

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.



CIRCULAR NO.SU/ Faculty of Science & Technology./B.VOC./ 94 /2022.

It is hereby informed to all concerned that, on the recommendation of Ad-hoc Board in Vocational Studies and Dean, Faculty of Science & Technology the Hon'ble Vice-Chancellor has **accepted the curriculum of following B.Voc. Courses under Choice Based Credit and Grading System** in his emergency powers under Section-12 [7] of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith:

Sr.No.	Course Name	Semester
1.	B.Voc in Electronic Manufacturing Services	III & VI
2.	B.Voc in Polymer Science and Chemical Technology	III & VI

This is effective from the **Academic Year 2020-21 and 2021-22** and onwards. This curriculum is also available on the University website www.bamu.ac.in.

All concerned are requested to note the contents of the circular and bring notice to the students, teachers and staff for their information and necessary action.

University campus,
Aurangabad-431 004.

Ref. No.SU/B.voc./Curri./2021-22

Date: 04.06.2022

123-134

**Deputy Registrar,
Academic [Syllabus]
Section.**

Copy forwarded with compliments to :-

- 1] **The Principal All Affiliated Concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.**
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload the curriculum along with this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation, Dr.BAMU, A'bad
- 2] **The Concerned Section, Examination Branch,**
- 3] The Section Officer, [Eligibility Unit],
- 4] **The Programmer [Computer Unit-1] Examinations, section, Dr. BAMU, A'bad**
- 5] **The Programmer [Computer Unit-2] Examinations, section, Dr. BAMU, A'bad**
- 6] The In-charge, [E- Suvidha Kendra],
- 7] The B.Voc Section, Dr. BAMU, A'bad
- 8] The Public Relation Officer,
- 9] The Record Keeper,

**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY
AURANGABAD**



**SYLLABUS OF
BACHELOR OF VOCATIONAL
IN**

**B.Voc in Electronic Manufacturing Services
SEMESTER- III & VI**

Choice Based Credit System

Effective from the Academic Year
2020-21 and 2021-22 & Onwards

Bharat Shikshan Sanstha's

**Shri Chhatrapati Shivaji College, Omerga. Dist.
Osmanabad-413606**

**(Affiliated to Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad.)**



B. VOC. in

(Electronic Manufacturing Services)

Syllabus III & IV Semester

Effective From 2021-22

split into 2 parts
50 marks
20/5/22
Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

B. VOC. In Electronic Manufacturing Services

Second Year: Semester III

Sr. No.	Course Code	Name of the Course	Contact Hours Per Week		Evaluation Scheme		Credit
			L	P	CIA	SEE	
Semester III		General Academic Components					
1	VOC 301	Second Language-Hindi	04	0	20	80	4
2	VOC 302	Professional Ethics	04	0	20	80	4
3	VOC 303	Electronic Instruments - Maintenance and troubleshooting	04	0	20	80	4
Semester III		Skill Development Components					
4	VOC 311	Linear Integrated Circuits	04	0	20	80	4
5	VOC 312	Fundamental of 8085 Microprocessor	04	0	20	80	4
6	VOC 313	Sensor Fundamental	04	0	20	80	4
7	VOC 321	Lab Course 7- Linear Integrated Circuits	0	04	25	25	2
8	VOC 322	Lab Course 8- Fundamental of 8085 Microprocessor	0	04	25	25	2
9	VOC 323	Lab Course 9-Sensor Fundamental	0	04	25	25	2
Total			24	12	195	555	30

[Signature]

 Dean
 Faculty of Science & Technology
 Dr. Babasaheb Ambedkar Marathwada
 University, Aurangabad

B. VOC. In Electronic Manufacturing Services

Second Year: Semester IV

Sr. No.	Course Code	Name of the Course	Contact Hours Per Week		Evaluation Scheme		Credit
			L	P	CIA	SEE	
Semester IV		General Academic Components					
1	VOC 401	Business Communication	04	0	20	80	4
2	VOC 402	Financial Managements and Accounts	04	0	20	80	4
3	VOC 403	Industrial Management	04	0	20	80	4
Semester IV		Skill Development Components					
4	VOC 411	Analog Communication Systems	04	0	20	80	4
5	VOC 412	8086 Microprocessor and interfacing	04	0	20	80	4
6	VOC 413	Properties of Electronic Materials	04	0	20	80	4
7	VOC 421	Lab Course 10- Analog Communication Systems	0	04	25	25	2
8	VOC 422	Lab Course 11-8086 Microprocessor and interfacing	0	04	25	25	2
9	VOC 423	Lab Course 12- Properties of Electronic Materials	0	04	25	25	2
10	VOC 431	In-Plant Training*	0	120	50	50	4
Total			24	12	225	605	34

*Students have to undertake 120 contact hours internship in respective industry during summer vacation at the end of each academic year. This is off campus activity.

