

SECOND SEMESTER

BS – 212          Applied Mathematics –II

CM - 232          Environmental studies

ES – 122          Basics of Information Technology CE – 230    Workshop Practice

CE – 231                  Construction Materials

STUDY AND EVALUATION SCHEME: CIVIL ENGG. / CIVIL (CONST) / CIVIL(PHEE)

SECOND SEMESTER

CODE NO.	SUBJECT	STUDY SCHEME PERIOD / WEEK			EVALUATION SCHEME						TOTAL MARKS
					INTERNAL ASSESSMENT		EXTERNAL ASSESSMENT (EXAM)				
		L	T	P	THEORY	PRACTICALS	WRITTEN	PRAC TICALS			
			MAX. MARKS	MAX MARKS	MAX MARKS	HRS.	MAX MARKS	HRS			
212	*Applied Mathematics -II	4	2	-	50	-	100	3	-	-	150
BS-213	*Applied Physics	4	2	2	50	50	100	3	100	3	300
ME-131	*Environmental Studies	4	-	2***	50	-	100	-	-	3	150
ES 122	* Basics of Information technology	-	-	4	-	50	-	-	100	3	150
ES-120	*Applied Mechanics	4	2	2	50	50	100	3	100	3	300
CE-231	Construction Materials	3	-	2	50	50	100	3	100	3	300
	** Student Centred Activities (Value Based Education) (Not for Exam)	-	-	3	-	-	-	-	-	-	-
TOTAL		19	6	15							1200

\* Common with Mechanical, Production, Mechanical Maintenance and Automobile Engineering Civil (Construction) and Civil(PHE).

\*\* Student Centered activities will include: extension lectures, field visits, soft skills, seminars, debates, hobby clubs, library studies,

awareness regarding ecology and environment, conservation of energy (Petroleum products, electricity etc), social service camps and other co-curricular activities including games.

Advanced planning for each semester has got to be made.

\*\*\*Field Visit

## BS-212 \*APPLIED MATHEMATICS-II

	L	T	P
Pds/Week	4	2	-

### RATIONALE

The course aims at developing analytical abilities in basics of applied mathematics such as: differential and integral calculus and solution of first order differential equations. Besides applications of the above elements in engineering, the course of study will also provide continuing education base to them.

NOTE: Weightage of each topic for external examination is given in the brackets

### I. DIFFERENTIAL CALCULAS. (40%)

Functions, concept of evaluation of following limits.

$$\text{Limit}_{x \rightarrow 0} \frac{\sin x}{x}, \quad \text{Limit}_{x \rightarrow a} \frac{x^n - a^n}{x - a},$$

$$\text{Limit}_{x \rightarrow 0} \frac{(1+x)^x}{x}, \quad \text{Limit}_{x \rightarrow a} \frac{a^x - 1}{x},$$

- (i) Differential coefficient. Its physical application. As rate measure, Geometric interpretation as slope of a curve. Differentiation from first prim of functions like  $x^n$ ,  $a^x$ ,  $\log x$ ,  $\sin x$ ,  $\cos x$  and  $\tan x$ . Differentiation of sum, product and quotient of functions.
- (ii) Differentiation of Trigonometric and inverse Trigonometric functions. Differentiation of function of a function, Implicit functions, parametric functions, Logarithmic differentiation.
- (iii) Application of differentiation in finding errors, Tangent and normal of curves. Maxima of functions.

### 3. INTEGRAL CALCULAS. (35%)

- (i) Integration as inverse operation of differentiation. Integral of standard functions. Integration by substitution, by parts and by partial fractions.
- (ii) Evaluation of integral of rational and irrational functions of the form.
 
$$\frac{dx}{ax^2 + bx + c} \quad \int \frac{dx}{ax^2 + bx + c}$$
- (iii) Simple definite integrals and properties. Evaluation of  $\int_0^{\pi/2} \sin^n x \, dx$ ,  $\int_0^{\pi/2} \cos^n x \, dx$ ,
- (iv) Applications of integration to finding area under a curve and axes, volume of solid of revolution of area about axes (simple problems). Mean value and R.M.S. value of a function.
- (v) Numerical integrations. Approximate evaluation of definite integral by Trapezoidal rule and by Simpson's rule (without proof).

### 4. PARTIAL DIFFERENTIATION. (10%)

- (i) First order and second order partial derivatives of functions of two variables.

(ii) Newton's forward and backward interpolation.

5. SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS. (15%)

(i) Order and degree of a differential equation. Solving first order first degree

differential equation – variable separable form, Homogeneous form and linear differential equation.

## BS-213 \*APPLIED PHYSICS

	L	T	P
Pds/Week	4	2	2

### RATIONALE

Applied physics is a foundation course. Its purpose is to develop proper understanding of physical phenomenon and scientific temper in the students. The course covers basics like Mechanics, Heat, Sound and Light.

