Panjab University, Chandigarh
Scheme of Examination and Syllabi for
B.E. (Electrical and Electronics Engineering)
1st and 2nd Semesters for Academic Year 2017-2018

Year: First **Semester: First**

S. No.	Course Code	Course Name	Scheme of Teaching			Scheme of Examination			
			L-T-P	Contact hrs/week	Credits	Theory			Practical*
						Internal Assessment	University Assessment	Total	
1.	MATHS101	Calculus	4-1-0	5	4	50	50	100	-
2.	EC102	Introduction to Electronics	3-0-2	5	3+1	50	50	100	50
3.	ME103	Workshop Practice	0-0-4	4	0+2	-	-	-	50
4.	CH101	Applied Chemistry	4-0-3	7	4+1	50	50	100	50
5.	HSS102	Communication Skills	2-0-0	2	2	50	50	100	-
6.	EE-E101	Basic Electrical Engineering	3-1-2	6	4+1	50	50	100	50
Total			**16-2-11**	**29**	**22**	**250**	**250**	**500**	**200**

Year: First **Semester: Second**

S. No.	Course Code	Course Name	Scheme of teaching			Scheme of Examination			
			L-T-P	Contact hrs/week	Credits	Theory			Practical*
						Internal Assessment	University Assessment	Total	
1.	MATHS201	Differential Equations and Transforms	4-1-0	5	4	50	50	100	-
2.	HSS201	Ethics and Self Awareness	2-0-0	2	2	50	50	100	-
3	-	Physics Course 1#	4-0-3	7	4+1	50	50	100	50
4.	CS204	Computer Programming	3-0-2	5	3+1	50	50	100	50
5.	GS201	Introduction to Environment Science	3-0-0	3	3	50	50	100	-
6.	EE-E201	Electrical Measurement and Instrumentation	3-1-2	6	4+1	50	50	100	50
Total			**19-2-7**	**28**	**23**	**300**	**300**	**600**	**150**

Summer Vacations training (four weeks):

S. No.	Subject Code	Subject Name	L-T-P	Contact hrs/week	Credits	Marks		
						Theory		Practical*
						Internal Assessment	University Exam	
1.	IPD201	Innovative product design	0-0-20	20	0+2	Nil	Nil	50

Note: Students will undergo four week in-house training during summer vacations in their respective branches. They will be trained to handle laboratory and practical aspects in their field of engineering.
The marks and credits of Innovative product design (IPD201) will be added in the second semester mark-sheet.

***** Practical marks are for continuous and end semester evaluation

Any one of the following three papers to be chosen by the institute
Paper Title: Oscillation and optics Paper Code: APH 101/ APH 201
Paper Title: Quantum and Statistical Physics Paper Code: APH 103/ APH 203
Paper Title: Physics of Materials Paper Code: APH 207/ APH 107

FIRST SEMESTER

Course Code	**MATHS101**
Course Title	**Calculus**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	 50 50
Course Prerequisites	
Course Objectives (CO)	1. To understand the behaviour of infinite series and its use. 2. To learn the concepts of functions of two and more than two variables and their applications. 3. To learn the methods to evaluate multiple integrals and their applications to various problems. 4. To understand the concepts of Vector calculus and their use in engineering problems.
Course Outcome	1. The students are able to test the behaviour of infinite series. 2. Ability to analyze functions of more than two variables and their applications. 3. Ability to evaluate multiple integrals and apply them to practical problems. 4. Ability to apply vector calculus to engineering problems

SYLLABUS

Note for the examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION-A

FUNCTIONS OF ONE VARIABLE

Sequences and Series: Sequences, Limits of sequences, Infinite series, series of positive terms, Integral test, Comparison test, Ratio test, Root test. Alternating series, Absolute and Conditional Convergence, Leibnitz test. Power series: radius of convergence of power series, Taylor's and Maclaurin's Series, Formulae for remainder term in Taylor and Maclaurin series, Error estimates. (Scope as in Chapter 11, Sections 11.1 – 11.9 of Reference 1).

Integral Calculus: Areas of curves, Length of curves, Volume (disk and washer method) and surface areas of revolution (Scope as in Chapter 5, Sections 5.6, Chapter 6, 6.1, 6.3, 6.5 of Reference 1).

(11 hours)

DIFFERENTIAL CALCULUS OF FUNCTIONS OF TWO AND THREE VARIABLES

Concept of limit and continuity of a function of two and three variables, Partial derivatives, total derivative, Euler's theorem for homogeneous functions, composite function, differentiation of an implicit function, chain rule, change of variables, Jacobian, Taylor's theorem, Errors and increments**,** Maxima and minima of a function of two and three variables, Lagrange's method of multipliers (Scope as in Chapter 14, Sections 14.1-14.4, 14.6-14.10 of Reference 1).

(10 hours)

SECTION-B

INTEGRAL CALCULUS OF FUNCTIONS OF TWO AND THREE VARIABLES

Double and triple integrals, Change of order of integration, Change of Variables, Applications to area, volume and surface area. (Scope as in Chapter 15 of Reference 1).

(9 hours)

VECTOR DIFFERENTIAL CALCULUS

Vector-valued functions and space curves, arc lengths, unit tangent vector, Curvature and torsion of a curve, Gradient of a Scalar field, Directional Derivative (Scope as in Chapter 13, Sections 13.1, 13.3-13.5 Chapter 14, Section 14.5 of Reference 1). (8 hours)

VECTOR INTEGRAL CALCULUS

Line integrals, Vector fields, Work, Circulation and Flux, Path Independence, Potential functions and Conservative fields, Green's theorem in the plane, Surface Areas and Surface Integrals, Stoke's Theorem, Gauss Divergence Theorem (Statements only) (Scope as in Chapter 16 of Reference 1).

