# Dr Babasaheb Ambedkar Technological University, Maharashtra B.E./B.Tech CSE Sem 1 syllabus

## Engineering Mathematics- I

### Engineering Mathematics – I

**Unit 1:Linear Algebra- Matrices**
Inverse of a matrix by Gauss-Jordan method; Rank of a matrix; Normal form of a matrix ; Consistency of non- homogeneous and homogeneous system of linear equations ; Eigen values and eigen vectors ; Properties of eigen values and eigen vectors (without proofs); Cayley- Hamilton's theorem (without proof) and its applications.

**Unit 2:Partial Differentiation**
Partial derivatives of first and higher orders; Homogeneous functions – Euler's Theorem for functions containing two and three variables (with proofs); Total derivatives; Change of variables.

**Unit 3:Applications of Partial differentiation**
Jacobians - properties; Taylor's and Maclaurin's theorems (without proofs) for functions of two variables; Maxima and minima of functions of two variables; Lagrange's method of undetermined multipliers.

**Unit 4: Reduction Formulae and Curve Tracing**
Reduction formulae ; Tracing of the curves given in Cartesian, parametric & polar forms.

**Unit 5: Multiple Integrals**
Double integration in Cartesian and polar co-ordinates; Evaluation of double integrals by changing the order of integration and changing to polar form; Triple integral; Applications of multiple integrals to find area as double integral , volume as triple integral and surface area.

**Text Books**

1) Higher Engineering Mathematics by B. S. Grewal, Khanna Publishers, New Delhi.
2) Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley & Sons, New York.
3) A Course in Engineering Mathematics (Vol I) by Dr. B. B. Singh, Synergy Knowledgeware, Mumbai.
4) A Text Book of Applied Mathematics (Vol I & II) by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
5) Higher Engineering Mathematics by H. K. Das and Er. Rajnish Verma, S. Chand & CO. Pvt. Ltd., New Delhi.

**Reference Books**

1) Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi.
2) A Text Book of Engineering Mathematics by Peter O' Neil, Thomson Asia Pte Ltd. , Singapore.
3) Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata Mcgraw-Hill Publishing Company Ltd., New Delhi.

## Engineering Physics

### BTBS102/ BTBS202 Engineering Physics

**Unit I Oscillation, Ultrasonics and Dielectric Materials:**

Free oscillation, damped oscillation, Forced oscillation and Resonance, differential wave equation, Ultrasonic waves, production of ultrasonics (Piezoelectric effect, Magnetostriction effect) and its applications.

Dielectric parameters (Dielectric constant, Electric displacement, Polarization & Polarizability), Types of polarization, temperature and frequency dependences of dielectric materials.

**Unit II Optics, Fibre Optics and Laser:**

Interference of light in thin film, wedge shaped film , Newton's rings, polarization of light, methods for production of polarized light(Reflection, Refraction& Double refraction), Huygen's theory of double refraction, Laurent's half shade Polarimeter, Principle and structure of optical fibre, acceptance angle, acceptance cone, numerical aperture.

Principle of laser, Einstein's coefficients, Types of laser – Ruby and He-Ne laser and their applications.

**Unit III Electron Optics, Nuclear Physics and Quantum**

**Mechanics:**
Measurement of ‘e/m’ by Thomson’s method, Determination of electronic charge by Millikan’s oil drop method, Bainbridge mass spectrograph, G.M. counter, Heisenberg’s uncertainty principle, Schrödinger’s time dependent and time independent wave equations, physical significance of wave function.

**Unit IV Crystal Structure, X-rays and Electrodynamics:**
Unit cell, Bravais lattice, cubic system, number of atoms per unit cell, coordination number, atomic radius, packing density, relation between lattice constant and density, lattice planes and Miller indices, Interplaner spacing for cubic system, Bragg’s law, X-ray diffraction, Line and Continuous Spectrum of X-ray, Mosley’s law. Introduction of Maxwell equations(no derivation), Electromagnetic wave in free space.

**Unit V Magnetic, Superconducting and Semiconducting materials:**
Types of magnetic materials( Ferrimagnetic & Antiferromagnetic, Ferrites & Garnets), B-H curve, Classical free electron theory-electrical conductivity, resistivity and its temperature dependence, microscopic Ohm’s law, Superconductivity, types of superconductors, Meissner effect and Applications. Band theory of solids, conductivity of semiconductors, Hall effect.

**Text books:**
1. Engineering Physics M.N. Avadhanulu and P.G. Kshirsagar. S.Chand and Company LTD.
2. Engineering Physics – Dr. L. N. Singh. Synergy Knowledgeware-Mumbai.

3. Engineering Physics - R.K. Gaur and S. L. Gupta. Dhanpat Rai Publications Pvt. Ltd.-New Delhi.
4. Fundamental of Physics - Halliday and Resnik. Willey Eastern Limited.

**Reference books:**
1. Introduction to Electrodynamics –David R. Griffiths.
2. Concept of Modern Physics – Arthur Beizer. Tata McGraw-Hill Publishing Company Limited.
3. Optics – Ajoy Ghatak.MacGraw Hill Education (India) Pvt. Ltd.
4. Science of Engineering Materials- C.M. Srivastava and C. Srinivasan. New Age International Pvt.Ltd.

5. Solid State Physics – A.J. Dekker. McMillan India –Limited.
6. The Feynman Lectures on Physics Vol I,II,III.
7. Introduction to solid state physics – Charles Kittel. John Willey and Sons

# Engineering Graphics

## BTES103/203 Engineering Graphics

**Unit 1: Drawing standards and geometrical construction:**
Drawing standard SP: 46, Type of lines, lettering, dimensioning, scaling conventions. Geometrical construction: Dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and a hexagon.

**Unit 2: Orthographic Projections and Projections of Points:**
Introduction to orthographic projection, drawing of orthographic views of objects from their isometric views. Projection of points lying in four quadrants.

**Unit 3: Projections of Straight Lines and Planes and their Traces :**
Projections of lines parallel and perpendicular to one or both planes, projections of lines inclined to one or both planes. Traces of lines. Projections of planes parallel and perpendicular to one or both planes, projection of planes inclined to one or both planes.

**Unit 4: Projections of Solids**
Types of solids, projections of solids with axis perpendicular and parallel to HP and VP, solids with axis inclined to one or both the planes. Projections of spheres touching each other.

**Unit 5: Sectioning of Solids, Isometric Projections**
Sectioning of solids: Section planes perpendicular to one plane and parallel or inclined to other plane. Isometric projections: Isometric scale, drawing of isometric projections from given orthographic views.

**Reference/Text Books:**
1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 46th Edition, 2003.
2. K. V. Nataraajan, A text book of Engineering Graphic, Dhanalakshmi Publishers, Chennai, 2006.

3. K. Venugopal and V. Prabhu Raja, Engineering Graphics, New Age International (P) Ltd, 2008.
4. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Autocad, McGraw Hill Education, 2017

# Communication Skills

## Communication Skills

**Unit 1: Communication and Communication Processes**
Introduction to Communication, Forms and functions of Communication, Barriers to Communication and overcoming them, Verbal and Non-verbal Communication
**Reading:** Introduction to Reading, Barriers to Reading, Types of Reading: Skimming, Scanning, Fast Reading, Strategies for Reading, Comprehension.
**Listening :** Importance of Listening, Types of Listening, Barriers to Listening.

**Unit 2: Verbal & Non-verbal Communication**
Use of Language in Spoken Communication, Principles and Practice of Group Discussion, Public Speaking (Addressing Small Groups and Making Presentation), Interview Techniques, Appropriate Use of Non-verbal Communication, Presentation Skills, Extempore, Elocution.

**Unit 3: Study of Sounds in English**
Introduction to phonetics, Study of Speech Organs, Study of Phonemic Script, Articulation of Different Sounds in English.

**Unit 4: English Grammar**
Grammar: Forms of Tenses, Articles, Prepositions, Use of Auxiliaries and Modal Auxiliaries, Synonyms and Antonyms, Common Errors.

**Unit 5: Writing Skills, Reading Skills & Listening Skills**
Features of Good Language, Difference between Technical Style and Literary Style, Writing Emails, Formal and Informal English, Technical Reports: Report Writing: Format, Structure and Types
**Letter Writing:** Types, Parts, Layouts, Letters and Applications, Use of Different Expressions and Style, Writing Job Application Letter and Resume.

**Text book:**
Mohd. Ashraf Rizvi, Communication Skills for Engineers, Tata McGraw Hill

**Reference Books:**

1) Sanjay Kumar, Pushp Lata, Communication Skills, Oxford University Press, 2016
2) Meenakshi Raman, Sangeeta Sharma, Communication Skills, Oxford University Press, 2017
3) Teri Kwal Gamble, Michael Gamble, Communication Works, Tata McGraw Hill Education, 2010
4) Anderson, Kenneth. Joan Maclean and Tossny Lynch. Study Speaking: A Course in Spoken English for Academic Purposes. Cambridge: CUP, 2004.
5) Aswalthapa, K. Organisational Behaviour, Himalayan Publication, Mumbai (1991).
6) Atreya N and Guha, Effective Credit Management, MMC School of Management, Mumbai (1994).
7) Balan,K.R. and Rayudu C.S., Effective Communication, Beacon New Delhi (1996).
8) Bellare, Nirmala. Reading Strategies. Vols. 1 and 2. New Delhi. Oxford University Press, 1998.
9) Bhasker, W. W. S & Prabhu, N. S.: English through Reading, Vols. 1 and 2. Macmillan, 1975.
10) Black, Sam. Practical Public Relations, E.L.B.S. London (1972).
11) Blass, Laurie, Kathy Block and Hannah Friesan. Creating Meaning. Oxford: OUP, 2007.
12) Bovee Courtland,L and Thrill, John V. Business Communication, Today McGraw Hill, New York, Taxman Publication (1989).

# Energy and Environment Engineering

## Energy and Environment Engineering

### Unit 1

**Conventional Power Generation:** Steam power station, Nuclear power plant – Gas turbine power plant- Hydro power station: Schematic arrangement, advantages and disadvantages, Thermo electric and thermionic generators, Environmental aspects for selecting the sites and locations of power plants.

### Unit 2

**Renewable Power Generation:** Solar, Wind, Biogas and Biomass, Ocean Thermal energy conversion (OTEC), Tidal, Fuel cell, Magneto Hydro Dynamics (MHD): Schematic arrangement, advantages and disadvantages.

**Unit 3**

**Energy conservation:** Scope for energy conservation and its benefits Energy conservation Principle – Maximum energy efficiency, Maximum cost effectiveness, Methods and techniques of energy conservation in ventilation and air conditioners, compressors, pumps, fans and blowers, Energy conservation in electric furnaces, ovens and boilers., lighting techniques.

**Unit 4**

**Air Pollution:** Environment and Human health - Air pollution: sources- effects- control measures - Particulate emission, air quality standards, and measurement of air pollution.

**Unit 5**

**Water Pollution:** Water pollution- effects- control measures- Noise pollution –effects and control measures, Disposal of solid wastes, Bio-medical wastes-Thermal pollution – Soil pollution -Nuclear hazard.

**Reference/Text Books:**

1. A Chakrabarti, M. L Soni, P. V. Gupta, U. S. Bhatnagar, A Text book of Power System Engineering, Dhanpat Rai Publication.
2. Rai. G. D., Non Conventional Energy Sources, Khanna Publishers, Delhi, 2006.
3. Rao S., Parulekar B.B., Energy Technology-Non conventional, Renewable And Conventional, Khanna Publishers, Delhi, 2005.
4. Glynn Henry J., Gary W. Heinke, Environmental Science and Engineering, Pearson Education, Inc, 2004.
5. J. M. Fowler, Energy and the Environment, McGraw-Hill, 2 nd Edition, 1984.
6. Gilbert M. Masters, Introduction to Environmental Engineering and Science, 2nd Edition, Prentice Hall, 2003.

# Basic Civil and Mechanical Engineering

## Basic Civil and Mechanical Engineering

### Module 1: Introduction to civil engineering

Various Branches, role of civil engineer in various construction activities, basic engineering properties and uses of materials: earth, bricks, timber, stones, sand, aggregates, cement, mortar, concrete, steel, bitumen, glass, FRP, composite materials.

**Module 2: Building Components & Building Planning**
Foundation and superstructure, functions of foundation, types of shallow and deep foundations, suitability in different situation, plinth, walls, lintels, beams, columns, slabs, roofs, staircases, floors, doors, windows, sills, Study of Building plans, ventilation, basics of plumbing and sanitation

**Module 3: Surveying**
Principles of survey, elements of distance and angular measurements, plotting of area, base line and offsets, introduction to Plane table surveying, introduction to levelling, concept of bench marks, reduced level, contours

**Part II Basic Mechanical Engineering**

**Unit 1:** Introduction to Mechanical Engineering, Introduction to Laws of Thermodynamics with simple examples pertaining to respective branches, IC Engines: Classification, Applications, Basic terminology, 2 and 4 stroke IC engine working principle, Power Plant: Types of Power plant; Gas power plant, Thermal power plant, Nuclear power plant, Automobiles: Basic definitions and objectives
**Unit 2:** Design Basics, Machine and Mechanisms, Factor of safety, Engineering Materials: types and applications, basics of Fasteners Machining and Machinability, Introduction to Lathe machine, Drilling machine, Milling machine, basics of machining processes such as turning, drilling and milling, Introduction to casting

**Text Books**


- Anurag Kandya, “Elements of Civil Engineering”, Charotar Publishing, Anand
- M. G. Shah, C. M. Kale, and S. Y. Patki, “Building Drawing”, Tata McGraw Hill
- Sushil Kumar, “Building Construction”, Standard Publishers Distributors
- M. S. Palani Gamy, “Basic Civil Engineering”, Tata Mc-Graw Hill Publication
- Kanetkar T. P. and Kulkarni S. V., “Surveying and Levelling”, Vols. I, II and III, Vidyarthi Gruh Prakashan, Pune
- B. C. Punmia, “Surveying”, Vol.- I, Vol.-II, Vol.-III, Laxmi Publications
- G. K. Hiraskar, “Basic Civil Engineering”, Dhanpat Rai Publications
- Gopi Satheesh, “Basic Civil Engineering”, Pearson Education

- P. K. Nag “Engineering Thermodynamics”, Tata McGraw Hill, New Delhi 3rd ed. 2005
- A. Ghosh, A K Malik, “Theory of Mechanisms and Machines”, Affiliated East West Press Pvt. Ltd. New Delhi.
- Serope Kalpakaji and Steven R Schimd “ Amanufacturing Engineering and Techology” Addision Wsley Laongman India 6th Edition 2009
- V. B. Bhandari, “ Deisgn of Machine Elements”, Tata McGraw Hill Publications, New Delhi.