UNIVERSITY POLYTECHNIC
B.I.T., MESRA, RANCHI

Syllabus of Diploma in Engineering Common for All Branches (Semester I)

COURSE STRUCTURE
(W.E.F. 2011 Batch Students)

(Total Unit – 7.5)
Common to All Branches

Course Code	Theory	Unit	Course Code	Sessional	Unit
DMA 1001	Mathematics I	1.0	DPE 1002	Workshop Practice I	0.5
DAS 1001	Applied Science I	1.0	DAS 1002	Applied Science Lab I	0.5
DBE 1001	Elements of Engg.	1.0	DME 1002	Engineering Graphics-I	0.5
DCP 1001	Fundamentals of Computer	1.0	DCP 1002	Computer Lab	0.5
DHU 1003	Communication Practice	1.0	DGA 1002	P.T. & Games/Creative Arts/NSS	0.5
		5.0			**2.5**

UNIVERSITY POLYTECHNIC
B.I.T., MESRA, RANCHI

Syllabus of Diploma in Engineering Common for All Branches (Semester I)

Course Code : DMA 1001 **Subject : Mathematics I**

Algebra :

Module 1 and Module 2

Progression: A.P.G.P. and H.P. A.M. G.M. and H.M. and relation between them. Sum to n terms of A.P. and G.P. Use of $\sum$ notation. (5)

Meaning of Factorial Nation, ${}^{n}C_{r}$ and ${}^{n}P_{r}$.

Binomical Theorem : Binomial expansion for positive integral index, General term, middle term and greatest term and related problems. (5)

Module 3

Complex numbers : Plotting of complex numbers in Argand diagram, conjugate, Modulus and argument and polar form of complex numbers. Cube roots of unity and their properties, De-Moiver's theorem (without proof) and related problems. (5)

Module 4

Quadratic equation : Nature of roots of a quadratic equation and their properties. Formation of quadratic equation when roots are given

Series : Exponential and logarithmic series (without proof) and direct application to problems. (5)

Module 5 and Module 6

Trigonometry :

Trigonometric ratios of standard angles, Use of Sin(A+B), Cos(A+B), Tan(A+B), Cot(A+B), trigonometric ratios of multiple angles, solution of Trigonometric equations and general values. (5)

Problems related to sine, cosine and tangent formulae in terms of sides of triangle. Inverse circular functions, Common Logarithms and their properties. (5)

Module 7

Co-ordinate Geometry :

Cartesian Co-ordinates, Distance formulae, section formulae, area of a triangle. General equation of a straight line and its standard forms. Length of perpendicular. Equation of circle, circle through three point, circle with a given diameter. (5)

Books

1) Senior Secondary School Mathematics – R. S. Agarwal

UNIVERSITY POLYTECHNIC
B.I.T., MESRA, RANCHI

Syllabus of Diploma in Engineering Common for All Branches (Semester I)

Course Code: DAS 1001 **Subject: APPLIED SCIENCE – I**

Module I:
Measurements **[4]**
Fundamental Physical quantities and Derived Physical quantities
System of units [M.K.S., C.G.S., F.P.S. & SI], Dimensions of the physical quantities Principle of homogeneity of dimensions, Order of magnitude
Scalar & Vector quantities
Significant figures, Prefixes of units, Error in measurement
Differential & Integral calculus (Introduction only).

Module II:
Basic concepts of Chemistry **[6]**
Mole concept, Avogadro's number, atomic weight, molecular weight
Atomic mass unit (a.m.u.), Equivalent weight, Oxidation number
Concentration terms (Molarity, Normality and molality) with numericals
Stoichiometry (problems based on chemical calculation)

Module III:
Force and Motion **[6]**
Position and Displacement, Velocity, Speed and Acceleration
Circular motion, Projectile motion [Time of flight, Vertical height and Horizontal range] Newton's laws of motion, Force, Torque.
Work, Energy and Power
Work, Energy, Power, Kinetic energy, Potential energy

Module IV:
Atomic structure and Nuclear Chemistry **[8]**
Rutherford's nuclear model of atom, Bohr's atomic model
Orbit and orbital, Atomic number, mass number, Isotopes and Isobars
Quantum numbers, Aufbau's rule, Electronic configuration (upto atomic no. 30),
Hund's rule, Pauli's exclusion principle
Dual nature of matter (de Broglie relationship), Heisenberg's uncertainty principle Radioactivity (Alpha, Beta and Gamma rays)
Nuclear fission and fusion, Nuclear reactor, Radio Carbon dating