(7 hours)

RECOMMENDED BOOKS

S. No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Calculus	Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas	11th edition, Pearson Education.
2.	Advanced Engineering Mathematics	E. Kreyszig.	8th edition , John Wiley.
3.	Advanced Engineering Mathematics	Michael D. Greenberg	2nd edition, Pearson Education.
4.	Advanced Engineering Mathematics	Wylie and Barrett	Tata McGraw Hill
5.	Higher Engineering Mathematics	B.V.Ramana	Tata McGraw Hill.
6.	Advanced Engineering Mathematics	R. K. Jain, S. R. K. Iyenger	Narosa Publications

Course Code	**EC202 / EC102**
Course Title	**Introduction to Electronics**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	1. To introduce the field of electronics along with the applications. 2. To understand the fundamental concepts of basic semiconductor devices and digital electronics. 3. To become familiar with basic principle of operational amplifier along with its applications. 4. To make students familiar with the basic concept of Communication System.
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION-A

Introduction to Electronics: Evolution of Electronic Devices and Integrated Circuit, Applications of electronics, Need and application of electronics in different areas (4 hours)

Semiconductor Devices: Concept of active and passive devices, Intrinsic and Extrinsic Semiconductors, conductivity of semiconductors and its temperature dependence, Semiconductor Devices: Structure, principle of operation, characteristics and applications of PN-Junction (Rectifier, Clipper and Clamper), BJT, Current Components in BJT, Input & Output characteristics BJT configurations. (12 hours)

Digital Electronics I: Number System and conversion, Binary arithmetic, basic and universal logic gates, minimization of Boolean expression using Boolean Algebra and K-map. (4hours)

SECTION-B

Digital Electronics II: Concept of flip-flops, RS, D, JK and T types, basic operation of counters and registers, Introduction to RAM & ROM, Basic principle and characteristics of Analog to Digital Converters (ADCs) and Digital to Analog Converters (DACs). (8 hours)

Operational Amplifier and its applications: Block diagram, characteristics, inverting and non-inverting configurations, Op-amp as summing amplifier, difference amplifier, integrator and differentiator. (8 hours)

Communication Systems: Various frequency bands used for communication, Block diagram of Analog and Digital communication, need of modulation, comparison of Analog and Digital communication systems. (6 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Integrated Electronics	Millman & Halkias	Mc-Graw Hill
2.	Electronics Devices & Circuit Theory	RL Boylestead & L Nashelsky	PHI
3.	Modern Digital Electronics	R P Jain	Tata McGraw Hill.
4.	Electronic Communication Systems	G. Kennedy	McGraw Hill, 4th Edition

List of Experiments

1. Familiarization with electronic components and usage of Multimeter
2. Familiarization with CRO and Signal Generator.
3. To study the V-I characteristics of pn junction diode and determine static resistance and dynamic resistance.
4. To implement clipper and clamper circuits.
5. To plot the characteristics of BJT configurations.
6. To verify Truth Table of different logic gates.
7. To verify Truth Table of different flip-flops.
8. To study Op-amp as summing amplifier.
9. To study Op-amp difference amplifier.
10. To study Op-amp integrator and differentiator.
11. A project related to implementation of application based Electronic Circuit on a general purpose PCB.

Course Code	**ME 203 / ME103**
Course Title	**Workshop Practice**
Type of Course	Core
Course Assessment Methods Practical (Continuous and end semester evaluation)	50
Course Prerequisites	Basic Workshop Practices
Course Objectives (CO)	1. To know different machines, tools and equipment, Identify different Engineering materials, metals and non-metals. 2. To understand different Mechanisms, Use of Machines, Tools and Equipment. 3. Knowledge of basic Manufacturing Processes in Electronics, Electrical, Machine, Welding, Fitting, Sheet Metal.Smithy, Foundry and Carpentry Workshops.
Course Outcome	1. Familiarity with common machines, Tools and Equipment in basic Workshop Practices. 2. On hand basic workshop practices in Electronics, Electrical, Machine, Welding, Fitting, Sheet Metal. Smithy, Foundry and Carpentry Workshops in Engineering professions. 3. Applications of Basic Workshop Practices.

SYLLABUS

Instruction for Students: The candidate will be attending a laboratory session of three hours weekly. Practice of basic exercises related with different shops. On hand basic workshop practices in Electronics, Electrical, Machine, Welding, Fitting, Sheet Metal. Smithy, Foundry and Carpentry Workshops in Engineering professions.

Welding Workshop :
(Theory)Joining Processes, Welding and its Classification, Welding Processes, Fusion Welding, Pressure Welding, Electric Arc Welding, Gas Welding, Resistance Welding, Metal Inert gas Welding, Welding Joints, Welding Positions, Welding defects, Welding Applications, Basic welding design and Procedures, identification of materials,

Jobs: Butt Joint in Flat Position using SMAW, Lap Joint using Spot Welding, Edge Joint in Horizontal Position using SMAW, Tee Joint in Flat position using SMAW, Corner Joint in vertical position using SMAW.
Defect Identification and marking, Edge preparation and Fillet making, Tacking, Distortion identification.

Electronics Workshop
To know about Soldering mechanism and techniques, Familiarity with Electronic Components / symbols, Testing of electronic components, Application of Soldering : Circuit Assembly

List of Jobs :
Practice of Soldering and de-soldering, Identification and testing of a) passive electronic components b) Active electronic components, Assembly of Regulated Power supply circuit.

Electrical Workshop
Introduction of Various Electric wirings, Wiring Systems, Electrical wiring material and fitting, different type of cables, Conduit pipe and its fitting, inspection points, switches of all types, Distribution boards, M.C.B's etc., Electric Shock and its management.
Electric Tools: Conversance with various tools and to carry out the following:

a) Measurement of wire sizes using SWG and micrometer
b) Identification of Phase and neutral in single phase supply

Jobs:
To control a lamp with a single way switch
To control a lamp from two different places
To assemble a fluorescent lamp with its accessories
To control a lamp, fan and a three pin socket in parallel connection with single way switches

Fitting Shop
Introduction of Fitting, different type of operations, Tools, materials, precision instruments like Vernier caliper and Micrometer etc, Safety precautions and Practical demonstration of tools and equipments

Jobs:
To make a square from MS Flat, Punching, Cutting, Filling techniques and practice, Tapping, Counter Drilling.

