two numbers using pointers.		Unit-3
7	Function	WAP in C to print Fibonacci series using function.		
8	Recursion	WAP in C to print factorial of a number using recursion.		
9	Array (1-D)	WAP in C to find greatest & smallest number from an array of five integers.	Unit-4	
		WAP in C to print the sum of elements available in an array of five floats.		
		WAP in C to copy all the elements from one array to another in reverse order.		
10	Array (2-D)	WAP in C to print the addition & subtraction of the elements of any two matrices.		
11	String	WAP in C to use string functions like strlen, strcpy, strcat, etc.		
		WAP in C to check whether an entered string is palindrome or not using string functions.		
12	Structure	WAP in C to enter the title, page and price of any three books using array of structures then print the details of the books.	Unit-5	
13	Enumeration	WAP in C to print corresponding month of an entered year using enumeration.		
14	File Handling	WAP in C to print total number of characters, number of spaces, number of tabs and number of new lines written in a text file "A.TXT"		
		WAP in C to copy the contents a file "A.TXT" to another file "B.TXT"		
		WAP in C to modify a particular word written at n th Position in a file using fseek function.		

WORKSHOP PRACTICE PRACTICALS

(PWS-101/201)

1. Carpentry Shop:

- a) Study of tools and operation and carpentry joints.
- b) Simple exercise using jack plain.
- c) To prepare half- lap corner joint, mortise and tennon joints.
- d) Simple exercise on woodworking lathe.

2. Fitting Bench Working Shop :

- a) Study of tools and operations
- b) Simple exercises involving filling work.
- c) Making perfect male-female joint
- d) Simple exercise involving drilling/tapping/dieing.

3. Black Smithy Shop :

- a) Study of tools and operations
- b) Simple exercises based on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.

4. Welding Shop:

- a) Study of tools and operations.
- b) Simple butt joint.
- c) Lap joint.
- d) Oxy acetylene welding.

5. Sheet metal shop :

- a) Study of tools and operations.
- b) Making funnel complete with soldering.
- c) Fabrication of tool box, tray, electrical panel box etc

6. Machine Shop:

- a) Study of tools and operations.
- b) Plane turning.
- c) Step turning.
- d) Taper turning
- e) Threading.
- f) Single point cutting tool grinding.

REFERENCES:

1. Hajra, Bose, Roy: Workshop Technology Vol 1 & 2, Media Promotors
2. Raghuvanshi B.S.: Workshop Technology, Vol 1 & 2, Dhanpatrai

ENGINEERING DRAWING PRACTICALS

(PED-101/201)

1. Introduction Graphics as a tool to communicate ideas, Lettering and' dimensioning, Construction of geometrical figures like pentagon and hexagon.
2. Orthographic Projection Principles of orthographic projections, Principal and auxiliary planes, First and Third angle projections. Projection of points. Pictorial view. Projection of lines parallel to both the planes. Parallel to one and inclined to other, Inclined to both the planes. Application to practical problems. Projection of solid in simple position, Axis or slant edge inclined to one and parallel to other plane, Solids lying on a face or generator on a plane. Sectioning of solids lying I various positions, True shape of the section. Development of lateral surfaces, sheet metal drawing.
3. Isometric Projection Principles of isometric projection, Isometric projection using box and offset methods.

References:

1. Bhatt. N.D.: Elementary Engineering Drawing, Charoathar Publishing.
2. Laxmi Narayan V & Vaish W. : A Text Book of Practical Geometry on Geometrical drawing