*Students should submit report of the in-plant training within seven (07) days after completion of training.


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B. VOC. Second Year: Semester III
General Academic Components

VOC 301- Second Language Hindi

(04 Credits: 100 Marks)

उद्देश्य:

- 1) साहित्य आस्वादन अभिरूची का परिसंस्कार
- 2) जीवन मूल्यों के प्रति आस्था
- 3) अत्याधुनिक इलेक्ट्रानिक माध्यमों का परिचय

अध्ययन-अध्यापन प्रक्रिया :

- 1) व्याख्यान पद्धति
- 2) लेखन एवं पठन कौशल वृद्धि के लिए अभ्यास
- 3) दृक-श्रव्य माध्यम का प्रयोग

पाठ्यपुस्तक:

अ.) गय के विविध आयाम, संपा., प्रो. जयमोहन एम.एस., वाणी प्रकाशन, नई दिल्ली

पाठ्यक्रम में समाविष्ट रचनाएँ

- 1) आत्मवृत्त: मेरा जीवन
- 2) रेखाचित्र-पीलकंठ मोर
- 3) संस्मरण -कमला
- 4) निबंध-शिरीष के पुल
- 5) यात्रावृत्त - चीड़ों पर चाँदनी

आ.) प्रयोजनमूलक हिंदी :

1) प्रयोजनमूलक भाषा

अ) भाषा का स्वरूप एक महत्व

आ) भाषा की परिभाषा , विशेषताएँ एवं प्रकार्य

इ) वैश्वीकरण के परिप्रेक्ष्य में हिंदी भाषा का महत्व

2) भाषा शिक्षण : स्वरूप एवं प्रक्रिया

अ) भाषा शिक्षण की प्रक्रिया,

आ) भाषा कौशल

1.श्रवण कौशल

2.भाषण कौशल

3.वाचन कौशल

4.लेखन कौशल

3) व्यावसायिक हिन्दी

अ) वाणिज्य व्यापार : तात्पर्य एवं स्वरूप

आ) वाणिज्य व्यापार के साधन

इ (वाणिज्य व्यापार और भाषीक प्रकार्य

ई (वाणिज्य -व्यावसायिक भाषा : संरचनात्मक विशेषताएं

उ) व्यावसायिक पत्र लेखन

4) निबंध लेखन

अ) निबंध : तात्पर्य एवं स्वरूप

आ) निबंध लेखन : साहित्यिक / सामाजिक/ समसामायिक समस्या। वैज्ञानिक विषय

संदर्भ ग्रंथ:

1) साहित्य विधाओं की प्रकृति: देवी शंकर अवस्थी

2) हिंदी गद्य । विन्यास और विकास : डॉ. रामस्वरूप चतुर्वेदी

3) हिंदी का गद्य पर्व: डॉ. नामवर सिंह

4) हिंदी के अध्यतन अनुप्रयोग: डॉ. माधव सोनटक्के

5) प्रयोजनमूलक तथा व्यावहारिक हिन्दी : डॉ. सुकुमार भंडारे

B. VOC. Second Year: Semester III
General Academic Components

VOC 302- Professional Ethics

(04 Credits: 100 Marks)

Learning Objective:

- To create an awareness on Engineering Ethics and Human Values.
- To install Moral and Social Values and Loyalty
- To appreciate the rights of others.
- To create awareness on assessment of safety and risk

Course Outcomes: By the end of the semester, the student will be able to:

- Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field.
- Identify the multiple ethical interests at stake in a real-world situation or practice.
- Assess their own ethical values and the social context of problems.
- Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human
- Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.

Unit I: Introduction to Professional Ethics

(15 Hrs)

Defination of Profession; Engineering and Professionalism; Two module of professionalism, Defination of Ethics, types of ethics/morality, negative force of engineering ethics-preventive ethics; positive force of engineering ethics- aspirational ethice, Good works, Ordinary positive engineering; case studies based on unit I.

Unit II: Ethics in the World of Business

(15 Hrs)

Introduction; ethics and Entrepreneurship; Economics and law: Ethics and Management; Business ethic and ethical theory; introduction to welfare, right and justice; introduction to equality, liberty and virtue; introduction to whistle blowing. Case studies based on unit II.

Unit III: The Social and Value Dimension of Technology

(15Hrs)

Technology and society: Technology optimism and pessimism; computer technology- primary and social interaction of technology and society; trust and reliability- Honesty, form of dishonesty, confidentiality; intellectual prperty; expert witnessing; informing the public; conflict of interest; Case studies based on unit III.

Unit IV: Corporate Social Responsibility

(15 Hrs)

Introduction, Debate over CSR, business case for CSR, Implementing CSR. Corporate Governance and accountability. Introduction to international Business ethics, Case studies based on unit IV.

Text and Reference Books:

1. Engineering Ethics: Concepts and Cases- C. E. Harris Jr., Michael S. Pritchard, M. J. Rabins: Cengage Learning India Pvt. Ltd. ISBN-8131517292
2. Ehtics and conduct of Business- J. R. Boatright, B. P. Patra; Pearson, ISBN: 9788131759622.
3. Professional Ethics and Human Values- M. Govindrajan, S. Natarjan, V. S. Senthilkumar: prentice hall india learning pvt. Ltd. ISBN-8120348168
4. Ngineering Ethics includes human values- M. Govindrajan, S. Natarjan, V. S. Senthilkumar: prentice hall india learning pvt. Ltd. ISBN-9788120325784.

B. VOC. Second Year: Semester III **General Academic Components**

(Generic Skill-IV)

VOC 303- Electronic Instruments - Maintenance and troubleshooting

(04 Credits: 100 Marks)

Learning Objectives:

- This course will help the students learn about the Fundamentals of Troubleshooting Electronic Equipment.
- Learn how to use various tools and equipments to find the fault in electronic.
- Learn how to test if a component is working properly or not and find substitute for it.

Course Outcomes:

By the end of the semester, the student will be able to:

- Explores causes of failures components and devices in electronic systems
- Acquires skill of troubleshooting analog and digital circuits
- Gets acquainted with fault diagnosis procedure
- Understands the importance of preventive maintenance

Unit- I : Failures and Testing of Semiconductor Devices

(15 Hrs)

Types of semiconductor devices, Causes of failure in Semiconductor Devices, Types of failure, Test procedures for Diodes, special types of Diodes, Bipolar Junction Transistors, Field Effect Transistors, Thyristors, Operational Amplifiers, Fault diagnosis in op-amp circuits

Unit- II: Troubleshooting Digital Circuits

(15 Hrs)

Logic IC families, Packages in Digital ICs, IC identification, IC pin-outs, Handling ICs, Digital troubleshooting methods – typical faults, testing digital ICs with pulse generators Logic clip, Logic Probe, Logic Pulser, Logic Current Tracer, Logic Comparator Special consideration for fault diagnosis in digital circuits Handling precautions for ICs sensitive to static electricity Testing flip-flops, counters, registers, multiplexers and de-multiplexers, encoders and decoders; Tri-state logic.

Unit-III: Troubleshooting - Case studies

(15 Hrs)

Power supply circuits- Types of Regulators, Power Supply Troubleshooting, SMPS, High Voltage DC Power supplies; Multimeters, signal generators, Oscilloscope – Fault Diagnosis chart, CRT replacement.

Unit- IV: Preventive maintenance

(15 Hrs)

Indications for preventive maintenance actions, preventive maintenance of Electronic circuits, mechanical systems, General guideline for cleaning and lubricating.

Books Recommended:

1. Troubleshooting Electronic Equipment, R. S. Khandpur, Tata Mc Graw Hill Publishing Ltd (2007)
2. Electronic Instruments and systems: Principles, maintenance and troubleshooting, R. G. Gupta, Tata Mc Graw Hill Publishing Ltd (2004)
3. Student Reference Manual for Electronic Instrumentation Laboratories by Stanley Wolf, and Richard F.M. Smith, Prentice Hall of India Pvt. Ltd. New Delhi (2003)

B. VOC. Second Year: Semester III **Skill Development Components**

(Specific Skill Course-VII)

VOC- 311: Linear Integrated Circuits

(04 credits: 100 marks)

Learning Objective:

- To understand the basic concepts of operational amplifier and its various applications.
- To understand the basics of oscillators and its practical applications.
- To study IC 555 timer and its use in different applications.

