

**SWAMI VIVEKANAND UNIVERSITY, SIRONJA,
SAGAR (M.P.)**



SYLLABUS

For

**Polytechnic Diploma
in Engineering
(All Branch) II Sem**

**Swami Vivekanand University, Sironja Sagar
2013-2014**



Swami Vivekanand Vishwavidyalaya, Sironja, Sagar

CREDIT BASED GRADING SYSTEM

Program Name: Three Year Diploma

SCHEME FOR DIPLOMA IN ENGINEERING (ALL BRANCH).

Name of Scheme

:CGPA-2012

Implemented from Session : July 2012

Scheme of Studies and Examinations for : **SECOND SEMESTER**

Exam Code:

COURSE CODE	COURSE TITLE	PAPER CODE	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDIT	GRAND TOTAL OF MARKS		
			LECTURES	CONTINUOUS EVALUATION		END OF THE TERM/ SEMESTER EVALUATION			THEORY CREDIT	PRACTICAL Hrs. Per Week	CONTINUOUS EVALUATION	END OF THE TERM/ SEMESTER EVALUATION							
				Hrs. Per Week	TERM WORK QUIZ, ASSIGNMENT	MID TERM TEST (TWO)		THEORY PAPER				LAB. WORK QUIZ, ASSIGNMENT	PRACTICAL / ORAL EXAMINATION (VIVA)						
						I	II	NO.					MARKS/ WEIGHTAGE	DURATION (Hrs)	NO.			MARKS	DURATION (Hrs.)
201	APPLIED MECHANICS	6034	06	10	10	10	01	70	3	04	02	20	01	30	3	02	06	150	
202	ENVIRONMENTAL ENGINEERING AND SAFETY	6035	06	10	10	10	01	70	3	04	02	20	01	30	3	02	06	150	
203	INTRODUCTION TO COMPUTERS	5132	04	10	10	10	01	70	3	04	04	20	01	30	3	02	06	150	
204	ENGINEERING DRAWING	6036	06	10	10	10	01	70	3	04	--	--	--	--	--	--	04	100	
205	WORKSHOP PRACTICE	-----	--	--	--	--	--	--	--	--	04	40	01	60	3	02	02	100	
206	PROFESSIONAL ACTIVITIES (PA)	-----	--	--	--	--	--	--	--	--	02								
	TOTAL	-----	22	40	40	40	04	280		16	14	100	04	150		08	24	650	

Theory Credits : 16
 Practical Credits : 08
Total Credits : 24

Theory Marks : 280
 Practical Marks : 150
 Quiz, Mid Term, Lab. Work : 220
Total : 650

Minimum Pass Grade in Theory & Practical 'D'



SWAMI VIVEKNAND UNIVERSITY SAGAR (M.P.)

SEMESTER-II

SUBJECT: APPLIED MECHANICS

SUBJECT CODE: PT201

UNIT I

COMPOSITION AND RESOLUTION OF FORCES

Definition, Effect, characteristics of force, System of Forces, Principle of Transmissibility of Forces, Concept of Resultant Force, Law of –Parallelogram of Forces, Triangle of Forces, Polygon of Forces Determination of Resultant of two or more concurrent forces (analytically and graphically)

PARALLEL FORCES AND COUPLES

Classification of Parallel Forces, Methods of finding resultant Force of parallel forces- analytically & graphically, Position of resultant force of parallel forces- Definition, Classification and characteristics of a force Couple, moment of couple

UNIT II

MOMENTS AND THEIR APPLICATIONS

Definition, Types and law of moment-Varignon's Principle of moment and its applications Lever and its Applications. Types of supports and determination of support reactions of a simply supported beam subjected to point load and uniformly distributed load (UDL).

EQUILIBRIUM OF FORCES

Equilibrium of a system of concurrent forces, Conditions and types of Equilibrium Lami's Theorem and its applications.