LANGUAGE LAB

PRACTICALS

1. Practicing the following modules through self- learning software:
 - a) Grammar with special emphasis on Tenses
 - b) Pronunciation: of consonants, vowels, syllables and individual words
 - c) Word Stress: based on accentual patterns
 - d) Rhythm in speech based on content words and strong words
 - e) Intonation: rising, falling and rising- falling tone
 - f) Pause groups
 - g) Speech making / public speaking
2. Introducing self and others keeping in mind kinesics.
3. Common conversation practice (making small talk etc.).
4. Asking for permission.
5. Making requests.
6. Describing events / people / places
7. Extempore.
8. JAM Session (Just a Minute Session).
9. Role play
10. Holding informal discussions.
11. Logical presentation of one's views on a given topic.
12. Delivering a speech using Stress, Rhythm and Intonation.
13. Practicing the following modules through self- learning software:
 - a) Pronunciation: of consonants, vowels, syllables and individual words
 - b) Word Stress: based on accentual patterns
 - c) Rhythm in speech based on content words and strong words
 - d) Intonation: rising, falling and rising- falling tone
 - e) Pause groups
 - f) Presentation skills
14. Participating in Mock Interviews
15. Participating in Group Discussions
16. Giving Presentations keeping in mind Kinesics, Para language, and Proxemics
17. Participating in Role Play for enhancing interpersonal and corporate communication skills

Syllabus of Course

NAME OF THE DEPARTMENT: **Humanities**

1. **Subject Code:** THM-201

2. **Subject Title:** ADVANCE TECHNICAL COMMUNICATION

3. **Credits:** 3

4. **Contact Hours:**

L	3	T	0	P	0
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5. **Examination Duration (Hrs) :**

Theory	03	Practical	00	Sessional	02
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6. Pre-requisite (if any): **Relevance of Technical Communication for Technocrats**

English Communication is an integral part of today's life. The advent of new technologies has led to the rapid development of a global village. A budding technocrat must be equipped with English language proficiency so that he / she can make a mark in this global village.

Engineering students come from different backgrounds with different mother tongues. It is imperative for them to overcome their native accentual patterns and gain proficiency in speaking Standard English. They also need to acquire optimum writing skills. Hence proper training in English speaking and writing is necessary. This goes hand in hand with the development of reading and listening skills. The course of Basic Technical Communication will help in the development and improvement of the communication skills and linguistic competence of engineering students.

7. **Objectives of the Course:**

- a) To help students perform better in all academic subjects through greater command over the English language.
- b) To promote efficiency in English language with the development of the four skills of communication i.e., LSRW (Listening, Speaking, Reading and Writing).
- c) To prepare students face the challenges of their professional lives in an increasingly globalised world.

8. **Details:**

Unit	Course Contents	No of Contact Hours
Unit -I	<p>TECHNICAL COMMUNICATION</p> <ol style="list-style-type: none"> 1. Introduction to technical communication, types of technical communication, history of the development of technical communication. 2. Difference between general and technical communication, importance of technical communication. 3. Characteristic features of technical communication. Elements of style in technical communication. 4. Technical communication: Definition, Oral and Written technical communication. Difference between general writing and technical writing. 5. Computer-aided Technical Communication. 6. Style in Technical Communication. Features of technical writing. 7. Importance of Technical Communication 8. Process of preparing a technical document. 9. Elements, features and objectives of scientific articles, research papers, dissertation and thesis. <p>Note: Emphasis should be on the practical use of Computer like MS Word, Office, Blog and Twitter</p>	8
Unit-II	<p>BUSINESS COMMUNICATION</p> <ol style="list-style-type: none"> 1. Importance and Features of Business Communication 2. Business Correspondence – Principles, Features, Types, Format and layout of Business letter. 3. Types of Business Correspondence – letters of Enquiry, Quotation, Order, Instructions, Sales, Credit, Complaint, Collection etc. 4. Some more types of Business Correspondence -- Notice, Agenda, Minutes, Memorandum. 5. Job Application letters -- Covering letter, Resume, Bio-data and C.V. <p>Note: Practical Exercises should be given to the students in the classroom.</p>	8

