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

Syllabus of Diploma in Engineering (Manufacturing Engineering) (Semester III)

COURSE STRUCTURE
(W.E.F. 2011 Batch Students)
(Total Unit 7.5)

Course Code	Theory	Unit	Course Code	Sessional	Unit
DMA 3001	Mathematics III	1.0	DEC 3002	Basic Electronics Lab.	0.5
DEC 3001	Basic Electronics	1.0	DAM 3002	Applied Mechanics Lab.	0.5
DAM 3001	Applied Mechanics	1.0	DCP 3006	C Programming Lab.	0.5
DCP 3005	C Programming	1.0	DME 3002	Manufacturing Process - I Lab.	0.5
DME 3001	Manufacturing Process – I	1.0	DGA 3002	PT & Games/Creative Arts/NSS	0.5
		5.0			**2.5**
			DHU 3002	Comm. Practice WS-II	0.5 (NC)

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Subject : Mathematics III **Course Code : DMA 3001**

Module 1 and Module 2
Differential Equations :
Degree and order of D.E., Formation. Variable separable method. homogeneous differential equations. D.E. reducible to homogeneous forms. Linear D.E. (Bernoulli's forms not required). (5)
Higher order differential equation with constant co-efficient. Complementary functions and rules for finding particular integrals. (5)

Module 3
Statics :
Parallelogram law of forces. Resolution for forces, Triangle of forces. Lami's Theorem. Parallel forces, Moments, Couples. (5)

Module 4 and Module 5
Dynamics :
Rectilinear motion projectiles, Projectiles, Motion on inclined planes. (5)
Work, Energy and Power, Collision of elastic bodies (direct impact). (5)

Module 6
Statistics :
Frequency distribution, Histogram (5)

Module 7
Polygon, Measures of central Tendencies (Mean. Median Mode), S.D. and variance. (5)

Books Recommended
Modern Approach to intermediate vector analysis – Das Gupta & Prasad
Engineering Mathematics – Bali, Saxena, Iyengar. – Laxmi Publication
Statics Via Vector – A. Ghatuary
Dynamics via calculus – A. Ghatuary

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Subject : Basic Electronics **Course Code : DEC 3001**

Module 1 :

Introduction to semiconductors, PN junction, Characteristics of Semiconductor diodes, biasing of P-N junction, Zener diode – characteristics and applications, AC & DC load lines.

(10)

Module 2 :

Rectifiers : Half-wave, Full-wave Centre-tap and Bridge Rectifiers. Filters Circuits : Inductor Filter, LC filter, Multiple Filter, CLC or π filters, comparison of filter circuits.

(6)

Module 3 :

Fundamentals of transistors – operation and configurations. Transistor biasing techniques and stability factor.

(4)

Module 4 :

Small signal analysis of BJT's at low frequencies. Transistor Power Amplifiers – Circuit and Opertion of Class A, Class B, Class AB & Class C.

(6)

Module 5 :

Oscillation Criteria, R-C phase shift oscillator, CRO – functional block diagram and description. Applications of CRO.

(6)

Module 6 :

Op-Amps, ideal characteristics of op-amps, configurations of op-amps and applications, Active filter design. (4)

Module 7 :

Number System – Binary, Octal, Decimal & Hexadecimal and their interconversions. Introduction to logic gates and their truth tables.

(4)

Books Recommended

1. Electronic Devices & Circuits – Allan Mottershed
2. Digital Electronics – B. R. Gupta & V. Singhal

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Subject : Applied Mechanics **Course Code : DAM 3001**

Module 1 :
FORCES
Introduction, Composition & Resolution of forces, Parallelogram law of forces, Triangle of forces, Lami's theorem, Polygon of forces, Parallel Force, Forces acting in the same and opposite direction, Resultant. (5)

Module 2 :
MOMENTS & EQUILIBRIUM
Moments : Definition, Graphical representation of moment, physical meaning, positive and negative moment, Algebraic sum of moments, Generalised theorem of moments, Moment about an axis, couples, theorem related to couples.
Equivalent forces & Moments, Equilibrium of rigid bodies, General condition of equilibrium, Action & reactions, freebody diagrams calculation of reactions, System of Forces : (a) Colinear forces (b) Non colinear forces in a plane (7)

Module 3 :
CENTRE OF GRAVITY & MOMENT OF INERTIA
C.G. of triangles, rectangles, circle and solid bodies, Area moment of inertia and mass moment of inertia. (4)

Module 4 :
FRICTION
Law of Static friction, Limiting friction, angle of friction, wedge. (4)

Module 5 :
RECTILINEAR AND CURVILINEAR MOTION
Motion Rectilinear : Laws of motion, equations of rectilinear motion, Rectilinear motion rectilinear motion under gravity, speed, velocity and acceleration, relative velocity, projectiles.
Motion Curvilinear : Definition of curvilinear motion, equation of curvilinear motion, equation of motion for rotating bodies Dynamic equilibrium. (9)

Module 6 :
WORK, POWER & ENERGY
Definitions, Potential energy, Kinetic energy, derivation of potential energy and kinetic energy, principle of conservation of energy, Motion of the centre of mass of a system of particles, Impulse & Momentum. (6)

Module 7 :
LIFTING MACHINES
Definition, Irreversible Machine, Helix and Screw and Screw Jack. (5)

Books :

1. Engineering Mechanics – S. Rammamruthan
2. Engineering Mechanics – I. B. Prasad
3. Engineering Mechanics – R. S. Khurmi

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Subject : C Programming **Course Code : DCP 3005**

Module 1: **04 Lectures**
Introduction to C Programming: Structure of a C Program; Data-types, variables and constants; Keywords and identifiers.

Module 2: **06 Lectures**
Managing Input and Output: Formatted input and output functions─ printf() and scanf(); Character input and output functions─ getchar() and putchar(); string input and output functions─ gets() and puts().

Module 3: **04 Lectures**
Operators and expressions: Arithmetic operators; precedence of operators; increment and decrement operators; assignments operators; Writing arithmetic expressions; Type casting; arithmetic functions─ pow(), sqrt(), sin(), cos() and tan().

Module 4: **08 Lectures**
Decision Making and Looping: if statement; if…else statements; Character testing functions─ isupper(), islower(), isalpha(), isdigit(), isalnum(); conversion functions─ toupper() and tolower(); switch-case and goto statement; for loop, while and do-while loops; break and continue.

Module 5: **06 Lectures**
Arrays and strings: Defining Array; One-dimensional arrays; Two-dimensional arrays; String storage and processing; String handling functions─ strlen(), strcat(), strcpy(), strcmp(), strcmpi(), atoi() and itoa().

Module 6: **08 Lectures**
Function and Pointers: Return values and their types, calling a function, Call by value, Call by reference, category of functions, nesting of function; recursion. Declaration and initialization of pointers; accessing a variable through its pointer.

Module 7: **04 Lectures**
Structures and Unions: Structure definition; declaration and initialization of structure variables; Storing value to structure members; Union; Difference between Structure and Union.

Textbook:
E. Balagurusamy, “Programming in ANSI C”, TMH.

Reference Books:
B. S. Gottfied, “Programming with C”,TMH

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Subject: Manufacturing Process - I **Course code : DME 3001**

Module 1
Foundry:
Pattern making – Type of patterns, pattern materials and pattern allowances 3

Module 2
Sand Moulding & core making – Conventional sand moulding, CO_2 moulding and Shell moulding, Machine moulding , Moulding materials and their characteristics different type of cores,core making materials and their characteristics
Gating System – Parts of the gating system – pouring basin, sprue, runner, riser 10

Module 3
Melting furnaces – Arc furnace, Cupola. 3

Module 4
Cleaning of casting and defects in casting.
Special Casting processes – Die casting, centrifugal casting, precision casting, 5

Module 5
Welding processes:
Concepts, principle, application, advantages and disadvantage of oxy-acetylene gas welding,manual metal arc welding, submerged arc welding, MIG and TIG welding processes. Electric resistance welding, spot, seam, Projection and butt welding. Thermit welding, defects in welding. 11

Module 6
Concept of Brazing and Soldering 3

Module 7
Hot and Cold Working Process: Concept of forging, rolling, drawing and extrusion. 5

Text Books :
1. Elements of workshop technology by Hazra S. K. and Choudhari, Vol. I & II
2. Workshop Technology by Raghuwanshi B. S.

Reference Books:
1. Workshop Technology Vol. I & II by Gupta K. N. and Kaushin J. P.
2. Workshop Practice Vol. I & V by Atherton W. H.
3. Principle of Foundry Technology – K. P. Sinha
4. Manufacturing Technology Vol. I & II – O. P. Khanna
5. Welding Technology – O.P. Khanna
6. Production Technology – R. K. Jain