Smithy Workshop
Introduction of Smithy and Forging process, Tools and Equipment's, Operations, Heat Treatment processes, Advantages, Dis-advantages, Defects and Safety precautions.

Jobs:
Drawing and Upsetting Practice using Open Hearth Furnace, Cold working process practice, Heat Treatment \: Annealing and hardening process

Machine Shop
Application, Function and different parts, Operations of Lathe, Type of Cutting Tools and their materials, Drill machine Types, applications and Functions. Hacksaw machines and functions, Work Holding devices and tools, chucks, Vices, machine Vices, V Block, Measuring Instruments uses, Shaper and Milling machine Applications.

Jobs:
To perform Marking, Facing, Turning, taper Turing, Grooving, Knurling, parting, Drilling, Reaming operations on lathe machine, Hacksawing practice on Power hacksaw, Shaping operation practice on Shaper.

Carpentry Shop
Classification of Tree, Timber. Advantages and uses of Timber, Seasoning of Wood, Tools Used, Defects and Prevention of Wood,

Jobs:

Tee Joint, Cross Joint,Tenon Joint, L Shape Joint, Practice of Wood Working Lathe, Practice on multi-purpose Planer.

Foundry Shop

Introduction to Foundry, Advantages and Disadvantages of castings process, Introduction to pattern and various hand tools, Ingredients of Green sands, Various Hand Molding processes, Introduction to Casting Defects.

Jobs:

Identification and uses of hand tools, Preparation of Green sand in Muller, Preparation of Sand Mould of Single piece solid pattern, Split pattern, Preparation of Green sand Core, casting of a Mould and study its defects.

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHOR(S)**	**PUBLISHER**
1.	Introduction to Basic Manufacturing Processes and Workshop Technology	Rajender Singh	New Age International Publication
2	Manufacturing Processes	Chapman	Viva Books Private Limited

Course Code	**CH101 / CH201**
Course Title	**Applied Chemistry**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	To teach the fundamentals of basic chemical sciences essential for the development of new technologies to all branches of engineering.
Course Outcome	1) Thermodynamics will help the students learn different thermodynamic laws, heat changes and energy calculations. 2) Studying catalysis will be beneficial to understand the role and mechanism of various heterogeneous and homogeneous catalysts in increasing reactions rate of many synthetically important chemical reactions. 3) By studying corrosion, the students will learn about basic nature and reasons of corrosion, its impact in many sectors of our lives. 4) Studying spectroscopy will help to understand the basic principles of spectroscopy and its use to determine chemical structures. 5) By studying coordination chemistry and CFT, explanation about different properties of coordination compounds will be given.

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION - A

Thermodynamics: Review of objectives and limitations of chemical thermodynamics, State functions, Thermodynamic equilibrium, work, heat, internal energy, enthalpy, heat capacity, Zeroth law of thermodynamics, First law of thermodynamics, Reversible, isothermal and adiabatic expansion & compression of an ideal gas. Irreversible isothermal and adiabatic expansion of an ideal gas. Carnot cycle and efficiency of reversible engines, Enthalpy change and its measurement. Flame

temperature, Second and third law of thermodynamics. Concept of entropy. Gibb's and Helmholtz equations. Simple numerical for calculating w, q, ΔE, ΔH and entropy.
(10 hours)

Catalysis: Catalysis and general characteristics of a catalytic reactions, homogeneous catalysis, kinetics of acid, base and enzyme catalysis – Michealis Menten equations. Heterogenous catalysis. Application of catalysis for industrially important processes– hydrogenation (Wilkinson's catalyst), hydroformylation, acetic acid process and Wacker process. (6 hours)

Electrochemistry: Introduction to electrochemistry, types of electrodes, Ion selective electrodes, Reference electrodes, Fuel cells (hydrogen-oxygen, propane-oxygen, methanol-oxygen fuel cells), Corrosion: Types of corrosion, dry and wet corrosion and their mechanisms, types of electrochemical corrosion (galvanic, pitting, waterline, differential aeration, soil, microbiological, inter-granular, stress corrosion), Factors influencing corrosion, Prevention of corrosion. (8 hours)

SECTION - B

Polymer chemistry: Classification of polymers, Mechanism and methods of polymerisation, idea of number average and weight average molecular masses of polymers, preparation, properties and uses of polystyrene, polyester, polyamide, phenol-formaldehyde, silicones and epoxy resins. (5hours)

Spectroscopy: UV- Introduction, Lambert-Beer's Law, selection rules, electronic transitions, Application to simple organic molecules (auxochrome, chromophore), effect of conjugation and solvent on transition of organic molecules, Woodward-Fieser Rules for calculating λ_{max} for dienes. IR-Introduction, Principle of IR spectroscopy-Fundamental vibrations, Application to simple organic molecules (effect of masses of atoms, bond strength, nature of substituent, hydrogen bonding on IR frequency), sample preparation for IR. (10 hours)

Coordination chemistry: Introduction, Crystal Field Theory, Splitting of octahedral, tetrahedral and square planar complexes, crystal field stabilization energies of octahedral and tetrahedral complexes and its applications. (6 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHOR(S)**	**PUBLISHER**
1.	Organic Chemistry	Joseph M. Hornback Brooke	Cole Publishing Company U.S.A.
2.	Atkin's Physical Chemistry	Peter Atkins, Julio de Paula	7th Edition, Oxford University Press.
3.	Concise Inorganic Chemistry	J D Lee	Vth Edition, Chapman & Hall, 2003
4.	A Textbook of Engineering Chemistry	Shashi Chawla	Dhanpat Rai & Co. Pvt. Ltd
5.	Introductory Polymer Chemistry	G.S.Mishra	John Wiley & Sons, New York, 1993.
6.	Principles of Physical Chemistry	Puri, Sharma and Pathania	W.H. Freeman & Co, 2008.

7.	Introduction to spectroscopy	D. S. Pavia, G.M. Lasmpman and G.S. Kriz	4th Edition, Thomson learning, Indian Edition 208.
8	Basic Inorganic Chemistry	F.A. Cotton, G. Wilkinson and P.L. Gaus	3rd Ed., John Wiley & Sons.

List of Experiments

Instruction for Students: The candidate will be attending a laboratory session of three hours weekly and has to perform any eight experiments.

1. Volumetric analysis: Iodometric titrations, complexometric titrations, Acid-base titrations (conductometric), Precipitation titrations
2. Analysis of lubricants: Viscosity/surface tension/saponification value/acid value
3. Instrumental techniques for chemical analysis: Conductometry, potentiometry, UV-visible/IR spectrophotometer.
4. Preparation of few organic compounds/inorganic complexes/polymer.

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHOR(S)**	**PUBLISHER**
1.	A textbook of Quantitative Inorganic Analysis	A. I. Vogel	Longman Gp. Ltd, 4th editon
2	Essentials of Experimental Engineering Chemistry	Shashi Chawla	Dhanpat Rai and Co. Delhi (2001)
3	Vogel's text book of quantitative chemical analysis	J. Mendham, R. C. Denny, J. D. Barnes and M. J. K. Thomas	Pearson Education

Course Code	**HSS102 / HS202**
Course Title	**Communication Skills**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION - A

Fundamentals of Communication Skills

Scope and Significance of Communication Skills, Listening, Speaking, Reading and Writing (2 hours)

Writing Skills

Basics of Grammar – Word Order, Sentence Construction, Placing of Subject and Verbs, Parts of Speech, Use of Tenses, Articles, Prepositions, Phrasal Verbs, Active-Passive, Narration (4 hours)

Vocabulary Building and Writing

Word Formations, Synonyms, Antonyms, Homonyms, One-Word Substitutes, Idioms and Phrases, Abbreviations of Scientific and Technical Words (3 hours)

Speaking Skills

Introduction to Phonetic Sounds, English Phonemes, Stress, Rhythm and Intonation, Countering Stage Fright and Barriers of Communication (3 hours)

Reading and Comprehension (2 hours)

Section–B

Advanced Communication Skills

Scope, Significance, Process of Communication in an organization, Types and Levels, Communication Networks, Technical Communication, Tools of Effective Communication (2 hours)

Speaking Skills and Personality Development

Interpersonal Communication, Presentation Skills, Body Language and Voice Modulation, Persuasion,Negotiation and Linguistic Programming, Public Speaking, Group Discussions, Interviews and Case Studies, Power Point Presentations , Relevant to the context and locale, Technical Presentations, Conducting , Meeting and Conferences (5 hours)

Communication and Media
Social and Political Context of Communication, Recent Developments in Media (1 hour)

Advanced Techniques in Speaking Skills
Importance of Listening/Responding to native and global accents, Telephonic Interviews and Video Conferencing (2 hours)

Advanced Techniques in Technical Writing
Job Application, CV Writing, Business Letters, Memos, Minutes, Reports and Report Writing Strategies, E-mail Etiquette, Blog Writing, Instruction Manuals and Technical Proposals
(4 hours)

Practical Sessions

1. Individual presentations with stress on delivery and content
2. Overcoming Stage Fright - Debates, extempore
3. How to discuss in a group - Group Discussion
4. Discussion on recent developments and current debates in the media
5. How to prepare for an Interview and face it with confidence
6. Conducting meeting and conferences
7. Exercises on Composition & Comprehension, Reading Improvement

TEXT BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	The Essence of Effective Communication	R. Ludlow and F. Panton	Prentice Hall
2.	Unversity Grammer of English	Randolph. Quirk and Greenbaum Sidney	Pearson Education
3.	Effective Technical Communication	M. Rizvi Ashraf	McGraw Hill
4.	Business Communication Today	Bovee L. Courtland, V. Thill John	Pearson Education
RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHOR(S)**	**PUBLISHER**
1.	Essential of Business Communications	Mary E. Guffrey	South-Western College Publishing
2.	Technical Communications : Principles and Practice	Minakshi Raman and S. Sharma	Oxford University press
3.	Effective Communication	M. V. Rodrigues	Himalaya Publishing House
4.	English Vocabulary in Use	Michael. McCarthy, Felicity O'Dell	Cambridge University Press
5.	The Pronunciation of English	Daniel Jones	University Book Stall
6.	Business Correspondence and Report Writing	R. C. Sharma and K. Mohan	Tata McGraw Hill

7.	Communications for Professional Engineers	Bill Scott	Thomas Teleford Ltd.
8	Handbook for Technical Writing	David A. McMurrey, Buckley Joanne	Cengage Learning
9	Enhancing Employability and Recognizing Diversity	L. Harve, W. Locke, A. Morey	Universities UK and CSU
10	Student Activities for taking charge of your carrer direction and Job Search	R. Locke	Core Publishing
11	Body Language	A. Pease	Sheldon Press
12	Technical Communication: Principles and Practice	Minakshi Raman and S. Sharma	Oxford university Press

Course Code	**EE-E101**
Course Title	**Basic Electrical Engineering**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION-A

DC circuits: Voltage and current sources, network analysis by mesh and node analysis, superposition theorem, Thevenin's theorem, Norton's theorem, maximum-power transfer theorem (numerical based on these theorem). (6 hours)

Single Phase AC Fundamentals: Alternating current systems, average and RMS values of alternating, quantities, phasor notation, solution and phasor diagram of single phase ac circuits with sinusoidal source excitation. (6 hours)

Three Phase AC Fundamentals: Three phase voltages and currents generation, voltages and currents in star and delta connected systems, power in a three phase system, solution of three phase balanced circuits, power and power factor measurement by two watt-meters method. (6 hours)

SECTION-B

Magnetic Circuit: Introduction to magnetic circuit, comparison of electric and magnetic circuits, B/H curve, magnetic circuits calculations, self and mutual inductance. (5 hours)

Transformers: Introduction, Basic Principle, EMF equation, losses, efficiency and condition for maximum efficiency, voltage regulation, open circuit and short circuit tests. (6 hours)

Electric Machines: Operating principle and application of DC machine and three phase induction motors. (7 hours)

Electrical Generation and Transmission: Introduction to Resources of Electrical Power, Conventional and Non-Conventional, AC transmission voltage levels, Single Line Diagram of Power transmission network. Distribution network and Single Line Diagram of Distribution Network. (6 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Electrical & Electronic Technology	Edward Hughes	Pearson Education Publication Asia, 2003.
2.	Basic Electrical Engineering	T.K. Nagsarkar and M.S. Sukhija	OXFORD University Press, 2004.
3.	Basic Electrical Engineering	Fitzgerald, Higginbotham, & Gabriel	McGraw Hill, 4th edition.
4.	Principles of Electrical Engineering	Del Toro	PHI, New-Delhi, 2nd edition
5.	Basic Electrical Engineering TMH	I.J.Nagrath and D.P. Kothari	TMH, New Delhi, 3rd edition.
6.	Experiments in Basic Electrical Engineering	S. K. Bhattacharya and K. M. Rastogi	New Age International Publishers Ltd., New Delhi

List of Experiments

Instruction for Students: Perform at least eight experiments.

1. Measure resistance and inductive reactance of a choke coil make a series RLC circuit using the choke coil and obtain its phasor diagram.
2. To prove Superposition and Maximum Power Transfer theorem.
3. To prove Thevenin's and Norton's theorem.
4. Study the resonance in an RLC series and parallel circuits.
5. To find out the relationship between line current & phase current, between line voltage & phase voltage for star and delta connected loads supplied from balanced three phase supply.
6. To measure power and power factor using wattmeter in single phase circuit.
7. Perform Open circuit and short circuit tests on a single phase transformer to draw equivalent circuit.
8. To connect, start and reverse the direction of a 3 Phase Induction Motor and measure speed / torque.
9. Study and demonstration of earthing system for protection against shocks.
10. To measure power and power factor using two wattmeter of three phase load.

SECOND SEMESTER

Course Code	**MATHS201**
Course Title	**Differential Equations and Transforms**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	 50 50
Course Prerequisites	Calculus (MATHS101)
Course Objectives (CO)	1. To learn the methods to formulate and solve linear differential equations and their applications to engineering problems 2. To learn the concepts of Laplace transforms and to evaluate Laplace transforms and inverse Laplace transform 3. To apply Laplace transforms to solve ordinary differential equations 4. To learn the concept of Fourier series, integrals and transforms. 5. To learn how to solve heat, wave and Laplace equations.
Course Outcome	1. The student will learn to solve Ordinary Differential equations. 2. The students will be able to apply the tools of Laplace Transforms to model engineering problems and solve the resulting differential equations. 3. Students will understand the nature and behavior of trigonometric (Fourier) series and apply it to solve boundary value problems.

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION – A

Ordinary differential equations: Review of geometrical meaning of the differential equation, directional fields, exact differential equations(scope as in chapter 8, sections 8.1 – 8.10 of reference 2), solution of differential equations with constant coefficients; methods of differential operators

(scope as in chapter 9, sections 9.1 – 9.5 of reference 2). Non-homogeneous equations of second order with constant coefficients: Solution by method of variation of parameters, reduciton by order (scope as in chapter 9, section 9.7, 9.10 of reference 2). Power series method of solution(scope as in chapter 10, section 10.2 of reference 2)

(13 hours)

Laplace Trasforms: Laplace transform, Inverse transforms, shifting, transform of derivatives and integrals. Unit step function, second shifting theorem, Dirac's Delta function. Differentiation and integration of transforms. Convolution Theorem on Laplace Transforms. Application of Laplace transforms to solve ordinary differential equations with initial conditions (Scope as in Chapter 5, Sections 5.1 – 5.5 of Reference 1). (10 hours)

SECTION – B

Fourier Series and Transforms: Periodic functions, Fourier series, Even and odd series, half range expansions, Complex Fourier Series, Approximation by trigonometric polynomials. Fourier integrals, Fourier Cosine and Sine transforms, Fourier Transforms (Scope as in Chapter 10, Sections 10.1 – 10.5, 10.7 – 10.10 of Reference 1). (8 hours)

Partial Differential Equations: Partial differential equations of first order, origin, solution of linear partial differential equations of first order, Integral surfaces passing through a given curve (Scope as in Chapter 2, Sections 1, 2, 4, 5 of Reference 4). (6 hours)

Boundary Value Problems: D'Alembert's solution of wave equation, separation of variables: one dimension and two dimension heat and wave equation, Laplace equation in Cartesian and Polar coordinates (Scope as in Chapter 11, Sections 11.1, 11.3 – 11.5, 11.8 – 11.9 of Reference 1).

(8 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Elements of Partial Differential Equations	Ian N. Sneedon	McGraw Hill,Singapore 1957.
2.	Advanced Engineering Mathematics	E. Kreyszig.	8th edition , John Wiley.
3.	Advanced Engineering Mathematics	Michael D. Greenberg	2nd edition, Pearson Education.
4.	Advanced Engineering Mathematics	Wylie and Barrett	Tata McGraw Hill
5.	Higher Engineering Mathematics	B.V.Ramana	Tata McGraw Hill.
6.	Advanced Engineering Mathematics	R. K. Jain, S. R. K. Iyenger	Narosa Publications
7.	Theory and problems of Differential Equations	Frank Ayers	Shuam outline series, McGraw-Hill, Singapore, 1957

Course Code	**HSS 201 / HSS 101**
Course Title	**Ethics and Self Awareness**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION-A

Introduction to Ethics: Concept of Ethics – Nature, Scope, Sources, Types, Functions and Factors influencing Ethics, Approaches to Ethics – Psychological, Philosophical and Social, Broader Ethical Issues in Society. (6 hours)

Values, Norms, Standards and Morality: Concept and Role, Relation with Ethics, Psycho-Social Theories of Moral Development – Kohlberg and Carol Gilligan. (4 hours)

Ethics and Business

Concept of Business Ethics – Nature, Objectives and Factors influencing Business Ethics, 3 C's of Business Ethics, Ethics in Business Activities, Ethical Dilemmas in Business, Managing Ethics (5 hours)

SECTION–B

Self-Awareness: Concept of Self Awareness – Need, Elements, Self Assessment – SWOT Analysis, Self Concepts – Self-Knowledge, Assertiveness and Self-Confidence, Self-Esteem. (4 hours)

Self-Development : Concept of Self-Development, Social Intelligence, Emotional Intelligence, Managing Time and Stress, Positive Human Qualities (Self-Efficacy, Empathy, Gratitude, Compassion, Forgiveness and Motivation), Personality Development Models – Johari Window, Transactional Analysis, Myers Briggs Type Indicator, Self-Awareness and Self-Development Exercises. (11hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Business Ethics – Text and	C.S.V. Murthy	Himalaya Publishing

	Cases		House
2.	Business Ethics	Hartman, Laura P. And Chatterjee, Abha	Tata McGraw Hill
3.	Business Ethics and Professional Values	A. B. Rao	Excel Books
4.	Business Ethics – Concepts and cases	Manuel G. Velasquez	Prentice Hall
5.	Issues and Ethics in the Helping Professions	G. Corey, M. Schneider Corey, P. Callanan	Brooks/Cole
6.	Theories of Personality	S. Calvin Hall, Dardner Lindzey and John B. Cambell	Hamilton Printing Company
7.	The Curse of Self-awareness, Egotism and the Quality of Human Life	M. R. Leary	Oxford University Press
8.	Self – Awareness	Allan Twain	

Physics Course 1

Any one of the following three papers to be chosen by institute

Course Code	**APH 101 / APH 201**
Course Title	**Oscillations and Optics**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION-A

Ultrasonics: Production and detection of ultrasonics (2 hours)

SHM: Review of SHM, superposition of two SHM in one dimension, charge oscillations in LC circuits (3 hours)

Damped Oscillations: Concept and cause of damping, differential equation of a damped oscillator and different kinds of damping, Methods of describing damping of an oscillator - logarithmic decrement, relaxation time, quality factor, band width. Series LCR circuit as a damped oscillator. (3 hours)

Forced Oscillations: States of forced oscillations, differential equation of forced oscillator – its displacement, velocity and impedance, behaviour of displacement and velocity with driver's frequency, Power, bandwidth, Quality factor and amplification of forced oscillator, resonance in forced oscillators, forced oscillations in series LCR circuit (4 hours)

Wave Motion: Wave equation and its solution, characteristic impedance of a string, reflection and transmission of waves on a string at a boundary, reflection and transmission of energy, the matching of impedances (3 hours)

SECTION – B

Interference: Division of wave front and amplitude; Fresnel's biprism, Newton's rings, Michelson interferometer and its applications for determination of λ and dλ. (4 hours)

Diffraction: Fresnel and Fraunhofer diffraction, qualitative changes in diffraction pattern on moving from single slit to double slit, plane transmission grating, dispersive power & resolving power of a grating. (5 hours)

Polarization: Methods of polarization, analysis of polarized light, quarter and half wave plates, double refraction. (4 hours)

Lasers: Elementary idea of LASER production, spontaneous emission, stimulated emission, Einstein's coefficients, Helium-Neon, Ruby and semiconductor lasers, applications of lasers. (4 hours)

Fibre Optics: Basics of optical fibre - its numerical aperture, coherent bundle, step index and graded index fibre, material dispersion, fibre Optics sensors, applications of optical fibre in communication systems. (3 hours)

Holography: Basic principle, theory and requirements, applications (2 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Physics for Engineers	N. K. Verma	Prentice Hall India
2.	Physics of Vibrations and Waves	H. J. Pain	5th edition, John Wiley & Sons
3.	Vibrations and Waves	A. P. French	CBS Publishers
4.	Optics	Ajoy Ghatak	McGraw Hill Publications

List of Experiments

1. To study Lissajous figures obtained by superposition of oscillations with different frequencies and phases.
2. To find the wavelength of sodium light using Fresnel's biprism.
3. (i) To determine the wavelength of He-Ne laser using transmission grating.
   (ii) To determine the slit width using the diffraction pattern.
4. To determine the wave length of sodium light by Newton's rings method.
5. To determine the wave length of sodium light using a diffraction grating.
6. To find the specific rotation of sugar solution using a Bi-quartz Polarimeter.
7. To design a hollow prism and used it find the refractive index of a given liquid.
8. To determine the wavelength of laser using Michelson interferometer.

Course Code	**APH 103 / APH 203**
Course Title	**Quantum and Statistical Physics**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION – A

Special Theory of Relativity: Inertial and non-inertial frames of reference, Galilean transformation, Michelson Morley Experiment, postulates of special theory of relativity, Lorentz transformation, Simultaneity, Length contraction, Time dilation, Doppler effect, Addition of velocities, variation of mass with velocity, mass-energy relation . (7 hours)

Origin and Postulates of Quantum Physics: Quantum theory of light, X-rays production, spectrum & diffraction (Bragg's law), photoelectric effect, Compton effect, pair production, photons & gravity, black holes, de-Broglie hypothesis, particle diffraction, uncertainty principle and applications (7 hours)

Postulates of quantum mechanics, Schrodinger theory, time-dependent and time-independent Schrodinger equation, wave function, Born interpretation and normalization, expectation values (3 hours)

SECTION - B

Applications of Quantum Physics: Particle in a box (infinite potential well), finite potential step and barrier problems, tunneling, linear harmonic oscillator (one-dimensional). (4 hours)

Hydrogen atom (qualitative), radiative transitions and selection rules, Zeeman effect, Spin-orbit coupling, electron spin, Stern-Gerlach experiment, exclusion principle, symmetric and antisymmetric wavefunctions (5 hours)

Statistical Physics: Maxwell-Boltzmann statistics, molecular energies in an ideal gas, Bose-Einstein and Fermi-Dirac statistics, black body radiation, Rayleigh-Jeans and Planck's radiation laws, free electrons in a metal, electron-energy distribution, Fermi energy, electronic specific heat, conduction in metals, thermionic emission. (10 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Concepts of Modern Physics	Arthur Beiser	McGraw Hill Publications
2.	Solid State Physics	C. Kittel	Wiley Eastern Publications
3.	Solid State Physics	S. O. Pillai	New Age International
4.	Statistical Physics Thermodynamics	V. S. Bhatia	

List of Experiments

1) To study the quantized energy level of the first excited state in the Argon using the Frank-Hertz setup.
2) To find the value of Planck's constant and evaluate the work function of cathode material by used of photoelectric cell.
3) To study various characteristics of photo-voltaic cell: (a) Voltage-current characteristics, (b) loading characteristics, (c) power-resistance characteristics and (d) inverse square law behavior of the photo-current with distance of source of light from photo-voltaic cell
4) To study the response of a photo-resistor to varying intensity of light falling on it and deduce spectral sensitivity of its semiconductor material.
5) To study the Balmer Series of Mercury and Hydrogen spectrum using diffraction grating and calculate Rydberg constant.
6) To evaluate charge on an oil drop using Millikan's oil drop method.
7) To verify Rutherford's alpha scattering formula using a mechanical model.

Course Code	**APH 107 / APH 207**
Course Title	**Physics of Materials**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION – A

Crystal structure: Bonding forces and energies, Primary and Secondary bonds, Space Lattices, Symmetries in a cubic lattice, Crystal Structures (cubic and hexagonal cells), Assignment of coordinates, directions and planes in crystals, Linear, Planar and Space densities in crystals, close packed morphology (Hexagonal and cubic close packing), single and polycrystalline structures, interstitial spaces (trigonal, tetrahedral and octahedral voids) Structure of ceramics (NaCl, Zinc blende, silica and silicates, diamond crystal, Graphite, Fullerenes and carbon nanotubes)
Structure of polymers, crystallinity of long chain polymers. Crystal Structure analysis, X-ray diffraction and Bragg's law, Powder method for study of X-ray diffraction pattern Crystal Defects (Point, line, surface and volume imperfections) (14 hours)

Diffusion: Diffusion mechanisms, steady state diffusion, non-steady state diffusion, factors affecting diffusion, applications based on diffusion (corrosion resistance of Duralumin, carburization of steel, decarburization of steel, doping of semiconductors) (3 hours)

Elastic, Anelastic and Viscoelastic Behaviour Elastic behaviour and its atomic model, rubber like elasticity, anelastic behaviour, relaxation processes, viscoelastic behaviour, spring-dashpot model (3 hours)

SECTION – B

Plastic Deformations and strengthening mechanisms : Tensile properties (Yield strength, Tensile Strength, Ductility, Resilience, Toughness), Dislocations and plastic deformation, characteristics of dislocations, slip systems, slip in single crystals, plastic deformation of polycrystalline materials, mechanisms of strengthening in metals (grain size reduction, solid-solution strengthening, strain

hardening), recovery, recrystallization and grain growth (5 hours)

Fracture, Fatigue and Creep : Fracture (Ductile and brittle fractures), principles of fracture mechanics, fracture toughness, ductile to brittle transitions Cyclic stresses, S-N curve, crack initiation and propagation, factors that affect fatigue life, environmental effects, generalized creep behavior, stress and temperature effects. (5 hours)

Phase Diagrams : One-Component (or Unary) Phase Diagrams, Binary Isomorphous Systems, Interpretation of Phase Diagrams, Development of Microstructure in Isomorphous Alloys, Mechanical Properties of Isomorphous Alloys ,Binary Eutectic Systems, Development of Microstructure in Eutectic Alloy, Equilibrium Diagrams Having Intermediate Phases or Compounds, Eutectic and Peritectic Reactions, The Gibbs Phase -Rule (6 hours)

Phase Transformations : Kinetics of phase transformation, kinetics of solid state reactions, Isothermal transformation diagrams, continuous cooling transformation, temper embrittlement (4 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Material science and engineering – An Introduction	William D Callister	6Th edition, John Willey and Sons.
2.	Material Science and Engineering – A First Course	V. Raghvan	4th edition, Eastern economy edition
3.	Solid State Physics	S. O. Pillai	New Age International
4.	Introduction to Solids	Leonid V Azaroff	Tata McGraw Hill, 3rd edition.

List of Experiments

1. To find the energy band gap of the given semiconductor by four probe method.
2. To study the Hall Effect of a given semiconductor.
3. To determine the dielectric constant of the given materials.
4. To study the B-H curve of the ferromagnetic materials.
5. To determine the value of e/m for electron by long solenoid (helical) method.
6. To study the variation of magnetic field with distance along the axis of a circular coil carrying current by plotting a graph.
7. To find the Curie temperature of a Ferroelectric material by measuring Capacitance as a function of temperature.
8. To determine the thermal conductivity of an insulator material using guarded plate method (Lee's disc method).
9. To Study (a) Voltage-current characteristics (b) loading characteristics (c) Power-Resistance characteristics and (d) intensity response of photovoltaic cell.

Course Code	**CS204 / CS104**
Course Title	**Computer Programming**
Type of Course	
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION-A

Introduction: Computer Basic, Block Diagram of Computer, Memory Hierarchy, Types of RAM, Secondary Memory Introduction to Operating Systems, Programming Languages, Program Structure, Linux Shell Commands, Bourne Shell, C Shell, Korn Shell. (8 hours)

Basic Constructs of C: Keywords, Identifiers, Variables, Symbolic Constants, Data Types and their storage, Operands, Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Increment & Decrement Operators, Expressions, Conditional Expressions, Assignment Operators and Expressions, Type Conversions, Precedence and Order of Evaluation, External Variables and Scope of Variables. Basic Input Output, Formatted I/O. (8 hours)

Program Control Flow: Statements and Blocks, Conditional Statements, IF, ELSE-IF, Switch Case statements, Control Loops, For, While and Do-While, Go to and Labels. (4 hours)

Arrays & Functions: Pointers and Addresses, Arrays, Multi dimensional arrays, strings, pointer arrays, Functions, Function Prototyping, Scope of functions, Arguments, Call by value and call by references, static variables, recursion. (8 hours)

SECTION B

Structures: Structures, Array of Structures, pointer to structures, Typedef, Unions, Bit fields, passing structures as an argument to functions , C-Preprocessor and Macros, Command line arguments.
(4 hours)

Input and Output: Standard and Formatted Input and Output, File Access & its types, Line Input and Output, Types of Files, Binary & ASCII Files, Error handling, stderr and exit functions
(7 hours)

I**ntroduction to Object Oriented Programming:** Classes and Objects, Structures vs Classes, Abstraction, Encapsulation, Polymorphism, Inheritance. (6 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	The C Programming Language	Brian Kernighan and Dennis M. Ritchie	Prentice Hall, 2nd Edition 2007
2.	Fundamentals of Information Technology and Computer Programming	V.K. Jain	HI. Latest Edition
3.	C Programming : A Modern Approach	K.N.King	W.W. Norton Company 2nd edition (2008).
4.	C: The Complete Reference	Herbert Schildt	Tata Mcgraw Hill Publications 4th edition.
5.	Let us C++	Yashwant Kanetkar	latest edition, BPB Publications
6.	Programming in ANSI C++	E. Balagurusamy	TMH publications, dition, Reprint (2008).
7.	Programming in ANSI C	Gottfired	Schaum Series, TMH publications, 2nd Edition (1996).

List of Experiments

Instruction for Students: The candidate will be attending a laboratory session of 2 hours weekly and students have to perform the practical related to the following list.

1. Introduction to UNIX Shells, C Shell, Bourne Shell, Korn Shell
2. Writing and compiling C Program in Linux.
3. Introduction to basic structure of C program, utility of header and library files.
4. Implementation of program related to the basic constructs in C
5. Program using different data types in C
6. Programs using Loops and Conditional Statements in C
7. Programs using arrays single dimension and multi dimensions in C.
8. Implementation of Matrices and their basic functions such as addition, subtraction, multiplication, inverse.
9. Programs using functions by passing values using call by value and call by reference method
10. Programs related to structures and unions
11. Program to implement array using pointers
12. Programs related to string handling in C
13. Program to manage I/O files
14. Introduction to classes and program related to basic use of classes showing their advantages over structures.
15. Any other program related to theory program to enhance the understanding of students in the subject.

Course Code	**GS 101 / GS 201**
Course Title	**Introduction to Environment Science**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	 50 50
Course Prerequisites	
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION - A

General: Introduction, components of the environment, environmental degradation. (4 hours)

Ecology: Elements of ecology: Ecological balance and consequences of change, principles of environmental impact assessment. (4 hours)

Air pollution and control: Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures. (6 hours)

SECTION - B

Water pollution and control: Hydrosphere, natural water, pollutants their origin and effects, river/lake/ground water pollution, standards and control. (6 hours)

Land Pollution: Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes): their origin and effects, collection and disposal of solid waste, recovery and conversion methods. (6 hours)

Noise Pollution: Sources, effects, standards and control. (6 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Introduction to Environmental Engineering and Science	C. M. Masters	Prentice Hall of India Pvt. Ltd., 1991
2.	Environmental Science	B. J. Nebel	Prentice Hall Inc., 1987

Course Code	**EE-E201**
Course Title	**Electrical Measurements & Instrumentation**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION – A

Units, Dimensions and Standards: Introduction to MKS & Rationalized MKSA System, SI Units, Standards of EMF, Resistance, Capacitance and Inductance, Systematic errors. (4 hours)

General Theory of Analog Measuring Instruments: Operating torque, damping & controlling torque, T/W ratio, Pointers & Scales. Principles of operation of various types of electro mechanical indicating / registering instruments viz. PMMC, dynamometer for DC & AC measurement of V, I, W, frequency, phase & power factor etc., energy meter, their sources of error & compensation, shunts & multipliers, multi- meter. (8 hours)

Potentiometers: Basic Potentiometer circuit, multiple range potentiometers, constructional details of potentiometers, applications of d-c potentiometers; self balancing potentiometers. A-C potentiometers, polar and co-ordinate types. (6 hours)

SECTION - B

Bridges: Sources and Detectors, General equation for bridge balance, Measurement of R,L,C,M, F etc by Wheatstone, Kelvin, Maxwell, Hay's, Anderson, Owen, Heaviside, Campbell, Schering, Wien bridges. Bridge sensitivity. Errors, Wagner Earthing Device. (9 hours)

Magnetic Measurements: Flux meter, B-H Curve, Hysteresis loop, Permeameters, AC Testing of Magnetic materials, Separation of iron losses, iron loss measurement by Wattmeter and Bridge methods. (5 hours)

Instrument Transformers: Theory and construction of current and potential transformers, ratio and phase angle errors and their minimization, Characteristics of CTs. & PTs., Testing of CTS & PTS. (3 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	A Course in Electrical & Electronics Measurement & Inst	A. K. Sawhney	Dhanpat Rai & sons.
2.	Electronic Inst. & Measurement techniques	W.D. Cooper	

List of Experiments

Instruction for Students: Perform at least eight experiments.

1. Study of principle of operation of various types of moving iron, PPMC and dynamo type measuring instruments.
2. Measurement of resistance using Wheatstone Bridge.
3. Measurement of resistance using Kelvin's Bridge.
4. Measurement of self inductance using Anderson's Bridge.
5. Measurement of capacitance using Schering Bridge.
6. Plotting of Hysteresis loop for a magnetic material using flux meter.
7. Measurement of frequency using Wein's Bridge.
8. To study the connections and use of Current and potential transformers and to find out ratio error.
9. Determination of frequency and phase angle using CRO.
10. Measurement of unknown voltage using potentiometer.
11. To find 'Q' of an inductance coil and verify its value using Q- meter.
12. To measure power factor using three voltmeters/ ammeters method.