Unit-III	TECHNICAL PROPOSAL and TECHNICAL REPORT <ol style="list-style-type: none"> 1. Technical Proposal – Introduction, purpose, features, types, format, importance, process of preparation. Writing technical proposals. 2. Technical Report -- Features, Types, Style, Format, Relevance. Writing Technical Reports.. 	8
Unit-IV	LITERATURE <ol style="list-style-type: none"> 1. Critical reading and thematic, value-based study of the Novella, ‘Animal Farm’ by George Orwell. 2. Critical review, study of theme, plot, symbolism, characterization, style of writing etc 	8
Unit-V	SOFT SKILLS This unit should be covered in classroom teaching as well as judicious use of language lab, (There should be optimum use of software’s related to accent, presentation skills etc.) <ol style="list-style-type: none"> 1. Kinesics, Para language, Proxemics, Haptics, Chronemics 2. Presentation skills - Features, Types, Structure, Aids and Importance. 3. Interpersonal communication skills – Role of Personality and its various attributes like EQ, attitude, motivation, stress management and accepting criticism in determining efficacy of interpersonal communication. 4. Corporate communication skills – Role of business etiquette, conducting meetings, managing conflict, negotiation, team spirit, decision-making, time management and problem solving skills. 5. Group Discussion skills - Features and Importance 6. Facing Interviews - Interview Tips. 	8
Total Lectures		40

Reference Books:

1. Gupta, Advanced Technical Communication, Cambridge University Press, N. Delhi
2. Sharma & Mishra, Communication Skills for Engineers and Scientists, PHI Learning, N. Delhi.
3. George Orwell, Animal Farm, Penguin Publishing Company, N. Delhi
4. Sharma & Mohan, Business Correspondence and Report Writing, TMH, N Delhi.
5. Rubens, Science & Technical Writing, Foundation books, Cambridge, N. Delhi
6. Daniel Riordan, Technical Communication, Cengage Learning, N. Delhi
7. Raman & Sharma, Technical Communication, OUP, N. Delhi
8. Wallace, Masters Personality Development, Cengage Learning, N. Delhi
9. Robert Barrass, Students Must Write, Foundation books, Cambridge,

Syllabus of Course

NAME OF THE DEPARTMENT: **Applied Science**

1. **Subject Code:** TMA-201
2. **Subject Title:** ENGINEERING MATHEMATICS-II
3. **Credits:** 4

4. **Contact Hours:**

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5. **Examination Duration (Hrs) :**

Theory	03	Practical	00	Sessional	02
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6. **Details:**

Unit	Course Contents	No of Contact Hours
Unit-I	Ordinary Differential Equation Introduction of differential equation, Order and degree, Ordinary differential equation, Exact differential equation, Linear differential equation of first order, Linear differential equation of nth order with constant coefficient's, Simultaneous linear differential equation, Homogenous linear differential equation, Method of variation of parameters.	8
Unit-II	Laplace Transform and its Applications Laplace transform and its properties, Existence theorem, Laplace transform of derivatives and integral, Inverse Laplace transform, Laplace transform of periodic function and unit step function, Convolution theorem, Application of Laplace transform to solve linear and simultaneous differential equation.	8
Unit-III	Fourier series Introduction of Fourier series, Periodic function and Trigonometric function with their Fourier series expansion, Euler's formula, Even and odd functions, Function with arbitrary time periods, Change of interval, half range sine and cosine series.	8
Unit-IV	Partial differential equation Introduction of partial differential equation, Order and degree, Formulation of partial differential equation, Lagrange's method of multipliers, Linear partial differential equation of nth order with constant coefficients, Classification of second order partial differential equation.	8
Unit-V	Application of Partial differential equations Method of Separations of variables for solving partial differential equation. One and two dimensional wave equation, One dimensional and two dimensional heat flow equation, Laplace equation with suitable examples.	8
Total Lectures		40

References:

1. A Text book of Engineering Mathematics (Vol.2) by Peter V. O' Neil, Cengage Learning.
2. B. S. Grewal: Higher Engineering Mathematics, Khanna Publications.
3. C. Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya.
4. E. Kreyszj: Advanced Engineering Mathematics, Wiley Eastern.
5. M.D. Raisinghania: Ordinary & Partial Differential Equations, S. Chand Publication.