### DETAILED CONTENTS

#### I. Measurement

(20%)

##### (i) Units and Dimensions

Fundamental and derived units, SI units, dimensions of physical quantities, dimensional formula and dimensional equation, principles of homogeneity of dimensions and applications of homogeneity principle in:

- Checking the correctness of physical equation.
  - Deriving relations among various physical quantities.
  - Conversion of numerical values of physical quantities from one system of units into other system.
- (ii) Errors in measurement accuracy, estimation of percentage error in the result of measurement.

#### 2. Waves

(20%)

Generation of waves by vibrating particles, progressive wave, equation of waves, energy transfer by particles and waves, superposition of waves and its applications to interference, beats and stationary waves (graphical); sound and light as wave – range of frequencies, wavelengths, velocities and their nature, electromagnetic spectrum.

#### 3. Sound

(15%)

##### (i) Acoustics

Reflection, refraction and absorption of sound waves by materials; definition of pitch, loudness, quality and intensity of sound waves, units of intensity (bel and decibel); Echo and reverberation and reverberation time, control of reverberation time. Acoustic insulation (qualitative treatment only of reverberation).

##### (ii) Ultrasonic

Production of ultrasonic waves by magnetostriction and piezoelectric effect, detection and properties of ultrasonic; applications to drilling, cold welding,

cleaning, flaw detection and exploration (sonar).

4. Light; Geometrical Optics: (20%)  
Defect in image formation, eyepieces construction and principles of preparation of telephoto and zoom lens, principle of optical projectors, optical principles of OHP and slide film projectors.
5. Laser and its Applications (15%)  
Laser principle, types of Lasers; detailed study of the He-Ne and Ruby lasers and their applications. Fluorescent tube; mercury arc light, xenon source, sodium lamp.
6. Radioactivity and Detection of Radiations (10%)  
Natural radioactivity; half-life; decay constant; mean life; radioactive transformation. Principles of nuclear fission and fusion; energy generation. Source of background radiations; health Hazards of radiations. Units of radiation.

#### LIST OF PRACTICALS

1. Use of Vernier calipers and micrometer for determination of diameter of a wire.
2. Study of resonance in air column and determination of velocity of sound in air.
3. To make a telescope by combination of suitable lenses and determine its magnifying power.
4. To make a compound microscope by suitable combination of lenses and determine its magnifying power.
5. Setting an OHP lenses and mirrors for its best performance.
6. Determination of wavelength of various spectral lines of mercury lamp.
7. Measurement of illumination level of a white surface under: natural daylight, incandescent light and fluorescent light.
8. To compare the intensity of illumination by Bunsen's photometer.
9. Study of diffraction of He-Ne laser beam by markings on a Vernier scale and determination of its wavelength.
10. To measure the first ionization potential of Hg using a diode.

#### SUGGESTIONS

While teaching the subject, teacher should make maximum use of demonstration to make the subject interesting to the students.

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Unit 1: The Multidisciplinary nature of environmental studies  
Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources

Renewable and non renewable resources:

a) Natural resources and associated problems

§O Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.

§O Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.

§O Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

§O Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, case studies.

§O Energy Resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies

- Land Resources: Land as a resource, land degradation, man induces land slides, soil erosion, and desertification.

b) Role of individual in conservation of natural resources.

c) Equitable use of resources for sustainable life styles.

Unit 3: Eco Systems

- Concept of an eco system
- Structure and function of an eco system.
- Producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco systems:
  - Forest ecosystem
  - Grass land ecosystem
  - Desert ecosystem.
  - Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4: Biodiversity and it's Conservation

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
  - Biodiversity at global, national and local level.
  - India as a mega diversity nation.
  - Hot-spots of biodiversity.

- Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

#### Unit 5: Environmental Pollution

Definition Causes, effects and control measures of:

- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes

Role of an individual in prevention of pollution Pollution case studies Disaster management: Floods, earth quake, cyclone and land slides

#### Unit 6: Social issues and the Environment

- Form unsustainable to sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, water shed management
- Resettlement and rehabilitation of people; its problems and concerns, case studies
- Environmental ethics: issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Wasteland reclamation
- Consumerism and wasteproducts
- Environment protection Act
- Air (prevention and control of pollution) Act
- Water (prevention and control of pollution) Act
- Wildlife protection act
- Forest conservation act
- Issues involved in enforcement of environmental legislations
- Public awareness

#### Unit 7: Human population and the environment

- Population growth and variation among nations
- Population explosion- familywelfare program
- Environment and human health
- Human rights
- Value education
- HIV / AIDS
- Women and childwelfare
- Role of information technology in environment and human health
- Case studies