Module V:
Gravitation **[6]**
Newton's laws of gravitation,
Variation of acceleration due to gravity 'g'
[On the Earth Surface, inside the earth and above the earth]
Escape Velocity, Planets and Satellites

Mechanical Properties of Matter
Elasticity: Stress, Strain, Hooke's law
Modulus of elasticity [Young's Modulus, Bulk's Modulus and Modulus of rigidity]
Surface Tension: Capillarity, Determination of surface tension by capillary rise method,
Surface energy, Relation between Surface Tension and Surface energy

Module VI:
Periodic table and Chemical bonding **[4]**
Modern periodic table and its periodic trends
Atomic radius, Ionization energy, Electron affinity and Electronegativity
Ionic bond, covalent bond, Co-ordinate bond and Hydrogen bonding
VSEPR theory and shape of molecules

Module VII:
Fluids (At rest and motion) **[6]**
Density and Pressure, Fluid at rest [Pascal Principle, Archimedes's Principle], Ideal fluids in motion [Equation of continuity, Bernoulli's Equation (Without proof) and its Applications]. Viscosity, Coefficient of viscosity, Reynold's number, Stoke's law, Poiseiulle's formula for steady flow (Without proof).

BOOKS RECOMMENDED:
1. Physics,Vol.-I,Robert Resnick,David Halliday & Kenneth S.Kumar,John Wiley & Sons, Inc
2. Physics for Class XI, N.K.Bajaj, Tata McGraw Hill Publishing Co. Ltd.
3. Introductory Physics, Vol.I, N. N. Ghosh, Bharti Bhawan
4. Concept of Physics, Vol. I, H.C.Verma, Bharti Bhawan
5. Inter Physics, Part I, Durga Prasad Singh, Students' Friends
6. Comprehensive Chemistry. Vol .I.`
7. Engineering Chemistry, Shashi Chawla.

UNIVERSITY POLYTECHNIC
B.I.T., MESRA, RANCHI

Syllabus of Diploma in Engineering Common for All Branches (Semester I)

Course Code : DBE 1001 **Subject: ELEMENTS OF ENGINEERING**

MODULE1 **[7]**

Introduction to Mechanical engineering : Work, Power, Energy, Heat, Temperature, Units of heat, Specific heat capacity, Interchange of heat, Change of state, Mechanical equivalent of heat, Internal energy, Enthalpy, Entropy, Efficiency, Statements of Zeroth Law, First law and Second Law of Thermodynamics, Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, , Relation between Cp and Cv, Non flow process, Constant volume process, Constant pressure process, Isothermal process, Poly-tropic process, Adiabatic process.

MODULE 2 **[5]**

Introduction to Electrical Engineering : Definition of electrical quantities – voltage, current, electrical power, electrical energy, resistance, inductor, capacitor; effect of temperature on resistance, series and parallel combinations of capacitors, charging a discharging of capacitors, energy stored in a capacitor.

MODULE 3 **[5]**

Introduction to steam generator & I.C. engine : Introduction to steam generator, Classification, Simple vertical boiler, Boiler draught.
Introduction to I.C. Engine, Classification, Engine details, Difference between two-stroke and four-stroke cycle, indicated power (ihp), Brake Power (bhp), Efficiencies.

MODULE 4 **[7]**

DC circuits and Electrical wiring: Circuits laws : Ohm's law, Kirchoff's laws, Kirchoff's current law, Kirchoff's voltage laws.
Series & parallel circuits : resistors in series, resistors in parallel series – parallel circuits, star-delta transformation. Maxwell's loop current method.
Electrical wiring : connector switches, system of wiring, domestic wiring – installation, sub circuit & control circuits. Type of lamps, fixtures & reflectors illumination schemes for domestic premises, lumen requirement for different categories.

MODULE 5 **[4]**

Introduction to Civil Engineering: Impact of Infrastructural Development on the Economy of a Country, Role of Civil Engineers, Importance of Planning, Scheduling and Construction Management.
Planning: Elementary principles and basic requirements of a building planning, layout of residential & industrial buildings.

MODULE 6 **[6]**

Manufacturing Processes : Classification of Manufacturing Processes, Concept of forging, rolling,
Type of patterns, pattern materials, Sand Moulding & core making
Welding : Type of welding, gas welding, gas cutting, arc welding.
Machine Tools (Drilling machine, Lathe machine).

MODULE 7 **[6]**

Construction Materials: Requirement, types, uses, properties and importance of Civil Engineering materials like Stone, Bricks, Lime, Cement, Ferrous and Non Ferrous Metals, Ceramic Materials, Timber, Sand, Aggregate, Mortar and Concrete, Paints and Varnishes, Glass , Plastic, Conducting, Magnetic, and Miscellaneous Materials

Syllabus of Diploma in Engineering Common for All Branches (Semester I)

Books

Title	Author	Publisher
Elements of Mechanical Engineering	K.P.Roy & Prof .S.K . Hajra Chaudhary	Media Promoters & Publishers Pvt.Ltd, Bombay
Fundamental of Mechanical Engineering	G.S. Sawhney	Prentice Hall of India Publication, New Delhi
Basic Electrical Engineering	V.N.Mittal	
Electrical Technology Vol.1	B.L.Theraja	
Engineering Mechanics and Elements of Civil Engineering	Bhavikatti and Duggal	New Age International publishers
Elements of civil Engineering	Balasubramanya N.	Pooja Publications, Bangalore.

UNIVERSITY POLYTECHNIC
B.I.T., MESRA, RANCHI

Syllabus of Diploma in Engineering Common for All Branches (Semester I)

Subject : Fundamentals of Computer **Course Code : DCP 1001**

Module 1: **04 Lectures**

Basics of Computer: Introduction, Characteristics of computer, Classification of computer; Computer hardware and software; Applications of computers.

Module 2: **06 Lectures**

Organization of Computers: CPU and its components; Computer Memory, Units of storage, Input and Output devices. Secondary storage devices;

Module 3: **06 Lectures**

Data Representation: Number systems; Data representation; Conversion of a number from one base to another; Addition, subtraction, multiplication and division using binary integers.

Module 4: **04 Lectures**

Software: System and application software; Operating system; Programming Languages and Translators- assembler, interpreter and compiler.

Module 5: **06 Lectures**

Windows and Windows-based Applications: Features of Windows operating system; General features of word processor, spreadsheet, graphics applications and databases; Common File extensions.

Module 6: **06 Lectures**

Computer Networks: Types of Network, Network topology, Transmission media, Internet and Intranet, Electronic mail.

Module 7: **08 Lectures**

Introduction to Programming: Logic development, Logic representation using flowchart and pseudo code; programming constructs- sequence construct, selection construct (decision making) and iteration construct (looping).

Textbook:

Jaiswal. S. “Fundamental of Information Technology”, Galgotia Publication.

Reference Books:

V. Rajaraman, “Fundamental of Computers”,PHI
S. Jain, “’O’-Level Information Technology”, BPB
Jaiswal. S. “Information Technology Today”, Galgotia Publication.

UNIVERSITY POLYTECHNIC
B.I.T., MESRA, RANCHI

Syllabus of Diploma in Engineering Common for All Branches (Semester I)

Subject : Communication Practice **Course code : DHU 1003**

1. Grammar
   - i) (a) Noun (b) Verb (c) Adjectives (d) Adverbs
   - ii) Agreement of the Verb with the subject
   - iii) Tense
   - iv) Articles
   - v) Prepositions
   - vi) Punctuation Marks

   15 Lectures

2. Framing Sentences

   Making grammatically correct sentences from given words

   5 Lectures

3. Report Writing
   - i) Definition of a professional report
   - ii) Types of Reports
   - iii) Standard format in a Tabular form — 3 Lectures

4. Notice Agenda & Minutes
   - i) Short notes on (a) Notice (b) Agenda (c) Minutes

   3 Lectures

5. Correspondence
   - i) Job Application
   - ii) Leave Application
   - iii) Business letter
   - iv) Friendly letter

   6 Lectures

6. Comprehension

   Reading a passage and then answer the following questions.

   5 lectures

7. Précis writing

   3 lectures.