



Savitribai Phule Pune University

(Formerly University of Pune)

Three Year B.Sc. Degree Program in Electronic Science

T. Y. B. Sc. Electronic Equipment Maintenance (Vocational)

(Faculty of Science & Technology)

T. Y. B. Sc. Electronic Equipment Maintenance

(Vocational)

Choice Based Credit System (CBCS) Syllabus

To be implemented from Academic Year 2021-22

Preamble: The curriculum has been designed for the fulfilment of the expectations of UGC about vocational course. The present syllabus attempts to satisfy the expectations by including topics demanded by society. It also includes topics that are suitable for new entrepreneurs. It is designed to impart knowledge about commonly used household, consumer and community appliances. Prerequisite for this course is basic understanding of electronics. Upon completion of the course, the students will be able to repair the equipments in society as well as prepare plan about entrepreneurship in the area of electronic equipment maintenance.

Titles of Papers and Scheme of Study Evaluation

(CBCS Pattern)

Structure of T. Y. B. Sc. Electronic Equipment Maintenance

Sem	Paper Code	Paper	Paper title	Credits
V	Discipline Specific Elective Course	EEM-355	Troubleshooting and Repair of Audio and Video Equipment	2
		EEM-356	Electronic Instrumentation	2
VI	Discipline Specific Elective Course	EEM-365	Entrepreneurship Development	2
		EEM-366	Medical Instrumentation	2

Practicals : Any three practical's from the list can be selected for each semester. These practicals should be included in practical course paper II of Electronic Science syllabus.

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PAPER V: Semester V: EEM-355

Troubleshooting and Repair of Audio and Video Equipment

Objectives:

1. To impart knowledge of troubleshooting procedures for electronic equipment
2. To impart skills of fault location and correction.
3. To prepare students for handling latest electronic equipment

Unit 1: Repairing Audio equipment

18 lectures

- *Faults in AM and FM receivers and their remedies.*
- Block diagram and Faults in satellite receiver
- Faults in smart phone with remedies.
- Faults in Audio Disc (CD, DVD) players and their remedies
- Faults in blue ray disc player
- Troubles in home theatre.
- Faults in PA system and their repairing

Unit 2: Repairing Video equipment

18 lectures

- Faults in Digital TV and set top box.
- Faults in LCD, Plasma TV
- Faults in Video monitors (LCD and CRT)
- Faults in laptop computer
- Faults in VCD and DVD players
- Faults in printers and their remedies
- Dot Matrix
- Inkjet
- Laser

Reference books

1. Electronic instruments and systems: Principles, maintenance and troubleshooting
R. G. Gupta Tata McGraw Hill
2. Modern electronic equipment: Troubleshooting, repair and maintenance by
Khandpur, Tata McGraw Hill
3. Electronic fault diagnosis by G. C. Loveday, A. H. Wheeler publishing

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PAPER VI: Semester V: EEM- 356
Electronic Instrumentation

Unit 1: General Instrumentation System

18 lectures

- Various Instrumentation applications in Electronic Industry and research.
- Block diagram of general instrumentation system.
- Sensors & systems for various applications / parameters - Displacement, Force, temperature, motion ...
- Concept of accuracy & accuracy calculation and error estimation, Traceability
- Concept of digital signal processing & its applications in various fields.

Unit 2: Specific Measurement Instructions & Systems

18 lectures

- Impedance (Z) and its measurement system
- DVM * Digital Volt Meter
- Concept of Spectrum & its analysis in time & frequency domains Basic & real till spectrum analyser.
- Concept of distortion, Distortion analyser, Logic analyser, Automatic test equipment (ATE), μp / μc based instruction.
- Concept of data acquisition & Df
- PLC C Programmable logic controller: Concept, Block diagram, Ladder diagram, Programming Testing and debugging, simulation, fault detection techniques.

Reference books:

1. Electronic measurements by U. A. Bakshi and V. U. Bakshi, Technical publications Pune.
2. Instrumentation, Measurement and Analysis by Nakra & Choudhari, Tata McGraw Hill
3. Petrezeulla, "Programmable Logic Controllers", McGraw Hill, 1989.
4. Curtis D. Johnson, "Process Control Instrumentation Technology", 8th edition Prentice Hall
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**Paper V: Semester VI: EEM- 365
(Entrepreneurship Development)**

Entrepreneurship is a tremendous force that can have a big impact in growth, recovery, and societal progress by fuelling innovation, employment generation and social empowerment.

