Programme Code: : CE/**CO**/EC/IS/ME/IF/LT/LG/RT									
Course Code: **CO11 201**				Course Title: **Computer fundamentals**					
Compulsory / Optional: **Compulsory**									
Teaching Scheme and Credits				Duration of Written Examination					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
--	**--**	**4**	**4**	**--**	**--**	**--**	**--**	**50**	**50**

Rationale:

A course designed to assure a basic level of computer applications literacy to include word processing, spreadsheet, presentation software, database, LAN, e-mail, and Internet utilization. It also covers application software like MS-Office, which helps for documentation, calculation, presentation purpose etc.

Objectives:

The students will be able to g

- Identify the major hardware components of a computer system,& their relationship.
- Demonstrate an understanding of computer systems.
- Identify specific operating systems and their purposes, features, and how they relate to application software.
- Demonstrate an understanding of Computer Networks.
- Prepare Excel Sheet, Charts
- Prepare power point presentation
- Create Database in Ms-Access.
- Create their own email account for sending and receiving mail

Contents:-	**Hrs.**
1. **Introduction to computer system:** 1.1 Evolution of Computer & Generation of Computer 1.2 Functional block diagram of computer 1.3 Characteristics of computer 1.4 Terminology :- Hardware, Software, Firmware 1.5 Peripherals : Keyboard, Monitor, Printer, Scanner 1.6 Functional elements of computer 1.7 Memory :RAM, ROM, Magnetic Disk, Floppy Disk, CD,DVD,Pendrive,USB Drive, Portable Disk 1.8 Introduction to operating system 1.8.1 What is operating system? 1.8.2 Need of OS 1.8.3 Types of operating system 1.8.4 Functions of operating system 1.8.5 Booting Concepts, booting procedure, command interpreter	**06**

2. **Working with Windows 2007/08 or Latest** 2.1 Introduction of windows O/S , 2.1.1 start menu icons, 2.1.2 start button, 2.1.3 Task bar 2.1.4 , starting and Running multiple programs, 2.1.5 moving, minimizing, maximizing and resizing windows and window shut down. 2.2 Using my computer: 2.2.1 To view CD,DVD 2.2.2 Read/Write contents, using pen drive, 2.2.3 changing the icon arrangement 2.2.4 copying a file, to drag and drop, deleting a file. 2.3 Windows explorer**:** Copy, move, delete files creating folder, copy and paste. 2.4 Find Utility**:** To search file by name. 2.5 Control panel**:** 2.5.1 Purpose 2..5.2 changing date and time, 2.5.3 choosing background, getting on line help, 2.5.4 installation of software. 2.6 Accessories: Paint, Calculator, Notepad 2.7 Introduction to Antivirus	**08**
3 **Introduction to Computer Network & Internet** 3.1. Introduction to Networking 3.2 Components of Networking 3.3 Types of Network 3.4 Application of Computer Network: 3.4.1Using a browser, 3.4.2 Using search engine 3.4.3 Creating an Email account, 3.4.4 Sending / Receiving mail with Attachments 3.5 Social Networking	**08**
4 Microsoft word 4.1 Introduction to Microsoft word: 4.1.1 Introduction to toolbar 4.1.2 advantages and features of Ms word. 4.2 Working with word document.	**10**

4.2.1 Edit menu: go to, replace, find, select all, cut, copy, paste. 4.2.2 View: document and map, header and footer, all tool bars. 4.2.3 Insert: hyperlink, foot note, end note, comment, picture, chart, date and time, page number, etc… 4.2.4 Format: tab setting, font, borders and shedding, bullets and numbering, background, etc… 4.2.5 Tools: printing envelopes and labels, mail merge, etc… 4.2.6 Table: draw table, insert table, formula, convert, sort, etc… 4.2.7 Window: use of split. 4.3Printing Document 4.3.1 Page Setup 4.3.2 Page Formating 4.3.3 Mirror Margin 4.3.4 Line Numbers 4.3.5 Print Preview 4.3.6 Printing Document	