Course Outcomes:

At the end of the course the student should be able to:

- Understand and analyze the IC 741 operational amplifier and its characteristics.
- Design the solution for linear & non-linear applications using IC741.
- Explain the principles of oscillation and design various oscillator circuits.
- Understand and analyze the IC 555 and its use in various applications.

Unit -I: Operational Amplifier

(15 Hrs)

Differential amplifier-Dual input balanced output differential amplifier, block diagram of typical Op-Amp, schematic symbol, interpreting data sheet, the ideal Op-Amp, equivalent circuit of an Op-Amp, Op-Amp Parameters-Input-Impedance, Output impedance, input offset voltage, Open Loop Voltage gain, input bias current, slew rate, open loop Op-Amp configurations

Unit -II: Operational Amplifier Applications

(15 Hrs)

Voltage series feedback amplifier, Voltage shunt feedback amplifier, DC and AC amplifiers, summing, scaling and averaging amplifiers, voltage to current converter (Low voltage DC voltmeter and low voltage AC voltmeter only), integrator, differentiator, basic comparator, zero-crossing detector, Schmitt trigger

Unit -III Oscillators:

(15 Hrs)

Oscillator principle, oscillator types, frequency stability, phase shift oscillator, Wien Bridge oscillator, square wave generator, triangular wave generator, saw tooth wave generator, voltage-controlled oscillator

Unit -IV The 555 Timer:

(15 Hrs)

Basic block of IC 555 timer and function of each block, IC 555 as monostable multivibrator, monostable multivibrator applications, IC 555 as an astable multivibrator, astable multivibrator applications, Free running ramp generator.

Books Recommended:

1. Op-Amps & Linear Integrated Circuits (Second Edition) [Chapters 1 to 4], Ramakant Gaikwad, Prentice Hall of India.
2. Electronics Principles and Applications (Fifth edition) [Chapters 1 and 2.], John D Ryder

3. Linear Integrated Circuits D Roy Choudhry & Shail B Jain, New Age International Publishing
4. Electronic Devices (Sixth Edition) Floyd, Pearson Education
5. Op Amps & Linear Integrated Circuits James M Fiore, Thomson Learning
6. Integrated Circuits, K R Botkar, Khanna Publishers, New Delhi.

B. VOC. Second Year: Semester III **Skill Development Components**

(Specific Skill Course-VIII)

VOC- 312: Fundamental of 8085 Microprocessor

(04 credits: 100 marks)

Learning Objective:

- To understand basic architecture of 8085 Microprocessors and its pin diagram and pin function.
- To understand instruction sets and different addressing modes.
- To understand assembly language programming and its logic.

Course Outcomes:

At the end of the course the student should be able to:

- Explain 8085 microprocessor as central device connected to memory and I/O devices.
- Describe basics of microprocessor, microprocessor architecture and programming.
- Explain & perform experiments based on interfacing microprocessor with memory and various I/O (Input/Output) devices.

Unit I: Overview of Digital Circuit Components

(15 Hrs)

Introduction, tri-states devices-buffer, controlled buffer register, bus organised structure; Latch, Multiplexer, Demultiplexer, decoder, Arithmetic logic unit, memory-classification, pin connections of memory components.

Unit II: 8085 Microprocessor

(15 Hrs)

The ideal microprocessor, architecture of microprocessor, organisation of microprocessor, features of Intel 8085, 8085 functional pin description, 8085 CPU architecture, arithmetic and logical group, register group, interrupt control, Serial I/O control group, Instruction register, decoder and control group. Demultiplexing AD7 – AD0, generation of control signals, 8085 clock circuit, basic 8085 microprocessor unit, 8085 instruction fetching and execution operation

Unit III: 8085 Instruction Set and Programming:

(15 Hrs)

Basic instructions: Instruction classification, Instruction formats. How to write and execute a simple program. Instruction Timings and Operation status. Data transfer instruction. Arithmetic operations, Branch operations.

Programming Techniques: Flow chart, Assembly Language Programs; Looping, Arithmetic Operations related to memory, Logical operations; Rotate, Compare.

Unit IV: Timing Diagram Technique:

(15 Hrs)

Memory Read, Memory write, OPcode - Fetch with and without wait state, T – state calculation of different instruction. Microprocessor interface: Memory interface, I/O Port interface, programmable peripheral interface, Memory mapped I/O, I/O mapped I/O.

Books Recommended:

1. 8 - bit Microprocessors System Design – V J Vibhte & P B Borole, Technova Publications, PUNE
2. Microprocessor Architecture, Programming, and Applications with the **8085**, (5th Edition) –Ramesh S. Gaonkar, Penram International Publishing.
3. Microprocessors –I –A. P. Godse Technical Publications PUNE
4. Fundamentals of Microprocessor & Microcomputer Controller, B. Ram

B. VOC. Second Year: Semester III

Skill Development Components

(Specific Skill Course-IX)

VOC- 313: Sensor Fundamentals

(04 credits: 100 marks)

Learning Objectives:

To facilitate the students to understand

- the concepts of sensor and the concept of different principles of sensors.
- To provide an opportunity to the students to enter into sensor research.
- To create enthusiasm among the students to undertake research in sensors.

Course Outcome:

After completion of program, Students will be able to –

- understand and explain Sensors, characteristics of sensors, optical fiber and optical sensors.
- analyze the system based on sensor and actuators.
- design and develop sensor devices
- Students will be capable to undertake research in Sensors.

Unit - I: Introduction

(15 Hrs.)

Sensors and Sensor Science, Sensors – Eyes and Ears of Machines, The Term ‘Sensor’, Optical Sensors, Physical Sensors, Chemical Sensors, elements of chemical sensors, **Sensor Physics**, Solids, Energy Band Model, Lattice Defects, Ionic Conductance, Hopping, Junctions and Potential Barriers, **Primary electronics for sensors** : Amplification by Operational Amplifier, Instruments for electric measurements.

Unit - II: Sensors and Sensor Characteristics

(15 Hrs.)

Sensors, Signals, and Systems; Ideal sensor curve, ideal sensor requisite, Sensor Classifications; **Sensor Characteristics**: Transfer Function; Span (Full-Scale Input); Full-Scale Output; Accuracy; Calibration; Calibration Error; Hysteresis; Nonlinearity; Saturation; Repeatability; Dead Band; Resolution; **Parameters of sensors**: Sensitivity, detection limit, response and recovery time, selectivity, dynamic range, linearity, stability.

Unit - III: Optical Sensors

(15 Hrs.)

Introduction of light detectors: Photodiodes, Phototransistor, Photoresistors; photovoltaic cell, Optical waveguides and fibres, types of optical fibers: single mode, multimode and graded index optical fiber, concept of TIR and ATR, Optical fibre sensors: Introduction and classification of sensors with optical fibres, Optical fibre sensors with amplitude modulation, Sensor with wavelength modulation; Optical chemical sensors: Introduction, Optical sensors: Methods of detection, Evanescent wave sensors.

Unit - IV: Physical Sensors

(15 Hrs.)

Potentiometric Sensors; Gravitational Sensors; LVDT and RVDT, Eddy Current Sensors, Piezoelectric sensors, **Resistive Sensors**: Potentiometers, Strain gauges; Inductive sensors, Capacitive sensors, Bridge circuits, Displacement Measurements, **Blood Pressure Measurements**: Extravascular sensors, Intravascular sensors, Disposable pressure sensors.

References:

1. Chemical Sensors: An Introduction for Scientists and Engineers: Grundler, Peter; Springer Berlin Heidelberg New York (2007), ISBN 978-3-540-45742-8
2. Modern Sensors Handbook, Edited by Pavel Ripka and Alois Tipek; ISTE Ltd, USA (2007), ISBN 978-1-905209-66-8.
3. Handbook of Chemical and Biological Sensors; Edited by Richard F Taylor, Arthur D Little Inc., Jerome S Schultz, University of Pittsburgh; Institute of Physics Publishing Bristol and Philadelphia; (1996) ISBN 0 7503 0323 9
4. Hand Book of Modern Sensors: Physics, Designs and Applications by Jacob Fraden
Third Edition (Springer-Verlag New York, Inc.) (2004), ISBN 0-387-00750-4.
5. Understanding Smart Sensors By Randy Frank; Second Edition; Artech House Boston. London (2000), ISBN 1-58053-398-1.
6. Sensors and Transducers, Third Edition by Ian R. Sinclair; Butterworth-Heinemann publication, Woburn (2001), ISBN 0 7506 4932 1
7. Principles of Chemical Sensors: Janata, Jiri 2nd Edition; Springer Dordrecht Heidelberg London, New York (2009), ISBN 978-0-387-69930-1 e-ISBN 978-0-387-69931-8
8. Optoelectronics Devices and System SECOND EDITION by S. C. Gupta; Prentice Hall International (2011) ISBN: 978-81-203-5065-6
9. Optical Fibers and fiber optic communication Systems by Subir Kumar Sarkar; S Chand & Company Ltd (2000), ISBN: 9788121914598
10. Lasers and Optical Fiber Communications by P Sarah; I.K. International Publishing House Pvt Ltd, New Delhi (2008), ISBN: 9788189866587 / 8189866583
11. Optoelectronics by R. A. Barapate (Tech-Max Publication) (2003)