Through entrepreneurship education, young people, including those with disabilities, learn organizational skills, including time management, leadership development and interpersonal skills, all of which are highly transferable skills sought by employers.

The syllabus for T.Y.B.Sc., Vocational students thus is aimed at creating an awareness amongst the students about the benefits of becoming an entrepreneur and at the same time equip them with information about a good and a viable opportunity; making a business plan by assessing the techno-economic feasibility, seeking financial assistance, variety of procedures and formalities for setting up an Small Scale enterprise, taking decisions in such a manner so that entrepreneurship becomes a life time career goal.

OBJECTIVES:

1. To create awareness about self-employment & motivate students for self-employment.
2. To study entrepreneurship concepts and their applicability.
3. To familiarize the students to the practical world of enterprise/business.

1. INTRODUCTION:

9 Lectures

Concept of entrepreneurship, Historical background, need and scope of entrepreneurship in modern society, Entrepreneurial behaviour, attributes and skills, Key elements of entrepreneur, Entrepreneurial process and culture, Environment of Entrepreneurship, Socio economic origins, types & Characteristics of Entrepreneur.

2. BUSINESS ORGANIZATIONS:

9 Lectures

Forms of business organizations such as sole proprietorship, partnership, Joint Stock Company, cooperative organization etc. Meaning and definition, Relative merits and demerits of each form

Study of organizations promoting Entrepreneurship

Sources of Information: Where to go for what?

- a) District Industry Centre (DIC)
- b) Maharashtra Industrial Development Corporation (MIDC)
- c) Maharashtra State Small Industries Development Corporation (MSSI DC)
- d) Small Industries Services Institute (SISI)
- e) National Institutes of Entrepreneurship and Small business Development (NIESBUD)
- f) National Entrepreneurship Development Board (12) (NEDB)
- g) Entrepreneurship Development Institute of India

- h) Commercial and Co-operative Banks
- i) State Industrial Development Bank (SIDBI)
- j) Pollution Control Board

Legal Aspects of Small Business: Elementary knowledge of Income Tax, Sales Tax, VAT, Service Tax, Patent Rules, Excise Rules, Factory Act and Payment of Wages Act, TDS act Procedures for registration of SSI, TDS no, PAN no.

3. ENTREPRENEURSHIP DEVELOPMENT:

9 Lectures

Identification of opportunities for entrepreneurship, ideas to start new business, criteria for selection of new product or service, Market Survey as a tool, Technical and economic feasibility of a project, Role of consultancy organizations. Project formulation and project report preparation (Use guidelines given in Schedule II)

FINANCIAL ASPECTS: Govt/Public sources of finance

Sources of finance, Role of various funding agencies, government and commercial Role of various funding corporations and funding institutes such as chamber of commerce, MSFC, MCED, NSSIDC, Banks, special institutes such as IDBI, MIDC, SICOM etc, working capital, cash flow, fund flow, study of basic financial statements, costing and pricing, breakeven point, SWOT analysis.

Private Sources

1. Equity –Angel finance, Venture capital
2. Debt Finance – Loans from banks loan against co-lateral security, PMYR-Loans with subsidy from Central GOVT, State Govt, CGTSME (Central Grant for Small Medium Enterprise)

4. MARKETING ASPECTS:

9 Lectures

Meaning, scope and importance, Marketing strategy, Market segmentation, marketing channels. Marketing mix and its effect. Digital marketing through Web browsing, Face book, Google search engines SMS campaigns, Mailers, Hand bills etc

HUMAN RESOURCE ASPECTS: (H.R Policies): Concept and scope in modern industry, Different modes of employment, Placement of proper person for a job, Interpersonal relations and communication skills, training of personnel, guidance for stress management, soft skills, Drafting -Appointment letter, termination tenure, experience certificates, exit policies, Legal liabilities of employees, Group insurance for factory workers, understanding WAC (Workers Accident Compensation)

RECOMMENDED BOOKS:

1. Dynamics of Entrepreneurial Development and Management – Shri. Vasant Desai. (Latest edition)
2. Electronic Product Design, V. S. Bagad, Technical Publications
3. Entrepreneurship Development, E. Gordan and K. Natarajan, Himalaya Publishing House, New Delhi
4. Electronic Product Design, R. G. Kaduskar, V. B. Baru Second edition Wiley India
5. Development of Entrepreneurship, G. S. Batra, Deep and Deep Publications, New Delhi

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PAPER VI: Semester VI EEM-366- Medical Instrumentation

Objectives:

- 1] To make the students conversant with biopotentials and their significance
- 2] To impart knowledge of medical instrumentation and its use

Unit 1:

16 lectures

Biopotentials Electrical activity of excitable cells -Central nervous system functional organization of peripheral nervous system -ENG, EMG, ECG, EEG
Biopotential electrodes -Body surface recording electrodes -Internal electrodes -Electrode arrays, microelectrodes -Electrodes for electric stimulation of tissue -Ion selective electrodes
Practical hints in the use of electrodes

Unit 2:

20 lectures

Recording systems Basic recording system. General considerations for bioelectric recorder amplifier. Sources of external noise in low level recording circuits. Amplifiers used with recording systems. Writing systems.

Instrumentation for clinical laboratory Blood: Introduction, Tests: Blood cell counter (conducting method) Chemical tests: Colorimeter (filter-photometer), flame photometer, spectrophotometer. Automation of chemical tests.

Electrical safety Physiological effects of electric current. Electric power distribution system. Macroshock and microshock hazards. Prevention of accidents and grounding of equipment. Double insulation, protection by low voltage, ground fault circuit interrupter. Isolation of patient connected parts. Isolated power distribution system.

Reference books:

- 1] Medical instrumentation: Application and design by J. G. Webster John Wiley and sons 2003
- 2] Handbook of Biomedical Instrumentation by R. S. Khandpur Tata McGraw Hill

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Practicals (CBCS Pattern)

Objectives:

1. The practicals are to be conducted to transform the knowledge gained by the students in their classes to real life experience.
2. These practicals will be based on the vocational subject and the Principal subject a student has offered.

Internal assessment should be carried out on the practicals/ assignments done by a student.

List of Practical: SEM V: PRACTICAL COURSE II

(Any 3)

1. Study of laser printer and its fault diagnosis.
2. Faults in PA system and their repairing.
3. Faults in LCD, Plasma TV
4. Faults in Video monitors (LCD and CRT)
5. Faults in laptop computer
6. Faults in VCD and DVD players
7. Faults in printers and their remedies

List of Practicals: SEM VI: PRACTICAL COURSE II

(Any 3)

Sr. No.	Title of Practical	Objective	Mode
1	Role of District industry centre	Understand the working of District industry centre	Visit and report submission
2	Visit to a small scale Industry	To understand plant location and plant layout and to submit a report on the guidelines given in schedule I	Visit and report submission
3	Visit to a service unit	To study the legal aspects of a service unit and to submit a report	Visit and report submission
4	Entrepreneurial ideas	Describe in brief two entrepreneurial ideas of yours	Home Assignment
5	Project formulation	Prepare a preliminary document about an enterprise you want to start. It should contain executive summary, customer/target market analysis and strategy (use guidelines given in schedule II)	Home Assignment
6	Review business plans. For this Plans should be exchanged with other teams	Submit a review of a business plan of another team . It should include critical and constructive comments	Home Assignment
7	Drafting a business plan	It should contain executive summary, customer/target market analysis and strategy, marketing and operations, risks, management team and financial projections	Power Point Presentation

Schedule-I
Visit to a small-scale Industry

Sr.No.	Information to be collected	Description
1	Year of commencement of the project	
2	Work experience of the entrepreneur before starting the project	
3	Detailed information of the product	
4	Type of customers using their product	
5	Pricing details of all the product range	
6	No. of workers/ Staff working in the Unit	
7	Turnover in the last three years	
8	Mode of Advt./Marketing adapted for promoting the Products	
9	Investment done at the time of starting the project	

Schedule II
Project formulation

Sr.No.	Information to be collected	Description
1	Product /services Selected its justification	
2	Capital investment required to start the Services /Product	
3	Minimum Infrastructure requirement	
4	Rent as per current rates for the same premises/ Office /Factory	
5	Various Competitors currently for the same product /Services	

6	Your unique selling proposition USP ie write down why your product will be preferred by the customer as against the present competition. 1) Features 2) Cost 3) Geographic location 4) service 5) durability	
7	Marketing Strategy used for Advertising your product	
8	Various digital marketing methods to be selected	
9	What will be your ROI (Return on Investment)	
10	What will be your Breakeven point	
11	How will you be raising the finance for the same	
12	Prepare a three years Balance sheet, / P/L statement taking help from a Third-year commerce stream student. (optional)	