UNIT III

CENTRE OF GRAVITY

Difference between Centroid and Center of Gravity (CG), Centroid of standard plane figures and CG of simple solid bodies, Method of finding out Centroid of composite plane laminas and cut sections, Method of finding out CG of Composite solid bodies.

FRICTION

Concept and types of friction, Limiting Friction, coefficient of friction, angle of friction, angle of repose, Laws of friction (Static and Kinetic), Analysis of equilibrium of Bodies resting on Horizontal and inclined Plane, Utility / Nuisance value of friction.

UNIT IV

SIMPLE LIFTING MACHINES

Concept of lifting Machines, Definition of Mechanical Advantage, Velocity Ratio and Efficiency of Machines and their relation Reversibility of Machines and condition for self locking machine, Law of Machines, Maximum mechanical advantage and maximum efficiency of machine, Friction in machine (In terms of Load and effort), Calculation of M.A., V.R. and efficiency of following machines, Simple wheel and axle Differential wheel and axle Single purchase crab Double purchase crab Simple screw jack, Different System of simple pulley blocks.

MOTION OF A PARTICLE

Definition of speed, velocity, acceleration, uniform velocity, uniform acceleration and variable acceleration, Motion under constant acceleration/ retardation (equations of motion) Motion under force of gravity, Concept of relative velocity, Definition of projectile, velocity of projection, angle of projection, time of flight, maximum height, horizontal range and their determination, Definition of angular velocity, angular acceleration and angular displacement, Relation between linear and angular velocity of a particle moving in a circular path, Motion of rotation under constant angular acceleration.

UNIT V

LAWS OF MOTION

Newton's Laws of motion and their applications.

WORK, POWER AND ENERGY 10

Definition unit and graphical representation of work, Definition and unit of power and types of engine power and efficiency of an engine. Definition and concept of Impulse, Definition, unit and types of energies, Total energy of a body falling under gravity.

S. NO.	REFERENCE BOOKS
01.	A text book of Applied Mechanics – R.S. Khurmi , S.C. Chand & Co. , New Delhi
02.	Applied Mechanics – I.B. Prasad, Khanna Publishers, New Delhi
03.	Applied Mechanics (Hindi) – R.S. Jog, Anand Publishers, Gwalior Applied
04.	Mechanics (Hindi) – A.R. Page, Deepak Prakashan, Gwalior

S. NO.	LIST OF EXPERIMENTS
01.	Verification of laws of parallelogram of forces.
02.	Verification of laws of polygon of forces
03.	Verification of laws of moments
04.	Determination of forces in the members of Jib Crane
05.	Determination of Centroid of plane lamina by graphical method
06.	Determination of coefficient of friction for surfaces of different materials on horizontal plane
07.	Determination of coefficient of friction for surfaces of different materials on an inclined plane Determination of mechanical advantage, velocity ratio and efficiency of the following lifting machines.
08.	Simple wheel and axle Differential wheel axle Single purchase crab Double purchase crab Simple pulley block Simple screw jack
09.	Measurement of B.H.P. of an engine using rope break dynamometer



SWAMI VIVEKNAND UNIVERSITY SAGAR (M.P.)

SUBJECT: ENVIRONMENTAL ENGINEERING & SAFETY

SUBJECT CODE: PT202

UNIT I

INTRODUCTION TO ENVIRONMENT.

The Biosphere, biotic and abiotic, An aquatic ecosystem, Types of pollution, Impact of human being on environment, Impact of environment on human being, Basic approach to improve environmental qualities, Role of an environmental engineer.

AIR POLLUTION SOURCES AND EFFECTS

Standard definition of air pollution, Composition of natural air, Names of air pollutants, Classification of air pollutants, primary and secondary pollutants, Classification of source of air pollutants on different bases, Definition of different types of aerosols, Effect of air pollution on: human health, material properties, vegetation, Major toxic metals and their effects, Major environmental phenomenon e.g., acid rain, global warming, green house effect, ozone layer depletion, Air quality standards, Brief description of air pollution laws.

UNIT II

METEOROLOGICAL ASPECTS OF AIR POLLUTANT DISPERSION

Meteorological parameters influencing air pollution, Environmental lapse rate, temperature inversion, atmospheric stability and adiabatic loss rate, Turbulence, topographical effects, Plume behavior, looping, coning, fanning fumigation, lofting, trapping.

AIR POLLUTION CONTROL METHODS AND EQUIPMENTS

Natural purification processes of air, Artificial purification methods of air, Brief description of following control equipments along with sketch e.g., gravitation settling chamber, cyclone, scrubber, bag house filter, electrostatic precipitator, Brief description of following processes for the control of gaseous pollutants e.g., absorption, adsorption, condensation, combustion etc

UNIT III

WATER POLLUTION SOURCES AND CLASSIFICATION

Water resources, Uses of water, Classification of water, Origin, composition and characteristics of domestic waste water as well as industrial waste water, Biochemical oxygen demand, Water pollution laws and standards, Uses of waste water, Classification of waste water, Chemical oxygen demand.

WASTE WATER TREATMENT METHOD

basic processes of water treatment. Meaning of primary, secondary and tertiary treatment. Flow chart of a simple effluent treatment plant, Theory of industrial waste treatment, Volume reduction, neutralization and proportioning.

UNIT IV

SOLID WASTE MANAGEMENT

Sources and classification of solid waste, Public health aspects, Disposal methods – open dumping, sanitary, land fill. Incineration, composting, Potential methods of disposal, Recovery and recycling of paper, glass, metal and plastic.

NOISE POLLUTION AND CONTROL

Sources of noise pollution, Units of Noise pollution measurement, Allowable limits for different areas, Problems of noise pollution and measures to control it, Noise pollution control devices brief discussion.

UNIT V

SAFETY PRACTICES

Responsibility of employees and employers regarding health and safety, Fire hazards, prevention and precautions, Industrial hazards prevention and protection, Protection from air and noise pollution.

S.NO.	REFERENCE BOOKS
1	Environmental pollution control Engineering by C.S. Rao
2	Air pollution and control by Seth
3	Air pollution by M.N Rao
4	Industrial waste and its treatment by Seth
5	Paryavaran Yantriki Hindi granth akadami

S.NO.	LIST OF PRACTICALS
1	<p>GROUP A AIR POLLUTION (Any one experiment may be selected from this group)</p> <ol style="list-style-type: none"> 1. Air monitoring and determination of SPM , CO, Nox, SO₂ with high volume sampler. 2. Monitoring of stack gases and determination of SPM , CO, Nox, SO₂ with slack monitoring kit. 3. Determination of CO,HC, in exhaust gases from petrol vehicle
2	<p>GROUP B NOISE POLLUTION</p> <ol style="list-style-type: none"> 4. Determination of sound pollution in (a) Auditorium (b) Factories (c) Busy roads (d) Theatre (e) TV rooms (select any three situations)
3	<p>GROUP C INDUSTRIAL WASTE WATER (Any Two experiment may be selected from this group)</p> <ol style="list-style-type: none"> 5. Determination of BOD/COD ratio in industrial waste water. 6. Determination of Ph and alkanity/ acidity in industrial waste water. 7. Determination of solids in industrial waste water. 8. Determination of turbidity, colour, and temperature of industrial waste water.
4	<p>GROUP D POLLUTION STANDARDS(Any Two experiment may be selected from this group)</p> <ol style="list-style-type: none"> 9. Study of drinking water standards. 10. Study of effluent standards for water disposal. <p>Study of air pollution standards.</p>



SWAMI VIVEKNAND UNIVERSITY SAGAR (M.P.)

SUBJECT: INTRODUCTION OF COMPUTERS.

SUBJECT CODE: PT203

UNIT- I

INTRODUCTION TO COMPUTERS

Basic Concepts-Generations of Computers Overview of computer Systems Classifications of Computers Characteristics of Computers Applications of Computers.

Numbers System & Codes-Decimal, Binary, Octal, Hexadecimal Conversions from one system to other Binary Coded Decimal & ASCII Code

Computer Hardware

Input Devices-Keyboard, Mouse, Trackball, Joystick, Scanner, OMR OCR Bar-Code Reader, MICR, Digitizer, Card Reader, Voice Recognition, Web Cam, Video Cameras, Etc.

Output Devices-Monitors, Printers : Dot matrix, Inkjet & Laser, Plotters, Commuter, Output Micro Film (COM), Multimedia Projector, Speech Synthesizer, Dumb, Smart & Intelligent Terminal.Storage Devices

UNIT- II

Primary and Secondary Storage- Characteristics and Limitation, Floppy, Hard disk, CD ROM DVD, Disk Cartridge.

Microprocessor-Registers, Arithmetic Unit, Control Unit, Buses, Instruction Set, Processor Speed.,Memory Concepts.

Concept of Memory-Unit of Memory, Types of Memory, RAM,ROM, PROM, EPROM, EEPROM, Cache Memory.

Computer Software-System Software Vs Application Software, Operating System Programs, Language Processor, Assembler, Compiler & Interpreter,Application Software, Types of Application Software and their examples., High Level Language, Low Level Language, Assembly Language.

Multimedia-Basics of Multimedia,Components- Text, Graphics, Animation, Audio, Images & Video. Multimedia Applications.

UNIT-III

OPERATING SYSTEM

Overview of DOS- Internal Commands, External Commands

Windows Operating System-Overview of different versions of Windows Characteristics and Facilities of Windows, Terminologies of Windows – Desktop, Icon, Menu etc. Components of Desktop. Working with Files and Folders.

Windows Utilities and Accessories – Notepad, WordPad, Paintbrush, Windows Explorer, Calculator.

Introduction to Linux- An overview of Linux, Basic Linux elements System, Features Software, Features File structure, Linux H/W & S/W requirements.

UNIT IV

WORD PROCESSING

Saving, Closing, Opening of documents, Selecting text Editing text, Finding and replacing text\ Printing documents, Merge Documents. Character and paragraph Formatting, Page Design and layout

Spell Check, Creating Tables and Charts. Handling Graphics

SPREADSHEET PACKAGE

Spreadsheet concept – Need, advantage, Terminology like cell, row, column etc. Working with **Spreadsheet**– Creating, Saving, Editing and printing, Entering data – Entering number, text, date, time etc. Selecting cells – Cut, copy, paste date, Editing Worksheet data. **Formatting** – Text and Cells, Applying border shading, background patterns, conditional formats, positioning cells, formatting numbers, text, Date, time. **Creating formulas**- Entering, Editing, Using Functions, Controlling calculations. Working with Charts- Creating charts, Adding & changing text, changing the view and display, types of charts.

Presentation Software

Introduction Presentation design tools Presentation terminologies, Creating, Opening and Saving Presentation. Working with different views Creating and Organizing slides, Adding and Formatting text in slides Formatting paragraphs Adding drawings and objects Creating special effects Working with table and charts Printing Presentation

UNIT V

Database

Introduction – need, Characteristics and terminologies of database

Types of database – relational, Hierarchical and Network

Basic entities – Tables, records, Data types, Data, Validation and constraints, keys relation between tables.

Query – Select, Insert, Update, Delete. Forms – Creating forms, Forms controls Report Designer- Customize formats, grouping reports.

Computer Communication & Networks

Information Networks- The Technology of Workgroup Computing, Types of network, Network topology. Network components

Data Communication- Introduction to Data Communication, Types of Data, Transmission media

Internet and E-mail- Internet Basics, Websites- Applications, terminologies, naming conventions., Web Browsers- Types, Navigation and tools, E-mail – concept, terminologies, mailing services provider, advantages comparison with Conventional mailing

Search engine – concept, search engine websites, searching methods.

