# FIRST SEMESTER B.TECH.

### (Civil, Electrical, Mechanical)

**University of Kashmir Zakura Campus**

| Course Code | MTH - 1.01 | | | Semester | | First | |
|---|---|---|---|---|---|---|---|
| Category | Basic Science Course | | | | | | |
| Course Title | Engineering Mathematics – I | | | | | | |
| Scheme & Credits | L | T | P | Credits | | Max Marks: 100 | |
| | 3 | 0 | 0 | 3 | | | |
| Prerequisites | Nil | | | | | | |

## Course Objectives:

1. Familiarize the prospective engineers with techniques incalculus, multivariate analysis and linear algebra.
2. Aims to equip the students with standard concepts and tools at an intermediate to advanced level.
3. Be able to tackle more advanced level of mathematics and applications that they would find useful in their disciplines.

| Unit | Topics | No. of Hours |
|---|---|---|
| I | **Matrices:** Symmetric and skew- symmetric, Hermitian, and skew-Hermitian Matrices, Orthogonal and Unitary matrices. Triangular matrices, Rank of a matrix, normal form, elementary transformations, solution of simultaneous equations by elementary operations, Cayley-Hamilton theorem, Eigen values and Eigen vectors of a matrix. | 10 |
| II | **Multivariable Calculus:** Differential calculus, Limits and continuity, partial derivatives of functions of severable variables, conditions for differentiability, The chain rule with one independent and with several independent variables, Implicit differentiation, Partial differentiation, homogeneous functions, and Euler's theorem. | 10 |
| III | **Taylor's and Maclaurin's series**: Taylor's theorem and mean value theorem for functionsof two variables, Errors and approximations, Maxima &Minima of several variables: Local maximum and minimum values, critical points, saddle points, first and second derivative Tests. | 10 |
| IV | **Probability:** Basic concepts of probability, Addition multiplication theorems on probability, Conditional Probability, Bayes theorem, Random Variable, Probability densityfunction, Discrete and continuous distributions, Binomial, Poisson & Normal distributions. | 9 |
| | **Total Number of Hours** | 39 |

**Textbooks:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1 | Advanced Engineering Mathematics | E. Kreyszig | John Wiley, Singapore |
| 2 | Differential Calculus | N. P. Piskinov | Mir Publisher Moscow |

**References:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1 | Differential Calculus | Gorakh Prasad | PothishalaPrivate Limited |
| 2 | Advanced Engineering Mathematics | R.K. Jain and S.R.K Iyengar | Narosa |
| 3 | Introduction to Mathematical Statistics | S. C. Gupta and V.K. Kapoor | S. Chand |

| Course Code | **PHY - 1.02** | **Semester** | **First** |
|---|---|---|---|
| **Category** | Basic Science Course | | |
| **Course Title** | Engineering Physics | | |
| **Scheme & Credits** | L T P Credits<br>2 1 0 3 | | Max Marks: 100 |
| **Prerequisites** | Nil | | |

## Course Objectives:

1. Familiarize with Vector calculus and its application to Electrical & Magnetic Fields.
2. Aims to equip the students with standard concepts of Relativity & Quantum Mechanics.
3. Introduction to Solid State Physics to be able to understand the behaviour of Semiconductor technology.

| Unit | Topics | No. of Hours |
|---|---|---|
| I | **Vectors:** cross product, Dot product and Scalar triple product of vectors. Cartesian Coordinate System, Gradient, Divergence and Curl in Cartesian coordinates. Curvilinear Coordinates, Cylindrical and Spherical Polar Coordinates, Gradient, Divergence and Curl in Curvilinear Coordinates. Vector fields, Electric and magnetic fields. Dirac delta function, One Dimensional and three-Dimensional Dirac Delta function and its applications. Divergence of $R^{\wedge}/R^2$ and its discrepancy and solution. | 10 |
| II | **Relativity:** Concept of Ether and Michelson Morley experiment, Inertial and non-inertial frame of references, postulates of relativity, Galilean and Lorentz transformation equations. Relativistic energy momentum relation, Relativistic energy mass relation or Einstein's energy-mass relation, mass-less particles. | 9 |
| III | **Quantum Mechanics:** Compton Effect, De-Broglie wave hypothesis, matter waves, Uncertainty principle and its applications. Wave function and its properties. Schrodinger's wave equation: time dependent and time independent Schrodinger's wave equations, energy, momentum and Hamiltonian operators. | 10 |
| IV | **Solid State Physics:** Band theory of solids (metals, insulators and semi-conductors), Energy band gap, Direct and Indirect band gap semiconductors, Intrinsic and Extrinsic semiconductors, N-type and P-type semiconductors-Charge carriers and charge carrier concentration, Fermi level and Fermi energy, Drift and Resistance, Conductivity and | 10 |

Mobility-Effect of Temperature and Doping, Hall-Effect, Diffusion of carriers, Diffusion length and Diffusion constant- D. Einstein's relation and Continuity equation.

### Total Number of Hours                                    39

**Textbooks:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|--------|------------------|--------|-----------|
| 1 | Concepts of Modern Physics | Arthur Beiser | Mc Graw Hill |
| 2 | Refresher course in B.Sc. Physics | C.L. Arora | S. Chand |
| 3 | Solid State Physics | S.O. Pillai | New Age International |

**References:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|--------|------------------|--------|-----------|
| 1 | Introduction to Electrodynamics | D. J. Griffiths | Prentice Hall India |
| 2 | Quantum Mechanics | Aruldhas | PHI Learning Pvt. Ltd |
| 3 | Introduction to Solid State Physics | Charles Kittel | Wiley |

| Course Code | CHM-1.03 | | | Semester | | First | |
|---|---|---|---|---|---|---|---|
| Category | Basic Science Course | | | | | | |
| Course Title | Engineering Chemistry | | | | | | |
| Scheme & Credits | L | T | P | Credits | | Max Marks: 100 | |
| | 2 | 1 | 0 | 3 | | | |
| Prerequisites | Nil | | | | | | |

## Course Objectives:

1. Understanding Chemistry on electronic, atomic and molecular level.
2. Distinguish the ranges of the electromagnetic spectrum used for exciting differentmolecular energy levels in various spectroscopic techniques
3. Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
4. Understand the concepts of Corrosion, methods of prevention and properties of various lubricants.

| Unit | Topics | No. of Hours |
|---|---|---|
| I | **Electrochemistry**: Reduction Potentials, Kinds of electrodes, Applications of electrochemical series, Redox stability in water (Diagrammatic presentation of potential data), effect of complexation on electrode potential, electrolytes and non-electrolyte solutions, Concentration cells, Lead storage cell and fuel cell. | 10 |
| II | **Corrosion and its Prevention**: Introduction, Effects of Corrosion, Dry Corrosion and Wet Corrosion, mechanisms, Types of Corrosion (Pitting Corrosion, Crevice Corrosion, Galvanic Corrosion and Stress corrosion), Factors Effecting Corrosion (Nature of the Metal and Nature of the Environment), Corrosion Protection and Inhibition (Cathodic Protection, Anodic Protection, Protective Coatings) | 10 |
| III | **UV – Visible and IR Spectroscopy**: UV – Visible Spectroscopy: Electromagnetic Radiation, Electromagnetic Spectrum, electronic transitions and electronic spectra, application to simple systems (Ti, Fe, Cu) Beers-Lambert Law and its applications, Chromophores, Auxo-chromes, effect of conjugation on spectrum, Infrared Spectroscopy: IR spectrum, Modes of vibration, IR bands corresponding to different functional groups, applications of IR spectra (Alcohols, Acids, Phenols) | 10 |
| IV | **Lubricants**: Introduction, mechanisms of lubrication, hydrodynamic, boundary and extreme pressure lubrication, classification of lubricants: liquid, semi solid and solid lubricants. Lubricating oils; fatty oils, mineral oils, blended | 9 |

oils, properties of lubricating oils with special reference to flash point, aniline point, viscosity, and viscosity index.

**Total Number of Hours** 39

**Textbooks:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|--------|------------------|--------|-----------|
| 1 | Principles of Physical Chemistry | Puri, Sharma&Pathania | Vishal Publisher |
| 2 | Principles of Inorganic Chemistry | Puri, Sharma& Kalia | Milestone publishers& distributors |

**References:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|--------|------------------|--------|-----------|
| 1 | Molecular Spectroscopy | C.N Banwell | Tata Mc Graw Hill |
| 2 | Engineering Chemistry | Jain P.C | Dhanpat Rai |
| 3 | Principles of Instrumental Analysis | Skoog D.A and Holles F.J | Cengage Learning |

| Course Code | CSE-1.04 | | Semester | | First | |
|---|---|---|---|---|---|---|
| Category | Basic Engineering Course | | | | | |
| Course Title | Computer Programming with C | | | | | |
| Scheme & Credits | L | T | P | Credits | Max Marks: 100 | |
| | 2 | 1 | 0 | 3 | | |
| Prerequisites | Nil | | | | | |

## Course Objectives:

1. To introduce the concept of problem solving through programming and the basics of C language including its character set, data types, operators, expressions and statements.
2. To make understand the control structure of C including branches and loops.
3. To provide the concept of arrays, pointers and functions, and illustrate their use in real world problems.
4. To introduce structures and unions and conceive the difference between them.
5. To perform basic operations on files.

| Unit | Topics | No. of Hours |
|---|---|---|
| I | **Introduction to Problem Solving and Basics of C Language**<br>Engineering problem solving methodology, Flow charts, Algorithms, Need for computer languages.<br>Types of programming languages-Machine language, Assembly language and High-Level language, History of C.<br>C Language preliminaries, Program structure, C character set, Identifiers and keywords, Built-in data types, Variables, Declarations, Statements, Pre-processors, Library functions, Input-Output, Operators and its various types, Expressions. | 10 |
| II | **Control Structure and Functions**<br>Decision making within a program, Conditions, Compound conditions with logical connectives, Control statements-if, if then else, switch, break, continue, and go-to statements, Loops-while, do while, for, Nested loops, Infinite loops, iterative loops. Concept of program modularity, Functions, Defining and accessing, passing arguments, Prototypes, Recursion, Difference between definition and declaration of an external function, Storage classes- Automatic & external. | 10 |
| III | **Arrays & Pointers**<br>Arrays, Defining and processing- Searching, Insertion, Deletion of an element from an array, Finding the largest/smallest element in an array, Addition/Multiplication of two matrices, String processing, Passing arrays to a function, matrices as 2D arrays, Multi-dimensional arrays. Pointers, Address operators, Pointer type declaration, Pointer assignment, Pointer | 10 |

initialization, Passing pointers to a function, Pointer Arithmetic, Arrays of pointers and function pointers. Dynamic memory allocation of arrays.

**Structures, Unions and File Handling**

IV  Structures- Defining and accessing a structure, Structure as function argument, Array of structures, Pointers to structures, Nested structure, Structures and functions. Unions- Defining and accessing union. File Handling- Files, ASCII files, Binary files, File operations such as storing, retrieving and updating a file.  9

**Total Number of Hours**  39

**Textbooks:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1 | Schaum's Outlines-Theory and Problems of Programming with C | Gottfried | Tata McGraw |
| 2 | C Programming for Scientists and Engineers | R. Reddy and C. Ziegler | Jones & Bartlett |
| 3 | Programming with ANSI-C | Balaguruswamy | Mc Graw Hill |

**References**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1 | Engineering Problem Solving with ANSI C | Delores M. Etter | Prentice Hall |
| 2 | C -How to Program | Deitel and Deitel | Pearson |
| 3 | The C Programming Language | Kerninghan and Ritchie | PHI |

| Course Code | HUM-1.05 | | Semester | | First | |
|---|---|---|---|---|---|---|
| Category | Basic Humanities Course | | | | | |
| Course Title | Professional Communication | | | | | |
| Scheme & Credits | L | T | P | Credits | Max Marks: 100 | |
| | 2 | 0 | 2 | 3 | | |
| Prerequisites | Nil | | | | | |

## Course Objective:

1. Students will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

| Unit | Topics | No. of Hours |
|---|---|---|
| I | **Communication:** Meaning, its types, significance, process, Channels, barriers to Communication, making communication effective, role in society, Communication model. Discussion **MECting and Telephonic Skills:** Group discussions, conducting a MECting, attending telephonic calls, oral presentation and role of audio-visual aids. | 10 |
| II | **Grammar:** Transformation of sentences, words used as different parts of speech one-word substation, abbreviations, technical terms etc. **Reading Skills:** Process of reading, reading purposes, models, strategies, methodologies, reading activities. | 9 |
| III | **Writing Skills:** Elements of effective writing, writing style, scientific and technical writing. **Listening Skills:** The process of listening, the barrier to listening, the effective listening skills, feedback skills. **Speaking Skills:** Speech mechanism, organs of speech, production and classification of speech sound, phonetic transcription, the skills of effective speaking, the components of effective talk. | 10 |
| IV | **Business Letters:** Structure of business letters, language in business letters. Letters of inquiry & their places. Sales Letters, Memorandum, Quotations/tenders, Bank correspondence, Letters of application and appointments, Resume writing. Report Writing, CV writing, Job Application Letter. **Oral Communication:** Conducting a MECting, Minutes of MECting, Oral Presentation, Group Discussion. | 10 |
| | **Total Number of Hours** | 39 |

**Textbooks:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|--------|------------------|--------|-----------|
| 1 | Effective Business Communication | Rodriques M V | Concept Publishing Company |
| 2 | Handbook of Practical Communication Skills | Wright, Chrissie | Jaico Publishing |
| 3 | An Approach to Communication Skills | Bhattacharya. Indrajit | Dhanpat rai Co |

**References:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|--------|------------------|--------|-----------|
| 1 | Modern Business Correspondence | Gartside L | Pitman Publishing London |
| 2 | How to Write and Publish a Scientific Paper | Day, Robert A | Cambridge University |
| 3 | An Introduction to the Pronunciation of English | Gimson A C | ELBS |

| Course Code | CIV-1.06 | | | Semester | | First | |
|---|---|---|---|---|---|---|---|
| Category | Basic Engineering Course | | | | | | |
| Course Title | Engineering Drawing | | | | | | |
| Scheme & Credits | L | T | P | Credits | | Max Marks: 100 | |
| | 2 | 0 | 2 | 3 | | | |
| Prerequisites | Nil | | | | | | |

## Course Objectives:

1. Students will be Introduced to engineering design and its place in society.
2. Students will be exposed to the visual aspects of engineering design.
3. Students will be exposed to engineering graphics standards.
4. Students will be exposed to solid modelling.
5. Students will be able to create working drawings.

| Unit | Topics | No. of Hours |
|---|---|---|
| I | **Introduction to Engineering drawing** (equipment, drafting tools, symbols and conventions used in drawing), dimensioning, types of lines and their uses, section representation, geometrical constructions of different types of polygons and conic sections. <br><br> **Introduction to projections** (different quadrant systems), projections on horizontal and vertical planes, principal views. Concept of projection of points | 13 |
| II | **Projection of lines** (inclined to single and both reference planes). Projection of planes (inclined to single and both reference planes). Concept of Traces | 13 |
| III | **Projection of solids** (inclined to both reference planes), Sections of solids. | 13 |
| IV | **Development of surfaces** viz. Cones, Prisms, Pyramids and Cylinders. Orthographic projections of simple blocks, Isometric projections and Isometric views of different planes and simple solids, Introduction to oblique and perspective projections | 13 |
| | **Total Number of Hours** | 52 |

## Textbooks:

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1 | Engineering Drawing | P.S.Gill | S. K. Kataria& Sons |
| 2 | Engineering Drawing | N.D.Bhatt | Salwa books store |

**References:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
| --- | --- | --- | --- |
| 1 | Engineering Drawing | K.L. Narayana, P.Kannaiah | Radiant Publishing House |
| 2 | Fundamentals of Engineering Drawing | LuzzaderW.J. | Prentice Hall |

| Course Code | PHY-1.02L | Semester | First |
|---|---|---|---|
| Category | Basic Science Course | | |
| Course Title | Engineering Physics Lab | | |
| Scheme & Credits | L | T | P | Credits | Max Marks: 100 |
| | 0 | 0 | 2 | 1 | |
| Prerequisites | Nil | | |

## Experiments

| S. No. | Experiments |
|---|---|
| 1. | Measurement of resistance by color coding & Ohm's Law. |
| 2. | Measurement of resistance by Wheat Stone bridge. |
| 3. | To find the value of Plank's constant using photo cell. |
| 4. | To find the value of Plank's constant using LED's. |
| 5. | To find the charge to mass ratio of an electron by Helical Method. |
| 6. | To find the charge to mass ratio of an electron by Thomson Method. |
| 7. | To find the Dielectric constant of different materials. |
| 8. | Verification of Stefan's Law (electrical method). |
| 9. | To find the wavelength of LASER light using diffraction grating. |
| 10. | To find the refractive index of prism using mercury vapor lamp by spectrometer. |
| 11. | Fresnel's Bi-prism for measurement of wavelength of sodium light. |
| 12. | Melde's experiment by using electrically maintained tuning fork. |
| 13. | Measurement of bandgap by four probe method. |
| 14. | Measurement of thermal conductivity by Lee's apparatus |
| 15. | G M counter Setup. |
| 16. | To find the refractive index of a liquid using a diode LASER on senior optical bench. |
| 17. | Verification of Biot Savart's law. |

| Course Code | CHM-1.03L | | Semester | | First | |
|---|---|---|---|---|---|---|
| Category | Basic Science Course | | | | | |
| Course Title | Engineering Chemistry Lab | | | | | |
| Scheme & Credits | L | T | P | Credits | Max Marks: 100 | |
| | 0 | 0 | 2 | 1 | | |
| Prerequisites | Nil | | | | | |

| S. No. | Experiments |
|---|---|
| 1. | To determine the total, permanent and temporary hardness of water by EDTA method. |
| 2. | To determine alkalinity of given water samples/alkali mixtures by warder's Method. |
| 3. | To estimate percentage of available chlorine (free chlorine) in bleaching powder/water |
| 4. | To determine the acid value of given lubricating oils |
| 5. | To determine the aniline point of given lubricating oils. |
| 6. | To verify Bear Lambert's law for coloured solutions and to determine the concentration of given unknown solution |
| 7. | To draw pH titration curve for strong acids vs strong base |
| 8. | Standardization of $KMnO_4$ using sodium oxalate or oxalic acid |

| Course Code | CSE-1.04L | | Semester | | First | |
|---|---|---|---|---|---|---|
| Category | Basic Engineering Course | | | | | |
| Course Title | Computer Programming with C Lab | | | | | |
| Scheme & Credits | L | T | P | Credits | Max Marks: 100 | |
| | 0 | 0 | 2 | 1 | | |
| Prerequisites | Nil | | | | | |

| S. No. | Experiments |
|---|---|
| 1. | Program to understand basic data types. |
| 2. | Programs on looping and branching. |
| 3. | Example of Fibonacci series program. |
| 4. | Finding a factorial for a given number. |
| 5. | Programs using<br>   i.  Library functions.<br>   ii.  Built-in math functions. |
| 6. | Programs on<br>   i.      functions<br>   ii.     arrays<br>   iii.    string manipulations<br>   iv.    Structures and unions.<br>   v.     Pointers.<br>Basic file operations. |

**Note:** The instructor is encouraged to provide maximum problem-solving insight to students through programs depicting real world scenarios, and not only remain confined to simple arithmetic operations and data manipulations.

| Course Code | MEC-1.07A | | Semester | | First | |
|---|---|---|---|---|---|---|
| Category | Basic Engineering Course | | | | | |
| Course Title | Workshop Practice A | | | | | |
| Scheme & | L | T | P | Credits | Max Marks: 100 | |
| Credits | 0 | 0 | 2 | 1 | | |
| Prerequisites | Nil | | | | | |

## Course Objective:

At the end of the course, the student will be able to:

1. Select suitable technique for MECting a specific job
2. Acquire a minimum practical skill with respect to the different manufacturing methods and develop the confidence to develop small components for their project work and to participate in various national and international technical competitions.
3. Have good practical exposure to different techniques.
4. Create of simple components using different materials.

| Unit | Topics | No. of Hours |
|---|---|---|
| I | **Carpentry and pattern making Section:** Safety precautions, Introduction to Carpentry shop, Different types of wood,seasoning of wood, Defects in wood, Materials, tools and equipment used in carpentry, Demonstration and practice of different types of joints, and patterns.<br>Aim: To prepare L-joint, T-Joint, Cross joint, Split Patternand Dove tail joint. | 07 |
| II | **Smithy and Forging Section:** Safety precautions, Introduction to various Forging methods, Forging defects, Different Forming methods, Forging Machines, Hot working and Cold working processes, Demonstration and practice of forging MS rod into MS ring and different cross-sections.<br>Aim: To prepare a square headed bolt from MS-round. | 07 |
| III | **Sheet metal shop:** Safety precautions, Different Machines used in sheet metal shop,Shearing Machine, Bending Machine, and power press, Different sheet metal materials, Tools and equipment.<br>Aim: Making trays and coneswith G.I sheet metal. | 05 |
| IV | **Fitting Shop:** Safety precautions, Introduction to fitting shop, detailed working of different tools and equipment used in a fitting shop, Demonstration of cutting, preparation of stud to cut external threads with help of dies, drilling, countersinking, counter boring and internal thread cutting with taps,<br>Aim: Pipe cutting and thread cutting on G.I pipe with pipe dies. | 07 |
| | **Total Number of Hours** | 26 |

**Textbooks:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1 | Workshop Technology Vol. I | Chapman Hajra Chowdhary | CBS |
| 2 | Workshop Technology Vol. II | | |

**References:**

| S. NO. | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1 | Workshop Technology Vol. I | Swarn Singh | S.K. Kataria& Sons |
| 2 | Workshop Technology Vol. I | Virender Narula | S.K. Kataria& Sons |