#### Unit 8: Field work

Visit to a local area to document environment assets river / forest / grassland / hill/ mountain. Visit to a local polluted site-urban/rural/industrial/agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc (field work equal to 5 lecture works)

**Recommended Books:**

1. Textbook of Environmental studies, Erach Bharucha, UGC
2. Fundamental concepts in Environmental Studies, D D Mishra, S Chand & Co Ltd

## RATIONALE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS Office/Open Office and internet form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

### Note:

Explanation of Introductory part should be dovetailed with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

## TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Information Technology – its concept and scope, applications of IT, ethics and future with information technology
2. Impact of computer and IT in society.-- Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more
3. Generations of computer, block diagram of a computer, CPU, memory, data – numeric data, alpha numeric data, processing of data.
4. Computers for information storage, information seeking, information processing and information transmission, computer organization, computer hardware and software; primary and secondary memory: RAM, ROM, PROM etc. Input devices; keyboard, mouse, scanner, etc ; output devices ; VDU and Printer(Impact and non-Impact printers), Plotter etc. Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD Memory)
5. Introduction to Operating Systems such as MS-DOS and Windows, difference between DOS and Windows
6. Basics of Networking – LAN, MAN, WAN

## LIST OF PRACTICALS

1. Identify and list functions of various components and peripherals of given computer.
2. Installation of operating system viz. \* Windows XP, \*Windows 2007 etc.
3. Installing a computer system by giving connection and loading the system software and application software and various sources to install software
4. Exercises on entering text and data (Typing Practice)
5. Features of Windows as an operating system:
  - a) Start , shutdown and restore
  - b) Creating and operating on the icons
  - c) Opening, closing and resizing the windows
  - d) Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file , creating and operating on a folder
  - e) Introduction to all properties such as changing settings like, date, time, calculator, colour (back ground and fore ground)
  - f) Using short cuts
6. Word Processing (MS Office/Open Office)
  - a) File Management:

Opening, creating and saving a document, locating files, copying contents in some different file(s)
  - b) Editing a document:
    - § Entering text, cut, copy, paste using toolbars
    - § Use of spell check
    - § PDF file and its conversion in different file formats (MS Word/Excel etc.)
    - § Scanning, editing and printing of a document
  - c) Formatting a document:
    - § Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
    - § Aligning of text in a document, justification of document ,Inserting bullets and numbering
    - § Formatting paragraph, inserting page breaks and column breaks, line spacing
    - § Use of headers, footers, inserting footnote, end note, use of comments
    - § Inserting date, time, special symbols, importing graphic images, drawing tools

d) Tables and Borders:

§ Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table

§ How to change docx file to doc file

§ Print preview, zoom, page set up, printing options

§ Using Find, Replace options

7. Spread Sheet Processing (MS Office/Open Office)

a) Starting Excel

open worksheet, enter, edit data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets

b) Menu commands:

Create, format charts, organize, manage data, solving problem by analyzing data, creating graphs

c) Workbooks:

§ Managing workbooks (create, open, close, save, rename), working in work books

§ Editing a worksheet: copying, moving cells, pasting, inserting, deleting cells, rows, columns, find and replace text, numbers of cells, formatting worksheet

d) Creating a chart:

§ Working with chart types, changing data in chart, formatting a chart, use chart to analyze data

§ Using a list to organize data, sorting and filtering data in list

e) Formulas:

Addition, subtraction, division, multiplication, percentage and auto sum

8. Power Point Presentation (MS Office/Open Office)

a) Introduction to PowerPoint

§ How to start PowerPoint

§ Working environment: concept of toolbars, slide layout, templates etc.

§ Opening a new/existing presentation

- § Different views for viewing slides in a presentation: normal, slide sorter etc.
  - b) Addition, deletion and saving of slides
  - c) Insertion of multimedia elements
    - § Adding text boxes, importing pictures, tables and charts etc.
  - d) Formatting slides
    - § Text formatting, changing slide layout, changing slide colour scheme
    - § Changing background, Applying design template
  - e) How to view the slide show?
    - § Viewing the presentation using slide navigator, Slide transition
    - § Animation effects etc.
9. Antivirus
- a) What is virus and its types
  - b) Problems due to virus
  - c) Installation and updation of antivirus (anyone out of Kaspersky, McAfee, Norton, Quickheal etc).
  - d) How to scan and remove the virus
10. Internet and its Applications
- a) Log-in to internet, introduction to search engine  
Browsing and down loading of information from internet
  - b) Creating e-Mail Account
    - § Log in to e-mail account and Log out from e-mail account
  - c) Managing e-Mail
    - § Creating a message
    - § Sending, receiving and forwarding a message
    - § Attaching a file
    - § Deleting a message

## INSTRUCTIONAL STRATEGY

Since this subject is practical oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals etc. and proficient in making use of MS Office/Open Office in addition to working on internet. The student should be made capable of working on computers independently. This subject should be taught with the help of LCD projector, (while teaching a group) using PowerPoint presentation slides.