S. NO.	REFERENCE BOOKS
01.	S . Jaiswal, A First Course in Computers, Golgotha Publication
02.	Slotnick, Butterfield, Colantonio and Kopetzky, Computers & Application, C.C. Health & Company
03.	Suresh K. Basandra, Computers Today, Galgotia Publication
04.	Ron Mansfield, The Complete Guide to Microsoft Office Professional, Sybex /BPB Asian Edition
05	Norton Peter, Inside IBM PC
06	Hardware Bible, BPB Publication
07	Computer Hardware, Osborne Series
08	DOS & Utilities, BPB Publication
09	DOS & Utilities, BPB Publication
10	Learning Windows in 24 Hours, Sam Techmedia
11	Tay Vaughan, Multimedia Making it work, Tata McGrawHill
	Chapman, Understanding windows, BPB Publication

LIST OF EXPERIMENTS

1. Study of various components of computer like CPU, keyboard, mouse, monitor, printer, CVT and storage devices.
2. Internal and external commands of DOS.
3. Using Windows operating system, study of desktop, control panel, accessories and settings.
4. File management in windows explorer, Study of WordPad, NotePad, PaintBrush, Calculator etc. Study of Linux operating system.
5. **Study of MS-word** – opening and saving of documents, formatting, editing and spell check, find and replace, printing, merging. Creating Table, Charts and Graphics.
6. **Study of Spreadsheet** – creating, saving, editing and printing. Entering data, selecting cells, formatting text, applying border shades and backgrounds, creating formulas, creating charts.
7. **Study of Power Point** – creating, opening, editing and saving of slides. Adding and formatting text, creating, animations, working with images and special effects. Printing presentation.
8. **Study of MSAccess**– creating, saving, editing and printing of tables. Managing relationships, writing queries e.g.
9. SELECT, UPDATE, DELETE, INSERT. Forms designing and report printing.
10. Study of Web Browser and mailing programs.



SWAMI VIVEKNAND UNIVERSITY SAGAR (M.P.)

SUBJECT: ENGINEERING DRAWING

SUBJECT CODE: PT-204

NOTE: ONLY FIRST ANGLE PROJECTION METHOD IS TO BE FOLLOWED

UNIT I

INTRODUCTION TO DRAWING INSTRUMENTS:

Introduction of drawing instruments, materials and their uses, Applications of minidrafter Applications of compass and divider Applications of French curves and spline Pencils grades and their uses, Designation and sizes of drawing sheet and drawing board.

PLANNING AND LAYOUT OF DRAWING SHEET:

Planning of drawing sheet as per I.S.: 696-1972 (SP 46: 1988). This should include- Margin, Title Block, Zoning, Revision panel, Folding marks, Numbering of sheet.

CONVENTIONAL REPRESENTATION:

Conventional representation of the following as per BIS practice

Common Engineering materials

Electrical installations and fittings – Main switches, (lighting and power), socket outlets (3 pin 5AMP, 3pin15AMP), bell, buzzer, loud speaker, Aerial, ceiling fan, exhaust fan, Bracket fan, fan regulator, battery and earth point.

Electronics components- Diode: Zener, varactor, Scotty, step recovery, light emitting diode (LED), PNP and NPN transistors, resistance, capacitor, Inductors (fixed and variable both), IC (8pin and 14pin), SCR, TRIAC, DIAC, UJT, FET, MOSFET, LOGIC GATES.

Sanitary fittings- showerhead, wall lavatory basin, corner Lavatory basin, urinal stall, kitchen sink, Indian type WC, Water closets (Asian pan, urissapan, Anglo-Indian, European)

Building -single and double swing doors and windows.

Mechanical components- Internal and external threads, slotted head, Square end and flat, radial arms and ribs, serrated shaft, splined shaft, Chain wheel, bearing, straight and diamond knurling, Compression and tension spring, leaf spring (with and without eye), Spur and helical gear.

LINES, LETTERING AND DIMENSIONING:

Introduction of type of lines and their applications, Single stroke vertical, inclined letters (capital and lowercase) And numerals. Dimensioning: Elements of dimensioning- dimension line, extension line, arrowhead And leader line

Dimensioning system – Aligned and unidirectional. Dimensioning of Arcs and Circles. Angular Dimensioning.

Dimension of counter sunk and counter bore.

UNIT II

GEOMETRICAL CONSTRUCTIONS AND ENGINEERING CURVES

Divide a line into any number of equal parts by parallel line method, Bisecting of line and angle. Construction of triangles and polygons Introduction of conic sections (curves), Construction of Ellipse by Eccentricity and Concentric circles methods, Construction of Parabola by Eccentricity and Rectangle methods, Construction of Hyperbola by Eccentricity method, Construction of Cycloid, Construction of Involute of circle and polygon, Construction of Archimedian Spiral of any number of convolutions

SCALES:

Introduction of scales and their applications, Concept of reducing, enlarging and full size scale Classification of scales – plain, diagonal, vernier, Scale of chord and comparative scales Definition of R.F. Construction of plain and diagonal scales.

UNIT III

THEORY OF PROJECTION AND PROJECTION OF POINTS, LINES AND PLANES

Definition of various term associated with theory of projection- Planes of projection, Quadrants, first & third angle projection method, Projection of points in all the four quadrants. **Projection of lines-** parallel to HP and VP both, perpendicular to one plane and parallel to other, Inclined to one plane and

parallel to other, knowledge of projection of line inclined to both the plane, (No practice required)
Projection of planes – Perpendicular to HP and VP both, Perpendicular to one plane and parallel to other, Inclined to one plane and perpendicular to other, Knowledge of projection of plane inclined to both the planes

UNIT IV

PROJECTIONS OF SOLIDS:

Projection of cylinder, cone, prism and pyramid. **Under the conditions** :- Axis parallel to HP and VP, Axis perpendicular to HP and parallel to VP, Axis perpendicular to VP and parallel to HP, Axis inclined to HP and parallel to VP, Axis inclined to VP and parallel to HP, Axis inclined to both HP and VP.

SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES:

Section of cone, cylinder, prism and pyramid

(Solid resting on its base in the HP i.e. the Axis perpendicular to HP and parallel to VP) in the cases:- Section plane parallel to HP and perpendicular to VP, Section plane parallel to VP and perpendicular to HP, Section plane inclined to HP and perpendicular to VP, Section plane inclined to VP and perpendicular to HP. Drawing True shape of section.

Introduction to development of lateral surface of solids-

Cone, Cylinder, Prism and Pyramids (Simple and truncated). Under the condition – solid resting on its base in the HP and axis Perpendicular to HP and parallel to VP. Development of funnel and elbow

INTERSECTION OF SURFACES

Intersection of following cases – Cylinder to cylinder and Prism to prism (With their axis intersecting and perpendicular to each other.)

UNIT V

ORTHOGRAPHIC PROJECTIONS & FREE HAND SKETCHING:

Principles of orthographic projections- Identification of necessary views and superfluous view

Selection of front view. Preparation of necessary orthographic views of simple objects

From given pictorial views. Dimensioning of orthographic views as per standard practice.

Free hand sketches of simple objects (Using Pencil, Eraser & Paper only)

ISOMETRIC VIEWS

Concept of isometric projection and isometric view (Isometric Drawing), Construction of isometric scale, Construction of isometric view of polygon and circle, Construction of isometric view of cone, cylinder, prism and pyramids, Construction of isometric view of simple objects from given orthographic views.

S.No.	REFERENCE
1	ENGINEERING DRAWING – N.D. Bhatt
2	ENGINEERING DRAWING – R.K. Dhawan
3	ENGINEERING DRAWING – P.S.Gill
4	FIRST YEAR ENGINEERING DRAWING – A.C.Parkinson
5	SP: 46-1988 Bureau of Indian standard
6	PRINCIPLES OF ELECTRONICS - Malvino
7	ABHIYANTRIK AAREKHAN - Shivdatt Upadhyay