5 Microsoft Excel 5.1 Introduction to Microsoft Excel: 5.1.1 Advantages of Microsoft excel 5.1.2 Features of Microsoft excel 5.2 Working with worksheet: 5.2.1 Entering data, 5.2.2 Creating a series 5.2.3 Editing worksheet. 5.3File handling. 5.3.1Saving a new unnamed document 5.3.2Saving a named work book 5.3.3 Closing a work book 5.3.4Creating a new work book 5.3.5 Opening an existing work book 5.4 Creating formulas and auditing work sheet. 5.4.1 Creating formula 5.4.2 Creating a simple worksheet 5.4.3 Creating auto sum method 5.4.4 Automatic calculation method 5.5 Formatting worksheet 5.5.1 Text, number, currency, date and time 5.5.2 Alignment and orientation 5.5.3 Font, font size, text color. 5.5.4 Border. 5.6 Printing workbook 5.6.1 Page set up 5.6.2 Page formatting. 5.6.3 Margins 5.6.4 Header and footer 5.6.5 Sheet 5.6.6 Print preview 5.6.7 Making final formatting adjustments 5.6.8 Printing a work sheet. 5.7 Concept of Macro 5.7.1 Creation of Macro	**12**

5.7.2 Run created macro	
6 Microsoft Power Point 6.1 Introduction to Microsoft PowerPoint: 6.1.1 What is the use of PowerPoint? 6.1.2 What is slide show? 6.2 Starting PowerPoint. 6.2.1 Understanding the PowerPoint Window, Title bar, and Menu bar. 6.2.2 Using Toolbars, Rulers, status bar 6.2.3 Using basic drawing tools, using auto shape tools, inserting text into object 6.3 Understanding the various views in power point. 6.3.1 Slide view 6.3.2 Outline view 6.3.3 Slide sorter view 6.3.4 Notes page view 6.3.5 Slide show view. 6.4 Changing Font color and applying effects. 6.4.1 Font color. 6.4.2 Line style, Dash style, Arrow style 6.4.3 Using lines style, dash style, and arrow for objects. 6.4.4 Applying color fill, Gradient effect, Texture effect, Pattern effect, Picture effect. 6.4.5 Applying shadow effect, Applying 3d effect. 6.5 Slide Transition 6.6 Custom animation. 6.6.1 Slide objects without animation. 6.6.2 Animation orders, Timing. 6.6.3 Start animation On mouse click or Automatically 6.7 Power point presentation Methods: 6.7.1 using Auto Content Wizards 6.7.2 Using Template method 6.7.3 Using Blank Presentation method	**10**
7 Microsoft Access 7.1 Introduction to Ms-Access 7.1.1 How to create table in Ms-Access? 7.1.2 How to Create a database? 7.2 Operation on Table Queries: Select, Insert ,Delete, Add, Update 7.3 Import report from Excel to MS Access and view.	10

List of Practical:-

1 Creating files, icons and folders

2 Study of Notepad ,Calculator window .

3 Study of Ms-Word Window.

4 Preparation of BIO-DATA using Ms Word.

5 Study of printing Documents in Ms Word.

6 Preparation of application.

7 Preparation of student information table.

8 Use of Mail Merge to send and receive Mail.

9 Prepare an Excel-sheet for storing students data having following columns-
First name, Last-named, Address,
Phno.,Email_id, SSC percent., Cell no,
Dept.

10 Create a following chart using Excel

Student Name	Percentage	Grade

Calculate the grade of students by using following conditions.

- If the percentage is more than or equal to 85 the grade is "excellent"
- If the percentage is more than or equal to 70 the grade is " distinction"
- If the percentage is more than or equal to 60 the grade is " first class"
- If the percentage is more than or equal to 50 the grade is "second class"
- Otherwise the grade is "fail"

11. Prepare an Excel sheet which has
company sales figures for 12 months as column and branches as rows. Using formula find Total sale in every month and total sale for every branch.

12. Prepare an Excel sheet for payroll System.
Calculate HRA as =10% of basic.
Calculate DA =15% of basic.
Calculate Conv=5% of basic.
Calculate total as = basic salary +HRA+DA+conv.
Calculate PF as =5% of total.
Calculate designation as = if the employees net salary is more than 5000/- his designation is 'Executive' otherwise he is 'Clerk'.

13. Prepare a power point presentation to Display objectives and contents of the Subject "Computer Fundamentals".

14. Prepare a power point presentation to display information of our institute.

15. Prepare a power point presentation to display information of your department.

16 Study of Ms-Access

17. Study of various table Operations in MS-Access.

References:

Sr.No.	Author	Title	Publication
1	Courter & Marquis	MS Office 2007/2010	BPB Publication
2		Teach Yourself Internet in 24 hours	SAMS Publication
3		Rapidex Computer Course	Pustak Mahal

Programme Code: **EC**									
Course Code: **EC 11 201**	Course Title: **Electronics Workshop**								
Compulsory / Optional: **Compulsory**									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
--	**--**	**4**	**4**	**--**	**--**	**--**	**--**	**50 (PA)**	**50**

Rationale:

An electronics engineer would be successful and an asset to the organization he serves, if he keeps his knowledge up-dated and applies his theoretical knowledge and practical skill diligently, intelligently and with dedication to give quality maintenance to his customers. Knowledge gained by learning the fundamentals with hands-on-experience achieves perfection.

This course is designed to fulfill to some extent the desire to get hands on experience in the electronics field, such as testing of components, cables, connectors, soldering and de-soldering technique, PCB making etc.

Objectives:

The students will be able to

- Identify tools, components and instruments.
- Select appropriate tools, components and instruments after preparing specification table.
- Prepare PCB artwork, layout for the given simple circuit and fabricate PCB.
- Assemble components on PCB and test the circuit with testing equipments.
- Able to find the equivalent components with help of data book.
- Effective use of internet for searching component information, specification.

Topic No	Contents
1	**Tools** 1.1 Nose pliers, wire stripper, screwdrivers, align keys, align screw, cutter, hand hacksaw, soldering iron, de-soldering pump, crimping tools (for RJ-45, RJ-11), and cable testers. 1.2 Identification, Selection and use of the tools. (Free hand constructional sketches may be drawn on drawing sheet)Illumination Terminology.

2	**Multimeters** 2.1 Need of Multimeter 2.2 Analog and digital Multimeter 2.3 Measurement of parameter using multimeter.
3	**Switches, Cables and connectors** 3.1 Types of switches, SPST, SPDT, Toggle, thumbwheel, rotary, slide, micro switch, membrane switch. 3.2 Cable: Flat, Ribbon, Co-axial, twisted pair, UTP, Fiber optic. 3.3 Connector Types: PCB edge connector, FRC connector, D-type, BNC, TNC, MCB, RJ-45, RS-232, USB connectors, Ethernet.
4	**Component Testing** 4.1 Identification and testing of following components. Resistors, Capacitors, Inductors, Transformers, Bipolar Junction Transistors (BJT), Filed Effect Transistors (FET), Metal Oxide Semiconductor FET (MOSFET), LED, 7- Segment Displays, Silicon Controlled Rectifiers (SCR), DIAC,TRIAC.
5	**Soldering and de-soldering** 5.1 Solder joint: Dry solder joint, cold solder joint, Good and Bad solder joint 5.2 Soldering material 5.3 Soldering tools: Soldering Iron, soldering gun, soldering station 5.4 De-soldering Technique: Tools used for de-soldering, De-solder WIK, De-solder Pump, De-solder gun 5.5 Precaution during soldering and de-soldering
6	**Component and tool specification** Teacher shall explain the importance of component specification and discuss important specification and packages for each group of items. 6.1 Use of catalog/ Internet to access required information.
7	**Equivalent Components** 7.1 Meaning and need of equivalent components 7.2 Important specification required to find out equivalent components for passive, active, power devices and for IC's 7.3 Use of data book

8	**Equipment Specifications** 8.1 Importance of equipment specification 8.2 Parameters of equipment specification 8.3 Manufacturers and cost of equipments
9	**PCB Making** 9.1 Types of PCB's: Glass Epoxy, paper phenolic, Single Sided, double sided, Selection and application of PCB's. Drawing electronic circuit, designing PCB layout and artwork. Use of paint, Templates, Pen. 9.2 Demonstration of PCB making equipments: Deep coating machine, UV exposure unit, Etching machine, dryer (oven) and scanner with lens. Drilling machine, Shearing machine. Developing negative and making PCB.
10	**Mini Project** 10.1 Selection of electronic circuit for mini project. 10.2 Testing of components to be used in the mini project. 10.3 PCB layout and artwork design. 10.4 Transfer the artwork on copper clad. 10.5 Etching and drilling. 10.6 Mount and solder components. 10.7 Testing and fault finding of circuit. 10.8 Wire harnessing and final assembly along with enclosure.

List of Practical:

1. To know your Electronics Workshop LAB.
   (A) Demonstration for identification and use of tools. (Nose pliers, wire stripper, screwdrivers, align keys, align screw, cutter, hand hacksaw, soldering iron, de-soldering pump, crimping tools (for RJ-45, RJ-11), and cable testers.)

   (B) Prepare the sheet of free hand sketch of various tools used in Electronics Workshop and write their uses.
2. Multimeters:
   (A) To identify analog and digital multimeters.

   (B) To measure resistance, voltage and current using analog and digital multimeter.

3. To identify and test: Teacher has to demonstrate various types of switches, cables and connectors (Lead identification, testing, uses).
   (A) SPST, SPDT, Toggle, thumbwheel, rotary, slide, micro switch, membrane switch.

(B) PCB edge connector, FRC connector, D-type, BNC, TNC, MCB, RJ-45, RS-232, USB connectors
(C) Flat, Ribbon, Co-axial, twisted pair, UTP, Fiber optic.
(D) (Prepare the chart for symbols with terminal identification, uses and testing procedures)

4. To identity and test passive components (Resistors, Capacitors and Inductors) with color codes and verify their values with multimeters / LCR meter.
5. To identify and test BJT, FET, MOSFET and 7- Segment displays using multimeter.
6. To identity and test SCR and TRIAC using multimeter.
7. Demonstration and practice of soldering and de-soldering technique
8. Assignment on
   (A) Soldering: Solder joint, Dry and cold solder joint, good and bad solder joint, soldering material, soldering tools

   (B) De-soldering: de-soldering technique, methods, Precaution during soldering and de-soldering.
9. To prepare specification table for following components and tools and write down the information about specification, manufacturer and cost. (At least 6 from each group.) (Teacher shall explain the importance of component specification, Use of catalog/ Internet to access required information and discuss important specification and packages for each group of items)
   Group-A : Resister, Capacitor, Inductors, Transformer, Diode, LED Display, LCD Display Switches, Fuses, BJT, FET, MOSFET, DIAC, TRIAC, Photo devices, TTL IC, CMOS IC, IC Sockets, Device packages.

   Group-B : Pliers, Cutters, Spanners (Wrenches), Wire stripper, Crimping tools, Screw drivers, Jewelers screw drivers, Hack saw, Hand drill and drills, Files, Solder materials, Soldering station, De-solder pump, Heat sink.

   Group-C : Bread board, Copper clad, Solder wire, Etching material, Antistatic Brush for PCB clean, General purpose PCB, Inspection mirror, Magnifying glass, Wire Sleeves, PCB cleaner, Lubricants (WD40, LPSI), solder flux, UV exposure unit, Etching machine.

10. To find out equivalent components by using data book/ Internet. (five components each) (Teacher shall explain :meaning and need of equivalent components, Important specification required to find out equivalent components for passive, active, power devices and for IC's, Searching the equivalent component from data book, handbook.)
    1. Transistors 2. Diodes 3. FET/ MOSFET 4. IC TTL 5. IC CMOS

11. To prepare equipment specification table for following measuring and testing equipments. (Any Five) Student may search the information from catalog/website about manufactures, specification and cost.) Teacher shall explain importance of equipment specification, important general specification of equipment.

1 Logic analyzer	2. Waveform generator
3. IC Tester	4. Soldering station
5. Spectrum analyzer	6. Curve Tracer
7. SMD Soldering accessories	8. DSO
9. RF power meter	10. Pattern generator

12. Demonstration to draw circuit schematic, layout and artwork using one of the PCB making software

mentioned below. (Express PCB, FreePCB, EAGLE PCB, workbench etc)

13. Assignment on types of PCB and PCB making equipments: Deep coating machine, UV exposure unit, Etching machine, dryer (oven) and scanner with lens. Drilling machine, Shearing machine. Developing negative and making PCB. Teacher shall explain artwork design rules, types of PCB's: Glass Epoxy, paper phenolic, Single Sided, double sided, Selection of PCB's, PCB layout and artwork design, Use of paint, Templates, Pen etc
14. Mini project

    To prepare PCB (with layout, artwork designed by the student) for small electronic circuits. (Such as oscillators, power phase control, optical sensors circuits, audio circuits, LED based display panel, tone generator circuits etc.)

    Note: Mini project group may consist of 3-4 students. Student has to demonstrate the project and submit the project report.

Reference Books/ Websites:

1. Electronic materials and components by Mrs. Madhuri Joshi, Publisher: Wheeler publication
2. Electronic Instrument and System by R. G. Gupta, Publisher: Tata McGraw Hill, Education
3. Printed Circuit Board by Walter Bosshart Publisher: Tata McGraw Hill, Education
4. Build your own electronic workshop by Thomos Petruzellis, Publisher: Tata McGraw Hill, Education
5. www.allelectronics.com, www.tek.com www.alldatasheet.com www.aplab.com, www.kpsec.freeuk.com

Course Code	Course Title	C/O	Credits				Examination Scheme					
			TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
HU 11 103	**Generic Skills**	**C**	**--**	**02**	**--**	**02**	**--**	**--**	**--**	**50**		**50**

Rationale:

The subject is included under the category of humanities. The role of subject is to make the student aware of its importance in the society, to inform him/her about technical education system, the institute (library, various dept, curriculums etc.), to help him/her with essential etiquettes & manners.

OBJECTIVES: - The Students will be able to,

1. Understand his/her importance in various areas of life.
2. Understand the technical education system property.
3. Know about importance of curriculum, MIS, IS , etc.
4. Carry him/ her in proper manner so that he/she will not inconvenient to others at any place.
5. Develop & adopt self study techniques.
6. Follow rules & regulation strictly & become a low abiding citizen.

Unit No	Contents	Hrs	Marks
1	**Social Aspects:** 1.1 Role of an individual in the family, in the institute, in the society. 1.2 Social responsibilities & rights of an individual. 1.3 Role of a diploma holder in the present day scenario. 1.4 Guest lecture on any of the above topic.	04	08
2	**Technical education in Maharashtra:** 2.1 Definition of technical education its types, structure (ITI, Diploma & Degree). 2.2 Governance in Technical Education.(BTE, Autonomous & private- structure , fees, faculty,	04	08

	exam, evaluation etc.) 2.3 Institutes of Indian standards (BIS & IS) ISO 14000 & ISO 18000 2.4 Guest lecture on Indian standards.		
3	**<u>Awareness of curriculum:</u>** 3.1 Definition of curriculum, steps observed in its construction, 3.2 Objectives, rationale, core subjects, other subjects and its credit. 3.3 Office and its work procedure, sections and their importance, 3.4 Guest lecture on functions of curriculum development .	**04**	**06**
4	**<u>MIS(Management Information System):</u>** 4.1 Definition , its working , applications & relevance in the present day scenario. 4.2 MIS applied to exam section, student registration , subject registration, exam registration. 4.3 Department related applications : Work related to office , library & others.	**04**	**08**
5	**<u>Library:</u>** 5.1 Introduction to library, its functioning, its role in an institute, role of a librarian. 5.2 facilities available in library, search facility for books on internet, digital library. 5.3 Two expert lectures by librarian on how to utilize the library to the fullest extent regarding the penalties and Book Bank system.	**04**	**06**

6	**Health Awareness and Social mannerism**: 6.1 Introduction to health and hygiene (WHO-definition) Definition, its importance. 6.2 Mannerisms to be followed –in the Institute, in the laboratory , in the corridors, in the classrooms-overall discipline, regarding use of mobiles. 6.3 Seminar culture- definition, etiquettes to be observed while attending seminar , presentation, party in a hotel etc. 6.4 Two guest lectures on seminar culture by hospitality/ event management experts.	**04**	**06**
7	**Self Study Techniques :** 7.1 Importance of listening, reading & writing skills for a student. 7.2 Safety precautions related to various laboratories e.g. workshop, electrical & chemistry laboratory. 7.3 Rules to be followed in library-keeping silence In the reading room, use of accession cards, returning the books in time.	**04**	**04**
8	**Banking Practice:** 8.1 Banking procedures, types of accounts, deposits- types, e-banking. 8.2 Guest lecture bank personale.	**04**	**04**

Course Code	Course Title	C/O	Credits				Examination Scheme					
			TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
HU 11 101	Communication Skills	**C**	2	-	-	**2**	80*	20	-	-	-	100

Rationale:

English is the global language today. The basic knowledge of this language isessential for every one. It is necessary for the Engineering and Technology related students to cope up with the challenges of the modern world with the help of English. The major part of their work experience needs certain knowledge of this language. At worksite, on the shop floor or fields, they might be required to take the instructions from superiors and to pass them on to subordinates. To write letters, circulars, memos, notice and reports will be an important task for them. While designing the curriculum of communication skills and communication practice the probable needs of the future technicians are kept in view.

Objectives:

The students will be able:

1. to understand the communication technique,
2. to use the basic concepts and principles of communication theory effectively in an organized set up,
3. to give positive feedback in various situations by using appropriate body language and avoid the barriers for effective communication and to write the various types of letters, reports and office drafting in the proper format.

Section I		
Contents:	**Hours**	**Marks**
1. Introduction to communication 1.1. Communication Cycle 1.2. Communication Event 1.3. Concept of communication process 1.4. Stages of communication cycle 1.5 Selection of proper channel for communication.	04	12
2. Types of Communication Definition, advantages and limitations of- 2.1 Formal Communication 2.2 Informal Communication	04	12

2.3 Verbal Communication 2.4 Non-verbal Communication 2.5 Vertical Communication 2.6 Diagonal Communication 2.7 Horizontal Communication 2.8 Grapevine Communication		
3. Non-verbal/Graphical Communication : 4.1 Non Verbal Communication 4.2 Aspects of body language 4.3 Interpreting Visuals	08	16
Section II		
Contents:	**Hours**	**Marks**
4. Principles of Effective Communication : 3.1 Components of effective Communication 3.2 Communication Barriers 3.3 Overcoming Barriers 3.4 Developing Effective Messages	04	12
5. Formal Written Skills : 5.1 Office Drafting 5.2 Job Application with Resume 5.3 Business Correspondence 5.4 Report Writing 5.5 Defining and describing objects and its functions	12	28

References:

Sr.No.	Author	Title	Publication
1	Meenakshi Raman Sangita Sharma	Communication Skills	Oxford Higher Education
2	Homai Pradhan D.S.Bhende Vijaya Thakur	Business Communication	Himalaya Publishing House
3	Curriculum Development Centre	A Course in Technical English	Somaiya Publications Pvt.Ltd.

Course Code	Course Title	C/O	Credits				Examination Scheme					
			TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
SC 11 106	Applied Physics	C	4	-	2	6	80*	20	--	--	50	150

Rationale: The subject is included under the category of science. The special feature of the subject is to develop the laboratory skill using principles of scientific phenomenon. This course will serve to satisfy the entire need of the technical student for his development in technical field. Deep thought is given while selecting the topics related to programmes like electrical ,electronics etc. which will develop intellectual skills of the students. Ultimately the focus of the course is on psychomotor skill .

Objectives:

The students will be able to

1. Understand the physical properties in the various materials that are used by the engineer.
2. Understand the physical quantities and it's relation with one another.
3. Understand the principle and laws of physics.
4. Interpret the results from observations and calculations.
5. Measure physical quantities accurately with different instruments.
6. Apply knowledge to correlate the properties of materials, their engineering uses & application.
7. Understand basic facts in Physics viz, force, light, electric and magnetic fields
8. Develop laboratory skills of investigation for use in production and technology.

Section I

(40 Marks)

Table of Contents:

Topic No	Contents	Hrs.	Marks
1	**Physical measurement** 1.1 Fundamental Physical quantities, examples. 1.2 Derived physical quantities, examples. 1.3 System of units, C. G. S., M. K. S., S. I. System. 1.4 Rules and conventions. 1.5 Errors in Measurements, types of errors. minimization of error	**04**	**04**
2	**Vectors and Scalars** 2.1 definition of Vectors, scalars 2.2 resultant vectors 2.3 Unit vectors, resolution of vector. 2.4 triangle law of vectors 2.5 parallelogram law of vectors 2.6 scalar product and vector product	**05**	**06**
3	**Circular Motion** 3.1 Uniform circular motion. 3.2 Relation between linear and Angular Velocity. 3.3 Radial Acceleration 3.4 Centripetal and Centrifugal force , examples	**05**	**06**
4	**Simple Harmonic Motion** 4.1 S. H. M. as projection of circular Motion.	**03**	**04**

	4.2 Definition and unit of parameters related to S. H. M. ; oscillation, phase, Amplitude, Period, Frequency**.**		
5	**Elasticity** 5.1 Definition of elasticity, stress, strain 5.2 Types of deformation. 5.2 Hooke's Law and elastic limit. 5.3 Definition and explanation of bulk modulus , young's modulus and modulus of rigidity	**05**	**06**
6	**Viscosity** 6.1 Concept and Definition of viscosity. 6.2 Newton's law of viscosity, Co-efficient of viscosity 6.3 Stoke's law, terminal velocity 6.4 Streamline flow, turbulent flow, critical velocity	**05**	**07**
7	**Gas laws and specific heats** 7.1 Concept of Heat and temperature. 7.2 Boyle's law, Charles's Law, Gay Lussac's law. 7.3 Concept of absolute zero, Kelvin scale of temperature. 7.4 Ideal & general gas equation, Universal gas constant.	**05**	**07**

Section II

(40 marks)

Table of Contents:

11	**Electricity**	**06**	**08**
	11.1 Ohm's Law , statement and mathematical expression of ohm's law. 11.2 E.M.F. of cell. And internal resistance of the cell 11.3 Specific resistance. 11.4 Resistances in series and parallel combination. 11.5 Theory of shunt, Definition and calculation of shunt resistance. 11.6 Conversion of Galvanometer in Ammeter and voltmeter. 11.7 Comparison of E.M.F. of two cells using potentiometer. 11.8 Wheat stone network, and Meter Bridge		
12	**Electromagnetism**	**04**	**06**
	12.1 Magnetic effect of current, magnetic induction. 12.2 Properties of magnetic lines of forces. 12.3 Laplace's law, Flemings left hand rule. 12.4 Magnetic induction at center of circular coil carrying current. 12.5 Force acting on conductor carrying current placed in magnetic field.		
13	**Photoelectric Effect**	**04**	**04**
	13.1 Concept of quantum theory of light.		

	13.2 Einstein photoelectric equation. Characteristics of Photoelectric effect. 13.3 Construction of Photoelectric cell, 13.4 applications of photoelectric cell		
14	**Optics and Optical Fibers**	**04**	**06**
	14.1 Reflection and Refraction of light through glass prism , Snell's law. Angle of Prism, Angle of incidence, emergence 14.2 Angle of deviation - Definition and prism formula (no derivation) 14.3 Introduction to optical fibers 14.4 total internal reflection, critical angle, 14.5 Structure of optical fiber, numerical aperture, 14.6 types of optical fibers & applications		

Numerical problems are integral part of our syllabus

List of Practical:

1.To find volume of given block using vernier caliper

2.To determine Acceleration due to gravity by Simple pendulum

3. To determine coefficient of viscosity of liquid by Stoke's method

4. To verify the principle of potentiometer.

5. To calibrate volt meter using potentiometer.

6. To calculate permittivity of air using flat condenser plates.

7. To verify series/parallel law of capacitors.

8. To determine specific resistance of material by Meterbridge.

9. To compare EMF of two cells by potentiometer using principle of single cell.

10. To plot characteristics of photo cell.

11. To observe effect of photo electric current.

12. To calculate numerical aperture of optical fiber.

References:

Sr.No.	Author	Title	Publication
1	Manikpure&Deshpande	Applied Physics	S.Chand& Company
2	B.G.Bhandarkar	Applied Physics	Vrinda Publication
3	BrijlalSubhramanyan	Optics & Optical Fibers	
4	Gaur &S.L.Gupta	Engg. Physics	S.Chand& Company
5	Resnick&Halliday	Physics	Tata Macgrohill
6	H.C.Verma	Physics part I & II	
7	S.V.Thereja	Electrical Engg.	
8	D.S.Mathur	Properties of Matter	

Programme Code: **EE/IS/CO/IF/EC**									
Course Code: SC11 110	**Course Title Basic Mathematics**								
Compulsory / Optional: **Compulsory**									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	**1**	**--**	**4**	**80**	**20**	**--**	**--**	**--**	**100**

RATIONALE:-

This subject intends to teach student basic facts, concepts, principle and procedure of mathematic as a tool to analyze Engineering problems and as such lays down foundation for understanding the engineering and core technology subjects

Course Objectives: - The students will be able to,

1. Understand basic facts of mathematics about the field analysis of any Engineering problem.
2. Know the standard ways in which the problem can be approached.
3. Apply basic concepts to engineering problem.

Section I (**ALGEBRA)**		
Contents:	**Hours**	**Marks**
Logarithms: 1.1 Definition 1.2 Laws of logarithms . 1.3 Simple examples based on laws Change of base rule.	**03**	**04**
2. **Determinants:** 2.1 Definition 2.2 Expansion of determent of order 2&3 2.3 Crammer's rule to solve simultaneous equations in 2 unknowns. 2.4 Crammer's rule to solve simultaneous equations in 3 unknowns.	**03**	**04**
3. **Matrices:** 3.1 Definition of a matrix of order m x n 3.2 Types of matrices 3.3 Algebra of matrices - equality, addition,subtraction ,multiplication & scalar multiplication.	**10**	**16**

3.4 Transpose of matrix. 3.5 Minor , co-factor of an element. 3.6 Adjoint & inverse of a matrix by adjoint method. 3.7 Solution of a simultaneous equations by matrix inversion method.		
4. <u>Binomial Theorem:</u> 4.1 Definition of factorial notation 4.2 Meaning of ${}^{n}c_{r}$ & ${}^{n}p_{r}$.. 4.3 Statement of Binomial Theorem. 4.4 General term formula. 4.5 To find term independent of x , coefficient of x^{r} & middle term/terms. 4.6 Approximation formula.	**04**	**08**
5. <u>Partial Fractions:</u> 5.1 Definition of proper, improper & partial fractions. 5.2 To find out the partial fractions when: i) Denominator contains linear non repeated roots. ii) Denominator contains linear but repeated roots. iii) Denominator contains quadratic but non repeated roots.	**04**	**08**
6. Trigonometry 6.1 Trigonometric ratios of any angle and fundamental identities. 6.2 Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), Sub multiple angles. 6.3 Sum and Product formulae 6.4 Inverse Circular function (definition and simple problems).	**10**	**16**
<u>7. Co-ordinate Geometry:</u> 7.1 Points & Distances : • Distance formula, section formula, mid-point formula & centroid of a triangle. • Area of a triangle & Co-linearity. 7.2 Straight line: • Slope & intercept of straight line. • Equation of straight line in slope point form, slope intercept form, two point form, two intercept form, normal form, general equation of straight line. • Angle between 2 straight lines condition of parallel &perpendicular lines. • Intersection of two lines. • Length of perpendicular from a point on the line & perpendicular distance between parallel lines.	**10**	**16**

7.3 Circle: • Equation of circle in standard form, Centre – radius form, Diameter form, two intercept form. **General equation of a circle & its centre radius.** i) SinX, CosX, and solution of trigonometric equations. (ii) Straight line graphs of **(a) $y = mx^2 + b$ (b) $y = m/x + b$**		
8. Vectors: 8.1 Definition of vector , position vector, Algebra of vectors(Equality, addition ,subtraction and scalar multiplication) ,Dot (Scalar) product & Vector (Cross) product with properties. 8.2 Application of Vectors**:** Work done & momentum of force about a point & line.	**04**	**08**

Reference:

Sr.No.	Author	Title	Publication
1	S.P. Deshpande	Mathematics for polytechnic students	Pune Vidyarthi Graha Prakashan
2	H. K. Das	Mathematics for polytechnic students (Volume I)	S.Chand Prakashan
3	G. V. Kumbhojkar	Companian to basic maths	Phadke Prakashan
4	N. Raghvendra Bhatt Late Shri R Mohan Singh	Applied Maths	Tata McGraw Hill Publication