## RECOMMENDED BOOKS

1. Fundamentals of Computer by E Balagurusamy, Tata McGraw Hill Education Pvt. Ltd, New Delhi
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Fundamentals of Computer by Sumita Arora by Dhanpat Rai and Co , New Delhi
4. Computers Today by SK Basandara, Galgotia Publication Pvt Ltd. Daryaganj, New Delhi.
5. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
9. Information Technology for Management by Henery Lucas; Tata McGraw Hill Education Pvt Ltd , New Delhi
10. MS Office by BPB Publications, New Delhi



## RATIONALE

In order to have a balanced overall development of diploma engineers, it is necessary to integrate theory with practice. General workshop practices are included in the curriculum in order to provide hand on experience about use of different tools and basic manufacturing practices. This course aims at developing general manual and machining skills in the students. Besides above, the development of dignity of labour, precision, safety at work place, team working and development of right attitude are the other objectives.

## DETAILED CONTENTS (PRACTICAL EXERCISES)

Note: The students are supposed to come in proper workshop dress prescribed by the institute. Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs in their practical Notebook.

The following shops are included in the syllabus:

1. Carpentry Shop-I
2. Painting Shop-I
3. Fitting Shop -I
4. Welding Shop-I
5. Sheet Metal Shop

Note:

## I. Carpentry Shop –I

## Safety precautions in carpentryshop

Introduction to various types of wood such as Deodar, Kail, Partal, Teak, Mango, Sheesham, etc. (Demonstration and their identification).

Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed.

**J**ob I Marking, sawing, planning and chiseling & their practice (size should be mentioned)

Introduction to various types of wooden joints, their relative advantages and uses.

**J**ob II Preparation of half lap joint

**J**ob III Preparation of Mortise and Tenon **J**oint

## 2. Painting Shop- I

- a. Demonstration of various methods of painting wooden items.
- b. Introduction to various types of paints and safety precaution observed in painting shop

**Job I** Preparation of wooden surface before painting including primer coating

**Job II** Painting Practice by brush/spray

## 3. Fitting Shop

Introduction to fitting shop tools, common materials used in fitting shop, Identification of materials. Such as Steel, Brass, Copper, Aluminium etc. Identification of various sections of steel such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z-Section, etc.

Description and demonstration of various types of work benches, holding devices and files. Precautions while filing.

Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.

**Job I** Marking of job, use of marking tools and measuring instruments.

**Job II** Filing a dimensioned rectangular or square piece of an accuracy of

( 0.5mm

**Job III** Filing practice (production of flat surfaces). Checking by straight edge.

Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set.

## 4. Welding Shop –I

(a) Introduction to welding and its importance in engineering practice; types of welding; common materials that can be welded, introduction to welding equipment e.g. a.c. welding set, d.c. rectifier, electrode holder, electrodes and their specifications, welding screens and other welding related equipment, accessories and gloves.

(b) Safety precautions during welding

(c) Hazards of welding and its remedies

Electric arc welding, (a.c. and d.c.) precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc. Earthing of welding machine.

**Job I** Practice of striking arc bending and tacking while using electric arc welding set.

**Job II** Welding practice on electric arc welding for making uniform and straight weld beads

Various types of joints and end preparation.

**Job III** Preparation of butt joint by electric arc welding.

Job IV Preparation of corner joint by using electric arc welding.

## 5. Smithy Shop

Demonstration and detailed explanation of tools and equipment used. Forging operations in smithy shop. Safety measures to be observed in the smithy shop.

Demonstration and description of bending operation, upsetting operation, description and specification of anvils, swage blocks, hammers etc.

Demonstration and description of tongs, fullers, swages etc.

Job I To forge a L-hook.

Job II To prepare a job involving upsetting process

Job III To forge a chisel

Job IV To prepare a cube from a M.S. round by forging method.

## 6. Sheet Metal Shop

Introduction to sheet metal shop, use of hand tools and accessories e.g. different types of hammers, hard and soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection of material and specifications.

Introduction and demonstration of hand tools used in sheet metal shop.

Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. shearing machine, bar folder, burring machine, power press, sheet bending machine.

Introduction and demonstration of various raw materials used in sheet metal shop e.g. M.S. sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc.

Study of various types of rivets, steel screw etc.

Job I Shearing practice on a sheet using hand shears.

a) Practice on making single riveted lap joint/double riveted lap joint.

b) Practice on making single cover plate chain type, seam joint and riveted butt joint

## RECOMMENDED BOOKS

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary; Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III; India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technology by B.S. Raghuwansh;, Dhanpat Rai and Co., New Delhi

6. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi.