Faculty of Engineering
B.TECH and SIX YEAR B. TECH-M.B.A. INTEGRATED PROGRAM

COMMON FOR ALL BRANCHES

COMPUTER SCIENCE ENGINEERING (CSE) / ELECTRONICS & COMMUNICATION ENGINEERING (ECE)
/ ELECTRONICS & COMPUTER ENGINEERING (ECM) / MECHANICAL ENGINEERING (ME) / CIVIL ENGINEERING

(Batch 2018 Onwards)
Session 2018-19

SCHEME OF PAPERS

FIRST SEMESTER (GROUP – A)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Course No.</th>
<th>Title</th>
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<th>Credits</th>
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<tr>
<td>1.</td>
<td>CPE 101</td>
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Total Contact Hours: 28

FIRST SEMESTER (GROUP – B)

<table>
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<tr>
<th>Sr. No.</th>
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<tr>
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<td>HSS 101</td>
<td>Communication Skills *</td>
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<td>Applied Chemistry Lab *</td>
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</table>

Total Contact Hours: 31

* BAS 103, BAS 153, HSS 101, CPE 101, CPE 151, MCE 151, MCE 102, MCE 152 & ECE 153 papers will be taught in both the semesters, offered in such a way that the students study half of these papers in first semester and the remaining half in second semester.

* BAS 151, BAS 153, CPE 151, MCE-151, MCE 152 and ECE 153 are practical papers only. There will not be any theory examination for these papers.
Faculty of Engineering
Punjabi University, Patiala

General Instructions to the Paper Setters

B. Tech & Six Year B.Tech-MBA Integrated Program (Common for all Branches):
Computer Science Engineering (CSE) / Electronics & Communication Engineering (ECE) /
Electronics & Computer Engineering (ECM) / Mechanical Engineering (ME) / Civil Engineering

Applicable 2016 Batch Onwards

The B. Tech paper structure will be as shown below:

<table>
<thead>
<tr>
<th>Section</th>
<th>Questions</th>
<th>Marks</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Q1. .........................................................................</td>
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<tr>
<td></td>
<td>Q2. .........................................................................</td>
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<tr>
<td></td>
<td>Q3. .........................................................................</td>
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<td>Q4. .........................................................................</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>Q5 ............................................................................ 3x5</td>
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<tr>
<td></td>
<td>Q6. ............................................................................ 3x5</td>
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<td></td>
<td>Q7. ............................................................................ 3x5</td>
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<td>Q8. ............................................................................ 3x5</td>
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<td></td>
<td>Q9. ............................................................................ 3x5</td>
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<tr>
<td></td>
<td>Q10. ........................................................................... 3x5</td>
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<tr>
<td>C</td>
<td>Q11. a)............................................................................. 2</td>
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<td></td>
<td>b) ............................................................................. 2</td>
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<td>c) ............................................................................. 2</td>
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<td>h) ............................................................................. 2</td>
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<tr>
<td></td>
<td>i) ............................................................................. 2</td>
<td></td>
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<tr>
<td></td>
<td>j) ............................................................................. 2</td>
<td></td>
</tr>
</tbody>
</table>

Note for the paper setter:
1. Total numbers of questions to be set are Eleven (11) as per the above format.
2. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts.
3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.
4. The maximum limit on numerical problems to be set in the paper is 35% while minimum limit is 20%.
5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
8. Use of non programmable calculators shall be specified clearly, if required.
CPE -101 Computer Programming

Course Objective:
Making the students understand and learn the basics of computer how to operate it, to make familiar with the part and function of computer and its types. Second part of the course is designed to provide complete knowledge of C language. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future after completing the subject, student should be able to:

- Understand the meaning and basic components of a computer system,
- Define and distinguish Hardware and Software components of computer system,
- Design an algorithmic solution for a given problem
- Write a maintainable C program for a given algorithm.
- Trace the given C program manually.
- Write C program for simple applications of real life using structures and files.

Section A

Number System: Bit, Byte, Binary, Decimal, Hexadecimal and Octal System, Conversion from one System to another.
Binary Arithmetic: Addition, Subtraction and Multiplication.

Introduction to C: Concepts of Procedure oriented programming, Character Set, Identifiers, Keywords and Data types and storage classes.

Operators and Expressions: Arithmetic, Unary, Logical, Relational, Assignment and Conditional Operator, Associatively and Precedence of Operators

Control Structures: If, while, do-while and for loop, Nested Control Structure, Switch-case, break and Continue statements

Section B

Arrays: Single Dimensional, Multidimensional Arrays and Pointers, String reading/writing

Functions: Types of Functions, Call by Value and Call by reference, Recursion, Structures. File processing: Opening and closing data files, simple writing and reading in unformatted data files.

Object Oriented Concepts: Comparison between C and C++, structure of C++ Program, Basic Input/Output statements, introduction to Classes and Objects, creating a class and object, accessing class members (private, public), C++ Fundamentals Concepts (Definition with example) of : Encapsulation, Function Overloading, Single level Inheritance, Polymorphism and Friend Functions.

Note: This subject is common to all branches. Only basics of C++ is covered

Recommended Books:
ECE- 101 BASIC ELECTRICAL ENGINEERING

Course Objective:

Understanding of basic concepts of Electrical Science is very important as life today, is unthinkable without the use of electrical energy. This forms the base for all the engineering disciplines. Light, Industry, Agriculture, air-conditioning, broadcasting and television systems, telephone all are dependent on electrical energy. The aim of course is to study Electrical Laws, DC Networks, Electrical circuits, transformers and electrical machines.

Section-A


Sinusoidal Steady-State Response of Circuits: Concept of Phasor diagram, form factor and peak factor of a waveform. Series and parallel circuits, power and power factors, Resonance in circuits, Balanced 3-phase voltage, current and power relations, 3-phase power measurement.

Section-B


Electrical Machines: Construction, Principle of working, Function of the commutator for motoring and generation action, Characteristics and applications of DC Motor.

Course Learning Outcomes (CLO): After the completion of the course, the student should be able to:

- Learn basic concepts of Electrical Engineering.
- Apply network laws and theorems to solve electric circuits.
- Analyze transient and steady response of DC circuits.
- Explain and Analyse the behaviour of transformer.
- Understand the principle and characteristics of DC motor and DC generator.

Text Books:

Reference Books:
MCE 102 MANUFACTURING PROCESSES

Course Objective:
The objective of this course is to have a good understanding the basic concepts of manufacturing via engineering materials, casting, machining, forming, joining, welding and assembly, enabling the students to develop a basic knowledge of the mechanics, operation and limitations of basic machining tools. The course also introduces the concept of basic carpentry operations.

At the end of the course, the students should be able to (1) demonstrate the capability of selecting suitable manufacturing processes to manufacture the products optimally, (2) ability to clear basic fundamental concepts of machining, welding, casting, forming processes (3) selecting or suggesting suitable manufacturing processes to achieve the required products with the aim of avoiding material and time wastage.

Section – A

Metal Casting: Principles of metal casting, casting terminology, Patterns, their functions, types, materials and pattern allowances, Characteristics of molding sand, Types of sand molds, Types of cores, chaplets and chills; their materials and functions. Casting Defects, their causes and remedies.

Machining Processes: Principles of metal cutting, cutting tool materials and applications, types of single point cutting tools. Geometry of single point cutting tool. Cutting fluids and their functions, types of cutting fluids, selection of cutting fluids.

Machine Tools: Introduction to Centre Lathe, parts of a lathe, lathe attachments, Operations performed on lathe, work holding devices in Lathes.

Section – B
Introduction to shaper and planner machines, their operations. Introduction to multipoint cutting tools. Introduction to milling and milling operations, Drilling and allied operations, Sawing operations.


Metal Forming and Shearing: Hot and cold working, Types of Forging processes. Rolling, Wire drawing and extrusion processes, drawing, bending, spinning, stretching, embossing and coining. Die and punch operation, shearing, piercing and blanking, notching, lancing, bending and deep drawing operations.


Recommended Books
3. Campbell, Principles of Manufacturing, Materials and Processes, Tata Macgraw HillCompany
BAS 101  APPLIED PHYSICS – I

Course Objective:

The course is aimed at developing the basic scientific skills among students of engineering that are imperative for effective understanding of engineering subjects. Physical concepts included in this syllabus are importance for understanding various engineering and technological problems. At the end of the course, students shall be able to deal with phenomena related to oscillations, diffraction, interference, polarization, lasers and quantum mechanics. They will learn how to implement their scientific knowledge to solve real world problems.

Section A


Interference by division of amplitude: plane parallel thin films, colors in thin films, non-reflecting films/coatings, high reflectivity thin film coatings, Michelson interferometer.

Fraunhoffer diffraction from circular aperture, double slit and a grating (normal incidence case), Rayleigh’s criteria of resolution, resolving power of telescope, microscope and grating.

Polarization by double refraction, dichroism, Nicol prism, Concept of plane, circular and elliptical polarization with mathematical expression.

Section B


Propagation of light through optical fiber, its geometry, numerical aperture and acceptance angle, step index and graded index fibers, Signal attenuation and dispersion (qualitative ideas). Applications of optical fibers.

de-Broglie waves, velocity of de-Broglie waves, wave packets, Davisson and Germer experiment (Qualitative only), wave functions, time dependent and time independent Schrodinger wave equation, expectation value, application of Schrodinger equation to particle in an infinite potential box, potential barrier (tunneling effect), energy eigen values of linear harmonic oscillator, elementary idea of quantum computing.

Recommended Books

1. Wave and Vibrations by H.J. Pain
2. Fundamentals of optics by Jenkins and White (McGraw Hills)
3. Lasers- Theory and applications by Thyagrajan and Ghatak (McMillan Publishers)
4. Physics for Engineering Applications by S. Puri (Narosa Publishers)

Scheme of Examination

- English will be the medium of instruction and examination.
- This course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 marks for external end semester examination.
- The duration of final written examination of this paper shall be of three hours.
- The students shall be declared passed in the paper if he/she secures minimum 40% marks in each of the Internal Assessment and External Examinations separately.

Instructions to the External Paper Setter

- The External Paper will carry 50 marks and would be of three hours. The Question paper will be divided into three Sections, namely Section-A, Section-B and Section-C. There will be FIVE questions in each of the Sections A and B, of five (05) marks each. However, a question may be segregated into subparts. Section C is compulsory and contains TEN (10) sub-parts each of two (2) marks. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A&B.
- The maximum limit on numerical problems to be set in the paper is 35%.
- The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
- The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
- Use of non-programmable calculator shall be specified clearly if required.
BAS-102  MATHEMATICS-I

Course Objective:

The course is aimed at developing the basic mathematical skills among the students of engineering that are imperative for effective understanding of engineering subjects. The main objective is to inculcate the knowledge of basic concepts of Calculus, Algebra, Complex Analysis and their applications for the solutions of engineering and mathematical problems. At the end of the course, students shall be able to deal with functions of several variables, matrices, system of linear equations, improper integrals and functions of complex variables. They shall learn how to implement their mathematical knowledge to solve real world problems.

Course Content

Section A

Matrix Algebra: Special Matrices: Hermitian matrices, Skew-Hermitian matrices, Unitary matrices and Orthogonal matrices; Rank of matrices, Rank by Echelon form; Consistency of system of homogeneous and non-homogeneous equations: Gauss Elimination method, Gauss Jordan method; Eigen values and Eigen vectors of a matrix, Elementary properties of Eigen values and Eigen vectors,Eigen values of Special Matrices, Cayley Hamilton's Theorem.

Functions of several variables: Partial derivatives, Total differential, Approximation by Total Differentials, Derivatives of composite and implicit functions, Homogenous functions, Euler's theorem, Maximum and Minimum values of functions of two and three variables, Lagrange's Method of Multipliers.

Section B

Complex Analysis: De Moivre's Theorem, Power and roots of complex numbers, Expansion of $\cos^n\theta$, $\sin^n\theta$ in terms of $\cos\theta$ and $\sin\theta$ and vice-versa, Analytic functions, Necessary and Sufficient condition for a function to be analytic, CR-equations, Polar form of CR-equations, Harmonic functions, Conjugate of Harmonic functions, Laplace equation.

Improper integrals: Improper integral of First and Second kind, Absolute convergence of Improper integrals, Comparison tests (without proof), Beta and Gamma functions and their properties.

RECOMMENDED BOOKS:


Scheme of Examination

- English will be the medium of instruction and examination.
- This course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 marks for external end semester examination.
- The duration of final written examination of this paper shall be of three hours.
- The students shall be declared passed in the paper if he/she secures minimum 40% marks in each of the Internal Assessment and External Examinations separately.

Instructions to the External Paper Setter

- The External Paper will carry 50 marks and would be of three hours. The Question paper will be divided into three Sections, namely Section-A, Section-B and Section-C. There will be FIVE questions in each of the Sections A and B, of five (05) marks each. However, a question may be segregated into subparts. Section C is compulsory and contains TEN (10) sub-parts each of two (2) marks. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A&B.
- The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
- The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
CPE 151  COMPUTER PROGRAMMING LAB

Course Objective:

To familiarize the students with basic concepts of computer programming and developer tools. To present the syntax and semantics of the “C” language as well as data types offered by the Language. To allow the students to write their own programs using standard language infrastructure regardless of the hardware or software platform. After completing the subject, student should be able to:

- Design an algorithmic solution for a given problem
- Write a maintainable C program for a given algorithm.
- Trace the given C program manually.
- Write C program for simple applications of real life using structures and files.

List of Experiments

1. Experiencing DOS internal and external commands.
2. Introducing ‘C’ language basics such as data types, variables, constants etc.
3. Working with operators (arithmetic, logical and relational).
4. Write a program showing input and output functions.
5. Write a program to illustrate decision control structures.
6. Write program using looping control structures.
7. Write applications based on one and two dimensional arrays.
8. Working with pointers.
9. Write a program showing array and pointer relationship.
10. Illustrate functions and recursion.
11. Show the use of pointers in functions.
12. Write a program to show the use of functions with arrays.
13. Write a program based on structure and using union.
14. Use the pointer to point to structure.
15. Use the structures with functions.
16. Illustrate the file handling.
17. Write program to illustrate C++ program structure.
18. Write program to illustrate the use of classes and objects.
19. Write program to illustrate the concept of inheritance.
20. Write program to illustrate the concept of polymorphism.
BAS 151 APPLIED PHYSICS – I LAB

Course Objective:
The main aim of the Applied Physics –I Lab is to inculcate the practical abilities in the students along with theoretical studies. Students will be able to understand the concept of electromagnetic waves, phenomena of reflection, refraction, interference and diffraction of electromagnetic light through various experiments. At the end, students will be able to understand the optical properties of waves.

List of Experiments
1. To measure the wavelength of Laser (He-Ne) light by using reflection grating.
2. To measure angle of prism using a spectrometer.
3. To measure refractive index of prism using a spectrometer.
4. To determine wavelength of sodium light using a plane diffraction grating.
5. To determine specific rotation of sugar using Polarimeter.
6. To study Transverse nature of light.
7. To study use of CRO to measure amplitude and frequency of different waveforms.
8. To superposition of two waves using Lissajous figures.
9. To determine numerical aperture of an optical fibre.
10. To study optical fibre transmitter & receiver function for audio signal.

Scheme of Examination
- English will be the medium of instruction and examination.
- This course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 marks for external end semester examination.
- The duration of final written examination of this paper shall be of two hours.
- The students shall be declared passed in the paper if he/she secures minimum 40% marks in the Internal Assessment and end semester external examinations collectively.

Instructions to the Paper Setter
- The External Paper will carry 50 marks and would be of two hours.
- Use of non-programmable calculator shall be specified clearly if required.
Course Objective:

The objective of this course is to inculcate practical knowledge to students regarding basic manufacturing processes like: casting, machining, sheet metal forming, fitting, smithy, welding and basic carpentry operations.

At the end of the course, the students should be able to - (1) demonstrate the capability of selecting suitable manufacturing processes to manufacture the products optimally, (2) ability to clear basic fundamental concepts of machining, welding, casting, smithy, sheet metal forming, fitting and carpentry processes.

List of Experiments

1. Machine Shop: Six in one job in Machine Shop (involving turning, step cutting, threading, grooving, taper turning, knurling, drilling and tapping)
2. Fitting Shop: L – Cutting from square piece in fitting shop (involving squaring, L – cutting and squaring, drilling, tapping, reaming)
3. Sheet Metal Shop: Layout marking, cutting/shearing, bending in box shape with drilling and Riveting
4. Carpentry Shop: Cross and Lap joints, T – Joint
6. Foundry Shop: Moulding of Flange, Moulding of Core and casting of pipe.
7. Smithy Shop: Poker, Circular Ring.
ECE 153      ELECTRICAL AND ELECTRONICS LAB

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<th>Credits</th>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Objective: The educational objective of the Electrical and Electronics Lab is to provide student the basic engineering knowledge by way of electrical and electronic devices and components.

List of Experiments

1. Identification and familiarization with the basic tools used in lab.
2. Familiarization and testing of Resistance, Capacitor & Inductors.
3. To study various types of switches such as normal/miniature toggle, slide, push button, rotary, micro switches, SPST, SPDT, DPST, DPDT, band selector, multiway Master Mains Switch.
4. To study various types of protective devices such as Wire fuse, cartridge fuse, slow acting/fast acting fuse, HRC fuse, and thermal fuse, single/multiple circuit breakers, over and under current relays.
5. To get familiar with the working knowledge of the measuring instruments: a) Ammeter & Voltmeter b) Cathode ray oscilloscope (CRO) c) Multimeter (Analog and Digital)
6. To get familiar with the working knowledge of the following instruments: a) Signal generator b) Function generator c) Power supply.
7. Familiarization and testing of Diode, BJT & FET.
8. Use of diode as half wave and full wave rectifier.
9. To verify Kirchhoff’s laws.
10. Verification of truth tables of logic gates.
11. Fabrication of Printed Circuit Board.
12. To learn soldering and desoldering techniques.
HSS 101 COMMUNICATION SKILLS

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<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2.5</td>
</tr>
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</table>

Course Objective:

The objective of the course is to hone the communicative skills of the budding engineers who are expected to be globally competent. It aims at inculcating in them the skills of effective Business communication, Reading, Writing, Listening and Speaking (LSRW) skills in English. It also aims at developing the learners’ grammatical competence so as to equip them with appropriate language expressions to communicate effectively in both oral and written contexts.

Section – A

Communication: Process of communication, semantic gap, Types and channels of communication. Significance of communication in a professional organisation.

Reading Skills: Reading purposes, gears, types and effective strategies of reading.

Writing Skills: Elements of effective writing, writing styles, use of homonyms, cloze tests, one word substitution, abbreviations etc.

Business Correspondence: Elements & kinds of business letters; quotations & tenders, Job application, Résumé, Agenda, memorandum, Report writing, e-mail etiquettes.

Section – B

Listening Skills: Process of listening, kinds of listening, barriers to listening, how to become an effective listener and feedback skills.

Grammar: Tenses, words used as different parts of speech, Transformation of sentences, Active and Passive voice, Narration, correction of Sentences

Speaking Skills: Speech Mechanism, articulation of sounds, phonetic transcription, components of effective talk, group discussion, interview skills, conducting meetings, oral presentation skills, types and use of audio visual aids in presentation.

Text and Readings:


Scheme of Examination:

- English will be the medium of communication.
- The course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 for External End-semester examination.
- The duration of final written examination of this paper shall be three hours.

Instructions to the External Paper Setter:

- The External Paper will carry 50 marks and would be of three hours duration. The Question Paper will be divided into three Sections, namely Section-A, Section-B and Section-C. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts. Section C is compulsory and contains TEN (10) sub-parts each of two (2) marks. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.
- The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
Course Objective:

The objective of this course is to have good and basic understanding of concepts of chemistry and related problems in the engineering field. The topic like spectroscopy, corrosion, polymers, lubricants, thermodynamics etc is for the development of right attitude, intellectual breadth and depth in engineering and also to educate students with strong background. At the end of the course, the students certainly are able to achieve better employment opportunities and other avenues for higher studies.

Section A


Corrosion: Corrosion and cause of corrosion, factors effecting corrosion, Types of corrosion, chemical corrosion (Dry) and electrochemical corrosion (Wet) and their mechanism, types of electrochemical corrosion (galvanic, pitting, waterline, differential aeration, soil, passivity, microbiological, stress corrosion and atmospheric corrosion), prevention of corrosion. Pilling-Bedworth rule. Numerical Problems based on Pilling Bedworth rule.

Electrochemistry: Electrolytic conductance, factors affecting conductance, strong and weak electrolytes, Kohlrausch’s law, effect of dilution on molar and equivalent conductance, diffusion and Ionic mobility, conductometric titrations, types and its applications, Electrochemical cell, types of electrodes, electrode potential, EMF, Cell reactions, EMF of galvanic cell, electrochemical series & its applications, Nernst’s equation, primary (Dry cell) and secondary batteries (Lead storage batteries and Ni-Cd cell), fuel cells(H2-O2). Numericals problems of Kohlrausch’s law and molar and equivalent conductance and EMF and Electrochemical cell.

Lubricants: Classification of lubricants, lubricating oils, semisolid lubricants, solid and synthetic lubricants, properties of lubricating oils (viscosity, flash and fire points, cloud and pour point, mechanical stability and saponification number) and their significance. Numerical of viscosity index.

Section B


Chromatography: Basic principle and theory of chromatography, thin layer and column chromatography, gas chromatography, gas-liquid chromatography, gas-solid chromatography, ion exchange and high pressure liquid chromatography, simple applications of chromatography.

Cont…
**BAS 103 APPLIED CHEMISTRY Cont....**

**Polymers:** Classification and physical properties of polymers, Different methods of classification in polymers: addition and condensation polymerization, Determination of number average and weight average molecular masses of polymers, Index of Poydispersity (Polydispersity index), Tacticity of polymers (stereochemistry of polymers), Different types of polymers: Fibre forming, conducting and photochromic polymers; Synthesis and applications of engineering polymers, Preparations, properties and its applications of: silicon polymers, polyurethanes and epoxy resins. Numerical problems of Mn and Mw method.


**Books Recommended**


**Scheme of Examination**

1. English will be the medium of instructions and examinations.
2. This course will carry 100 marks of which 50 marks shall be reserved for the internal assessment and remaining 50 Marks for external end semester examination.
3. The duration of final written examination of this paper shall be of three hours.
4. The students shall be declared passed in the paper if he/she secures minimum 40% marks in each of the internal assessment and external examination separately.

**Instructions to the External Paper setter**

1. The external paper will carry 50 marks and would be of three hours. The question paper will be divided into three sections, namely Section– A, Section– B and Section– C. There will be FIVE questions in each of the Sections A and B. Of five(05)marks each. However a question may be segregated into subparts. Section C is compulsory and contains TEN(10) sub-parts each of (2) marks. Candidates will be required to attempt SIX questions by selecting three questions from each Sections A & B. 
2. The maximum limit on numerical problems to be set in the paper is, 30%.
3. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided in the solutions.
4. The paper setter should seal the internal and external envelope properly with signatures and cello tape at proper place.
5. Use of non programmable calculators shall be specified clearly if required.
MCE 151  ENGINEERING GRAPHICS

Course Objective:

The objective of this course is to inculcate good understanding of basic fundamentals of engineering graphics in the students. This course is aimed at to make the student understand visual science in the form of technical graphics. General instructions related to Theory of Orthographic Projection of points, lines, planes and solids as per the BIS codes prevalent to drawing practice will be introduced initially. Section of solids, intersection and development of surfaces, isometric projection and orthographic projection of simple solids/blocks will further upgrade the basic understanding and visualization of geometrical objects and to certain extent the machine parts.

At the end of the course, the students should be able to - (1) acquire knowledge of different conventions and methods of engineering drawing, (2) understand dimensioned projections, (3) learn how to create two-dimensional images of objects using first angle orthographic projection, (4) learn how to create isometric, perspective and auxiliary projections.

Section-A

Lines, Lettering, Dimensioning, Scales; Reference and Auxiliary Planes; Systems of Orthographic Projections; Projection of Points and Lines; True length of lines and their true angles of inclination with the reference planes; Projection of Planes and their true shape.
Polyhedral and Solids of Revolution; Projection of Solids in simple positions: Axis parallel to both the reference planes, parallel or perpendicular to one and inclined to the other or inclined to both the reference planes.
Section of solids: Section Planes, Sections and projection of sections on the reference planes; True shape of sections of simple solids.

Section-B

Development of lateral surfaces of simple solids such as cubes, prisms, cylinders, pyramids, cones, spheres etc. Intersection of lateral surfaces of simple solids penetrating into one another; Projection of lines/curves of intersection/interpenetration on the reference planes.
Isometric axes, lines and planes; Isometric scale; Drawing/Sketching isometric view of planes, plane figures and simple solids from orthographic projections; Conversion of pictorial view of simple solids into orthographic projections.

Recommended Books:

2. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Autocad, Tata McGraw Hill, New Delhi
3. M.B. Shah and B.C. Rana, Engineering Drawing, Pearson Education Asia, New Delhi
7. N. D. Bhatt and V. M. Panchal, Engineering Drawing, Charotor Publication House, Anand
BAS 153 APPLIED CHEMISTRY LAB

Course Objective:

The objectives of this paper is to develop the skill to identify the problem, analyze and solve it. Learn how to cope up and upgrade with the continuous flow of new technologies and also to educate students with strong background so that they will fulfill the needs and expectations of scientific and industrial communities.

List of Experiments

1. To determine the strength of a given acid by titrating with N/10 NaOH, conductometerically.
2. To determine the strength of a given acid by titrating with N/10 NaOH, pH metrically.
3. To verify Beer’s law and to find the concentration of an unknown solut- ion using colorimeter/ Uv- Vis spectrophotometer.
4. To estimate the strength of the given HCl solution by titrating with N/10 NaOH potentiometrically using Quinhydrone as the indicator electrode.
5. To determine the amount of Fe^{2+} ions in the given sample of Mohr salt provided with N/20 oxalic acid.
6. To determine the composition of a mixture of acid (HCl + Oxalic acid).
7. To determine the composition of a mixture of bases (NaOH + Na_{2}CO_{3} ).
8. To determine the copper content in a given sample Iodometrically.
10. To determine the total hardness of water by EDTA method.
11. Determination of coefficient of viscosity of given liquid by using Ostwald viscometer.
12. Determine the CMC of a soap/surfactant by conductometric measurements.

Scheme of Examination

1. English will be the medium of instructions and examinations.
2. This course will carry 100 marks of which 50 marks shall be reserved for the internal assessment and remaining 50 marks for external end semester examination.
3. The duration of final written examination of this paper shall be of two hours.
4. The students shall be declared passed in the paper if he/she secures minimum 40% marks in aggregates.
Faculty of Engineering  
B.TECH and SIX YEAR B. TECH-M.B.A. INTEGRATED PROGRAM  

COMMON FOR ALL BRANCHES  
COMPUTER SCIENCE ENGINEERING (CSE) / ELECTRONICS & COMMUNICATION ENGINEERING (ECE) / ELECTRONICS & COMPUTER ENGINEERING (ECM) / MECHANICAL ENGINEERING (ME) / CIVIL ENGINEERING  

(Batch 2018 Onwards)  
Session 2018-19  

SCHEME OF PAPERS  
SECOND SEMESTER (GROUP – A)  

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Course No.</th>
<th>Title</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>HSS 101</td>
<td>Communication Skills *</td>
<td>2</td>
<td>1</td>
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<td>2.5</td>
</tr>
<tr>
<td>2.</td>
<td>ECE 102</td>
<td>Basic Electronics Engineering</td>
<td>3</td>
<td>1</td>
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<tr>
<td>3.</td>
<td>BAS 103</td>
<td>Applied Chemistry *</td>
<td>3</td>
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<tr>
<td>4.</td>
<td>BAS 104</td>
<td>Applied Physics – II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
</tr>
<tr>
<td>5.</td>
<td>BAS 105</td>
<td>Applied Mathematics – II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
</tr>
<tr>
<td>6.</td>
<td>MCE 151</td>
<td>Engineering Graphics *</td>
<td>2</td>
<td>4</td>
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</tr>
<tr>
<td>7.</td>
<td>BAS 153</td>
<td>Applied Chemistry Lab *</td>
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<td>0</td>
<td>2</td>
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</tr>
<tr>
<td>8.</td>
<td>BAS 154</td>
<td>Applied Physics – II Lab</td>
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<td>0</td>
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<td>1.0</td>
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<td></td>
<td></td>
<td>16</td>
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<td>6</td>
<td>23.5</td>
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</table>

Total Contact Hours: 31

SECOND SEMESTER (GROUP – B)  

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Course No.</th>
<th>Title</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CPE 101</td>
<td>Computer Programming *</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
</tr>
<tr>
<td>2.</td>
<td>ECE 102</td>
<td>Basic Electronics Engineering</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
</tr>
<tr>
<td>3.</td>
<td>MCE 102</td>
<td>Manufacturing Processes *</td>
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<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>4.</td>
<td>BAS 104</td>
<td>Applied Physics – II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
</tr>
<tr>
<td>5.</td>
<td>BAS 105</td>
<td>Applied Mathematics – II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
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<tr>
<td>6.</td>
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<td>Computer Programming Lab *</td>
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<td>2</td>
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<tr>
<td>7.</td>
<td>BAS 154</td>
<td>Applied Physics – II Lab</td>
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<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>8.</td>
<td>MCE 152</td>
<td>Manufacturing Processes Lab *</td>
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<td>0</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>9.</td>
<td>ECE 153</td>
<td>Electrical and Electronics Lab *</td>
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<td>0</td>
<td>2</td>
<td>1.0</td>
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<td></td>
<td></td>
<td></td>
<td>15</td>
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<td>9</td>
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</tr>
</tbody>
</table>

Total Contact Hours: 28

* BAS 103, BAS 153, HSS 101, CPE 101, CPE 151, MCE 151, MCE 102, MCE 152 & ECE 153 papers will be taught in both the semesters, offered in such a way that the students study half of these papers in first semester and the remaining half in second semester.

* BAS 153, BAS 154, CPE 151, MCE-151, MCE 152 and ECE 153 are practical papers only. There will not be any theory examination for these papers.
Faculty of Engineering
Punjabi University, Patiala

General Instructions to the Paper Setters

B. Tech & Six Year B.Tech-MBA Integrated Program (Common for all Branches) :
Computer Science Engineering (CSE) / Electronics & Communication Engineering (ECE) / Electronics & Computer Engineering (ECM) / Mechanical Engineering (ME) / Civil Engineering

Applicable 2016 Batch Onwards

The B. Tech paper structure will be as shown below:

<table>
<thead>
<tr>
<th>Section</th>
<th>From</th>
<th>Syllabus</th>
</tr>
</thead>
</table>
| A       | Section A of the syllabus | Q1.  
Q2.  
Q3.  
Q4.  
Q5.  |
| B       | Section B of the syllabus | Q6.  
Q7.  
Q8.  
Q9.  
Q10. |
| C       | From whole syllabus | Q11  
a)  
b)  
c)  
d)  
e)  
f)  
g)  
h)  
i)  
j)  |

Pattern of Question Paper

TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch)

End Semester Exam

<table>
<thead>
<tr>
<th>TIME ALLOWED: 3 Hour</th>
<th>Maximum Marks: 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll. No.…………….</td>
<td>Pass Marks : 20</td>
</tr>
</tbody>
</table>

Note:- Section C is compulsory. Attempt any six questions selection three questions from each section A & B.

Note for the paper setter:
1. Total numbers of questions to be set are Eleven (11) as per the above format.
2. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts.
3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.
4. The maximum limit on numerical problems to be set in the paper is 35% while minimum limit is 20%.
5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
8. Use of non programmable calculators shall be specified clearly, if required.
HSS 101 COMMUNICATION SKILLS

Course Objective:

The objective of the course is to hone the communicative skills of the budding engineers who are expected to be globally competent. It aims at inculcating in them the skills of effective Business communication, Reading, Writing, Listening and Speaking (LSRW) skills in English. It also aims at developing the learners’ grammatical competence so as to equip them with appropriate language expressions to communicate effectively in both oral and written contexts.

Section – A

Communication: Process of communication, semantic gap, Types and channels of communication. Significance of communication in a professional organisation.

Reading Skills: Reading purposes, gears, types and effective strategies of reading.

Writing Skills: Elements of effective writing, writing styles, use of homonyms, cloze tests, one word substitution, abbreviations etc.

Business Correspondence: Elements & kinds of business letters; quotations & tenders, Job application, Résumé, Agenda, memorandum, Report writing, e-mail etiquettes.

Section – B

Listening Skills: Process of listening, kinds of listening, barriers to listening, how to become an effective listener and feedback skills.

Grammar: Tenses, words used as different parts of speech, Transformation of sentences, Active and Passive voice, Narration, correction of Sentences

Speaking Skills: Speech Mechanism, articulation of sounds, phonetic transcription, components of effective talk, group discussion, interview skills, conducting meetings, oral presentation skills, types and use of audio visual aids in presentation.

Text and Readings:


Scheme of Examination:

- English will be the medium of communication.
- The course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 for External End-semester examination.
- The duration of final written examination of this paper shall be three hours.

Instructions to the External Paper Setter:

- The External Paper will carry 50 marks and would be of three hours duration. The Question Paper will be divided into three Sections, namely Section-A, Section-B and Section-C. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts. Section C is compulsory and contains TEN (10) sub-parts each of two (2) marks. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.
- The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
ECE 102  BASIC ELECTRONICS ENGINEERING

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

**Course Objective:**
To enhance comprehension capabilities of student through understanding of electronic devices such as Diode, Transistor and FET. The student should also be able to acquire basic knowledge of Digital electronics and communication system.

**Section-A**
PN junction, Depletion layer, Barrier potential, Forward and reverse bias, Breakdown voltage, PIV, Characteristics of p-n junction diode, knee voltage, load line; and operating Point. Ideal p-n junction diode, junction capacitance, zener diode. Rectifiers and filters-Half wave, centre tap full wave and bridge rectifier, clipping and clamping circuit, voltage regulation.

BJT - Introduction, Basic theory of Qperation of PNP ad NPN transistor, V-I characteristics, CB, CE and CC configuration, Basic BJT Amplifiers. Introductory idea of multistage & feedback amplifiers. Biasing- Base bias, emitter feedback bias, collector voltage divider bias junction FET- Introduction, V-I characteristics and operation, MOSFET- Introduction, V-I characteristics and operation, UJT - Introduction, V-I characteristics and operation.

**Section-B**
Number Systems: Number systems, Conversions, Number Representations, Demorgan 's Theorem, Boolean Algebra and Arithmetic operations. Binary codes, Error detection and correction codes. Introduction and truth tables, Flip Flops and the truth tables; RS, J-K, D and T, Multiplexers, Demultiplexer, MUX, DEMUX.

Introduction to communication system, General block diagram, need for communication, need of modulation, Modulation-AM FM,PM. Comparison of AM and FM .Demodulation or Detector- AM detector, FM detector. Block diagram of radio transmission and reception system and function of each block.

**Course Learning Outcomes (CLO):**After the completion of the course, the student should be able to:
1. Demonstrate the use of semiconductor diode in various applications.
2. Discuss and explain the working of transistor, their configuration and application.
3. Recognize and apply the number system and Boolean algebra.
4. Define the communication system and differentiate various modulation techniques.
5. Explain radio transmission and reception.

**Text Books:**

**Reference Books :**
BAS 103 APPLIED CHEMISTRY

Course Objective:

The objective of this course is to have good and basic understanding of concepts of chemistry and related problems in the engineering field. The topic like spectroscopy, corrosion, polymers, lubricants, thermodynamics etc is for the development of right attitude, intellectual breadth and depth in engineering and also to educate students with strong background. At the end of the course, the students certainly are able to achieve better employment opportunities and other avenues for higher studies.

Section A


Corrosion: Corrosion and cause of corrosion, factors effecting corrosion, Types of corrosion, chemical corrosion (Dry) and electrochemical corrosion (Wet) and their mechanism, types of electrochemical corrosion (galvanic, pitting, waterline, differential aeration, soil, passivity, microbiological, stress corrosion and atmospheric corrosion), prevention of corrosion. Pilling- Bedworth rule. Numerical Problems based on Pilling Bedworth rule.

Electrochemistry: Electrolytic conductance, factors affecting conductance, strong and weak electrolytes, Kohlrausch’s law, effect of dilution on molar and equivalent conductance, diffusion and Ionic mobility, conductometric tiritations, types and its applications, Electrochemical cell, types of electrodes, electrode potential, EMF, Cell reactions, EMF of galvanic cell, electrochemical series & its applications, Nernst’s equation, primary (Dry cell) and secondary batteries (Lead storage batteries and Ni-Cd cell), fuel cells(H₂-O₂). Numericals problems of Kohlrausch’s law and molar and equivalent conductance and EMF and Electrochemical cell.

Lubricants: Classification of lubricants, lubricating oils, semisolid lubricants, solid and synthetic lubricants, properties of lubricating oils (viscosity, flash and fire points, cloud and pour point, mechanical stability and saponification number) and their significance. Numerical of viscosity index.

Section B


Chromatography: Basic principle and theory of chromatography, thin layer and column chromatography, gas chromatography, gas-liquid chromatography, gas-solid chromatography, ion exchange and high pressure liquid chromatography, simple applications of chromatography.
**Polymers:** Classification and physical properties of polymers, Different methods of classification in polymers: addition and condensation polymerization, Determination of number average and weight average molecular masses of polymers, Index of Poydispersity (Polydispersity index), Tacticity of polymers (stereochemistry of polymers), Different types of polymers: Fibre forming, conducting and photochromic polymers; Synthesis and applications of engineering polymers, Preparations, properties and its applications of: silicon polymers, polyurethanes and epoxy resins. Numerical problems of Mn and Mw method.


**Books Recommended**


**Scheme of Examination**

1. English will be the medium of instructions and examinations.
2. This course will carry 100 marks of which 50 marks shall be reserved for the internal assessment and remaining 50 Marks for external end semester examination.
3. The duration of final written examination of this paper shall be of three hours.
4. The students shall be declared passed in the paper if he/she secures minimum 40% marks in each of the internal assessment and external examination separately.

**Instructions to the External Paper setter**

1. The external paper will carry 50 marks and would be of three hours. The question paper will be divided into three sections, namely Section- A, Section –B and Section –C. There will be FIVE questions in each of the Sections A and B. Of five(05) marks each. However a question may be segregated into subparts. Section C is compulsory and contains TEN(10) sub-parts each of (2) marks. Candidates will be required to attempt SIX questions by selecting three questions from each Sections A & B.
2. The maximum limit on numerical problems to be set in the paper is, 30%.
3. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided in the solutions.
4. The paper setter should seal the internal and external envelope properly with signatures and cello tape at proper place.
5. Use of non programmable calculators shall be specified clearly .if required.
### BAS 104  APPLIED PHYSICS – II

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

**Course Objective:**
The main objective is to provide advanced skills to deal with vector algebra in physics, electromagnetic waves, special theory of relativity, probability & statistics, crystal systems. The knowledge of these skills is essential to apply the laws of physics to various engineering problems. At the end of the course, students will study some advanced forms of materials such as dielectrics, superconductors, nano-materials.

**Section A**
Scalar and vector fields, Gradient, divergence and curl, Gauss divergence theorem, Stoke’s theorem, Poisson’s and Laplace equations. Inadequacy of Ampere’s law and Maxwell equations (differential and integral form), wave equation for a perfect dielectric medium, transverse nature of em waves, solution of em wave equation for free space conditions, relation between electric and magnetic field vectors, wave equation for conducting media, sinusoidal time variations, wave propagation in dielectric and conducting media, response of medium to em waves, penetration depth, Poynting theorem.

Postulates of special theory of relativity, Galilean transformations, concept of simultaneity, relativity of time and length, Lorenz transformations, velocity transformations, relativity of mass, relativistic momentum and energy, introductory idea of global positioning system (GPS).

**Section B**
Crystal systems, lattice parameters, closed pack structures, Miller indices, crystals directions and planes, diamond structure, Bragg’s law and structure determination based on XRD techniques (qualitative ideas), crystal defects (zero, one, two and three dimensions).

Magnetic materials, Magnetic permeability and susceptibility, Classification of magnetic materials, Ferromagnetism (concept of magnetic domains).

Dielectric materials: Different polarization mechanisms, Clausius-Mosotti relation, temperature and frequency effects, dielectric breakdown, ferroelectrics.

Superconductors: Effects of magnetic field, Meissner effect, critical currents, Type-I & II superconductors, Entropy and Specific heat, Isotope effect, London equations, Cooper pair and BCS theory (qualitative ideas), Applications of superconductors.

Elementary ideas of nano-particles (Fullerenes, carbon nano tubes, porous silicon and aerogels).

**Recommended Books:**
1. Berkley physics course Volume-II; Electricity & Magnetism (Indian edition).
2. Electromagnetic waves and radiating systems by Jordan and Balmain (PHI, India)
3. Solid state Physics by O.P. Pillia (New Age International)

**Scheme of Examination**
- English will be the medium of instruction and examination.
- This course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 marks for external end semester examination.
- The duration of final written examination of this paper shall be of three hours.
- The students shall be declared passed in the paper if he/she secures minimum 40% marks in each of the Internal Assessment and External Examinations separately.

**Instructions to the External Paper Setter**
- The External Paper will carry 50 marks and would be of three hours. The Question paper will be divided into three Sections, namely Section-A, Section-B and Section-C. There will be FIVE questions in each of the Sections A and B, of five (05) marks each. However, a question may be segregated into subparts. Section C is compulsory and contains TEN (10) sub-parts each of two (2) marks. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.
- The maximum limit on numerical problems to be set in the paper is 35%.
- The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
- The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
- Use of non-programmable calculator shall be specified clearly if required.
Course Objective:
The main objective is to provide advanced skills to deal with sequence and series, differential equations, Laplace transformations and Fourier series. The knowledge of these skills is essential to solve various electrical and mechanical problems analytically. At the end of the course, students shall be able to solve series solution of differential equations and also able to solve engineering problems based on initial and boundary value problems with the help of Laplace transformations.

Course Content

Section-A

Differential equations: Basic concepts and ideas. Separable Differential Equations, Exact Differential Equations, Integrating Factors, Linear Differential Equations, Bernoulli's Differential Equations, Solution of second order linear Homogeneous equations with constant coefficients, Solution of Non-Homogeneous linear equations with constant coefficients of second order by Method of Variation of Parameters, Method of Undetermined Coefficients; Solution of Euler-Cauchy equations.

Infinite Series: Infinite series and their convergence, Tests for Convergence: Comparison Test, D’Alembert Ratio Test, Raabe’s Test, Cauchy Root Test, Cauchy Integral Test, Logarithmic Test, Leibnitz Test (all tests without proof), Power Series, Radius of Convergence of Power Series.

Section-B

Probability Distributions: Binomial Distribution, Mean and Variance of Binomial Distribution, Recurrence formula for the Moments of Binomial Distribution, Moment Generating Function of Binomial Distribution; Poisson Distribution, Poisson Distribution as a limiting case of Binomial Distribution, Mean and Variance of Poisson Distribution, Recurrence formula for the Moments of Poisson Distribution, Moment Generating Function of Poisson Distribution; Normal distribution, Mean and Variance of Normal Distribution, Median and Mode of Normal Distribution, Moment Generating Function of Normal Distribution, Normal Distribution as a limiting case of Binomial Distribution.


RECOMENDED BOOKS:

Scheme of Examination

- English will be the medium of instruction and examination.
- This course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 marks for external end semester examination.
- The duration of final written examination of this paper shall be of three hours.
- The students shall be declared passed in the paper if he/she secures minimum 40% marks in each of the Internal Assessment and External Examinations separately.

Instructions to the External Paper Setter

- The External Paper will carry 50 marks and would be of three hours. The Question paper will be divided into three Sections, namely Section-A, Section-B and Section-C. There will be FIVE questions in each of the Sections A and B, of five (05) marks each. However, a question may be segregated into subparts. Section C is compulsory and contains TEN (10) sub-parts each of two (2) marks. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.
- The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
- The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
MCE 151  ENGINEERING GRAPHICS

Course Objective:

The objective of this course is to inculcate good understanding of basic fundamentals of engineering graphics in the students. This course is aimed at to make the student understand visual science in the form of technical graphics. General instructions related to Theory of Orthographic Projection of points, lines, planes and solids as per the BIS codes prevalent to drawing practice will be introduced initially. Section of solids, intersection and development of surfaces, isometric projection and orthographic projection of simple solids/blocks will further upgrade the basic understanding and visualization of geometrical objects and to certain extent the machine parts.

At the end of the course, the students should be able to - (1) acquire knowledge of different conventions and methods of engineering drawing, (2) understand dimensioned projections, (3) learn how to create two-dimensional images of objects using first angle orthographic projection, (4) learn how to create isometric, perspective and auxiliary projections.

Section-A

Lines, Lettering, Dimensioning, Scales; Reference and Auxiliary Planes; Systems of Orthographic Projections; Projection of Points and Lines; True length of lines and their true angles of inclination with the reference planes; Projection of Planes and their true shape. Polyhedral and Solids of Revolution; Projection of Solids in simple positions: Axis parallel to both the reference planes, parallel or perpendicular to one and inclined to the other or inclined to both the reference planes. Section of solids: Section Planes, Sections and projection of sections on the reference planes; True shape of sections of simple solids.

Section-B

Development of lateral surfaces of simple solids such as cubes, prisms, cylinders, pyramids, cones, spheres etc. Intersection of lateral surfaces of simple solids penetrating into one another; Projection of lines/curves of intersection/interpenetration on the reference planes. Isometric axes, lines and planes; Isometric scale; Drawing/Sketching isometric view of planes, plane figures and simple solids from orthographic projections; Conversion of pictorial view of simple solids into orthographic projections.

Recommended Books:

2. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Autocad, Tata McGraw Hill, New Delhi
3. M.B. Shah and B.C. Rana, Engineering Drawing, Pearson Education Asia, New Delhi
7. N. D. Bhatt and V. M. Panchal, Engineering Drawing, Charotor Publication House, Anand
Course Objective:

The objectives of this paper is to develop the skill to identify the problem, analyze and solve it. Learn how to cope up and upgrade with the continuous flow of new technologies and also to educate students with strong background so that they will fulfill the needs and expectations of scientific and industrial communities.

List of Experiments

1. To determine the strength of a given acid by titrating with N/10 NaOH, conductometrically.
2. To determine the strength of a given acid by titrating with N/10 NaOH, pH metrically.
3. To verify Beer’s law and to find the concentration of an unknown solution using colorimeter/ Uv- Vis spectrophotometer.
4. To estimate the strength of the given HCl solution by titrating with N/10 NaOH potentiometrically using Quinhydrone as the indicator electrode.
5. To determine the amount of Fe$^{2+}$ ions in the given sample of Mohr salt provided with N/20 oxalic acid.
6. To determine the composition of a mixture of acid (HCl + Oxalic acid).
7. To determine the composition of a mixture of bases (NaOH + Na$_2$CO$_3$).
8. To determine the copper content in a given sample Iodometrically.
10. To determine the total hardness of water by EDTA method.
11. Determination of coefficient of viscosity of given liquid by using Ostwald viscometer.
12. Determine the CMC of a soap/surfactant by conductometric measurements.

Scheme of Examination

1. English will be the medium of instructions and examinations.
2. This course will carry 100 marks of which 50 marks shall be reserved for the internal assessment and remaining 50 marks for external end semester examination.
3. The duration of final written examination of this paper shall be of two hours.
4. The students shall be declared passed in the paper if he/she secures minimum 40% marks in aggregates.
BAS 154 APPLIED PHYSICS – II LAB  

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**Course Objective:**

The aim of Applied Physics – II Lab is to make the theoretical concepts more clear to the students through experiments. In the course of lab, students will learn the various phenomena related to electrical properties of matter such as determining the energy band gap of a semiconductor, studying the p-n junction and Zener diode characteristics, Hall effect, hysteresis loop, inverse square law of light using photocell etc. The experiments so conducted will be helpful to students in solving their engineering problems.

**List of Experiments**

1. To determine Planck’s Constant using photocell apparatus.
2. To determine the velocity of Ultrasonics in water.
3. To find the Energy Band Gap of a semiconductor using Four Probe Method.
4. To study the Hall Effect and measure Charge Density and Carrier Mobility.
5. To find the e/m ratio by long Solenoid method.
6. To study the p-n junction characteristics.
7. To study the Zener diode characteristics.
8. To study the Hysteresis loses for a given sample using a Loop Tracer.
9. To determine the beam spot size and intensity distribution for a He –Ne Laser.
10. To verify the Inverse Square Law of light using photocell.

**Scheme of Examination**

- English will be the medium of instruction and examination.
- This course will carry 100 marks of which 50 marks shall be reserved for Internal Assessment and remaining 50 marks for external end semester examination.
- The duration of final written examination of this paper shall be of two hours.
- The students shall be declared passed in the paper if he/she secures minimum 40% marks in the Internal Assessment and end semester external examinations collectively.

**Instructions to the Paper Setter**

- The External Paper will carry 50 marks and would be of two hours.
- Use of non-programmable calculator shall be specified clearly if required.
CPE -101 Computer Programming

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**Section A**

**Number System:** Bit, Byte, Binary, Decimal, Hexadecimal and Octal System, Conversion from one System to another.

**Binary Arithmetic:** Addition, Subtraction and Multiplication.


**Introduction to C:** Concepts of Procedure oriented programming, Character Set, Identifiers, Keywords and Data types and storage classes.

**Operators and Expressions:** Arithmetic, Unary, Logical, Relational, Assignment and Conditional Operator, Associatively and Precedence of Operators

**Control Structures:** If, while, do-while and for loop, Nested Control Structure, Switch-case, break and Continue statements

**Section B**

**Arrays:** Single Dimensional, Multidimensional Arrays and Pointers, String reading/writing

**Functions:** Types of Functions, Call by Value and Call by reference, Recursion, Structures. File processing: Opening and closing data files, simple writing and reading in unformatted data files.

**Object Oriented Concepts:** Comparison between C and C++, structure of C++ Program, Basic Input/Output statements, introduction to Classes and Objects, creating a class and object, accessing class members (private, public), C++ Fundamentals Concepts (Definition with example) of : Encapsulation, Function Overloading, Single level Inheritance, Polymorphism and Friend Functions.

**Note:** This subject is common to all branches. Only basics of C++ is covered

**Recommended Books:**
Course Objective:
The objective of this course is to have a good understanding the basic concepts of manufacturing via engineering materials, casting, machining, forming, joining, welding and assembly, enabling the students to develop a basic knowledge of the mechanics, operation and limitations of basic machining tools. The course also introduces the concept of basic carpentry operations.

At the end of the course, the students should be able to - (1) demonstrate the capability of selecting suitable manufacturing processes to manufacture the products optimally, (2) ability to clear basic fundamental concepts of machining, welding, casting, forming processes (3) selecting or suggesting suitable manufacturing processes to achieve the required products with the aim of avoiding material and time wastage.

Section – A

Metal Casting: Principles of metal casting, casting terminology, Patterns, their functions, types, materials and pattern allowances, Characteristics of molding sand, Types of sand molds, Types of cores, chaplets and chills; their materials and functions. Casting Defects, their causes and remedies.

Machining Processes: Principles of metal cutting, cutting tool materials and applications, types of single point cutting tools. Geometry of single point cutting tool. Cutting fluids and their functions, types of cutting fluids, selection of cutting fluids.

Machine Tools: Introduction to Centre Lathe, parts of a lathe, lathe attachments, Operations performed on lathe, work holding devices in Lathes.

Section – B
Introduction to shaper and planner machines, their operations. Introduction to multipoint cutting tools. Introduction to milling and milling operations, Drilling and allied operations, Sawing operations.


Metal Forming and Shearing: Hot and cold working, Types of Forging processes. Rolling, Wire drawing and extrusion processes, drawing, bending, spinning, stretching, embossing and coining. Die and punch operation, shearing, piercing and blanking, notching, lancing, bending and deep drawing operations.


Recommended Books
CPE 151  COMPUTER PROGRAMMING LAB

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List of Experiments

1. Experiencing DOS internal and external commands.
2. Introducing 'C' language basics such as data types, variables, constants etc.
3. Working with operators (Arithmetic, logical and relational).
4. Write a program showing input and output functions.
5. Write a program to illustrate decision control structures.
6. Write program using looping control structures.
7. Write applications based on one and two dimensional arrays.
8. Working with pointers.
9. Write a program showing array and pointer relationship.
10. Illustrate functions and recursion.
11. Show the use of pointers in functions.
12. Write a program to show the use of functions with arrays.
13. Write a program based on structure and using union.
14. Use the pointer to point to structure.
15. Use the structures with functions.
16. Illustrate the file handling.
17. Write program to illustrate C++ program structure.
18. Write program to illustrate the use of classes and objects.
19. Write program to illustrate the concept of inheritance.
20. Write program to illustrate the concept of polymorphism.
MCE 152  MANUFACTURING PROCESSES LAB

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List of Experiments

2. Fitting Shop: L – Cutting from square piece in fitting shop (involving squaring, L – cutting and squaring, drilling, tapping, reaming)
3. Sheet Metal Shop: Layout marking, cutting/shearing, bending in box shape with drilling and Riveting
4. Carpentry Shop: Cross and Lap joints, T – Joint
6. Foundry Shop: Moulding of Flange, Moulding of Core and casting of pipe.
7. Smithy Shop: Poker, Circular Ring.
Objective: The educational objective of the Electrical and Electronics Lab is to provide student the basic engineering knowledge by way of electrical and electronic devices and components.

List of Experiments

1. Identification and familiarization with the basic tools used in lab.
2. Familiarization and testing of Resistance, Capacitor & Inductors.
3. To study various types of switches such as normal/miniature toggle, slide, push button, rotary, micro switches, SPST, SPDT, DPST, DPDT, band selector, multiway Master Mains Switch.
4. To study various types of protective devices such as Wire fuse, cartridge fuse, slow acting/fast acting fuse, HRC fuse, and thermal fuse, single/multiple circuit breakers, over and under current relays.
5. To get familiar with the working knowledge of the measuring instruments: a) Ammeter & Voltmeter b) Cathode ray oscilloscope (CRO) c) Multimeter (Analog and Digital)
6. To get familiar with the working knowledge of the following instruments: a) Signal generator b) Function generator c) Power supply.
7. Familiarization and testing of Diode, BJT & FET.
8. Use of diode as half wave and full wave rectifier.
9. To verify Kirchhoff’s laws.
10. Verification of truth tables of logic gates.
11. Fabrication of Printed Circuit Board.
12. To learn soldering and desoldering techniques.