Lab Course 7-Specific Skill Course-VII

VOC -321: Linear Integrated Circuits

List of Experiment: (At least six experiments have to be performed)

1. Study of Op – Amp as a non-inverting amplifier.
2. Study of Op – Amp as an inverting amplifier.
3. Study of Op – Amp as an inverting adder.
4. Study of Op – Amp as an inverting subtractor.
5. Study of Op – Amp as an integrator.
6. Study of Op – Amp as a differentiator.
7. Study of Op – Amp as a Schmitt trigger.
8. Study of Op – Amp as an analog computer to solve simple equation.
9. Study of Op – Amp as Low voltage DC voltmeter
10. Built and study Wien Bridge oscillator using Op – Amp.
11. Built and study phase shift oscillator using Op – Amp.
12. Built and study astable multivibrator using IC 555.
13. Built and study monostable multivibrator using IC 555.

Lab Course 8-Specific Skill Course-VIII

VOC -322: Fundamental of 8085 Microprocessor

List of Experiment: (At least six experiments have to be performed)

1. Assembly language program to find sum of two 8 bit numbers.
2. Assembly language program to find sum of 8 bit numbers in a given array.
3. Assembly language program to find difference of two given numbers.
4. Assembly language program to find largest/smallest number in a block of data containing N numbers.
5. Assembly language program to find ascending/descending order number in a block of data containing N numbers.
6. Assembly language program to move a block of data from one location to other location.
7. Assembly language program to find a factorial of 8-bit number.
8. Assembly language program to find sum of two 16-bit numbers.
9. Assembly language program to perform one byte BCD addition.
10. Assembly language program to multiply two single byte numbers.

Lab Course 9-Specific Skill Course-IX

VOC -323: Sensor Fundamental

List of Experiment: (At least six experiments have to be performed)

1. Determination of Numerical Aperture of PMMA optical fiber
2. Losses in Optical fiber.
3. Study of Optical to Electrical (O-E) characteristics of fiber optic Phototransistor converter.
4. Study of Electrical to Optical (E-O) characteristics of fiber optic 660nm and 850nm converter.
5. Optical fiber chemical sensor.
6. Study of Potentiometric sensor
7. Study of Displacement sensor
8. Gas sensor based on OCP (organic Conducting Polymers)
9. Gas Sensor based on Single Walled carbon nanotubes (SWNTs)
10. Study of LVDT as displacement Sensor
11. Study of Hall Effect sensor as an event counter

Second Year: Semester IV
General Academic Components

VOC- 401: Business Communication
(4 credit: 100 marks)

Learning Objectives:

- To acquaint students with linguistic practices in business communication
- To provide students with effective business writing skills
- To improve situational analysis capacity in students

Course Outcomes:

On completion of this course, the students will be able to-

- State and use principals of effective writing
- Apply communication as a tool to resolute conflicts
- Analyze a case study
- Categorize communication areas to construct monologues/ dialogues for effective situational communication

Course Contents

Unit I: Introduction to Communication (12 Hrs)

Definition of Communication, Classification, Role; Characteristics of successful communication — Importance of communication in business — Communication structure in organization Communication in conflict resolution; Case Studies

Unit II: Writing Skill (12 Hrs)

Principles of effective writing — Approaching the writing process systematically: The 3X3 writing process for business communication; Writing routine and persuasive letters — Positive and Negative messages Writing Reports, Writing memos, Case Studies

Unit III: Case Analysis (12 hrs)

Different types of cases — Difficulties and overcoming the difficulties of the case method — Reading a case properly (previewing, skimming, reading, scanning) — Case analysis approaches (Systems, Behavioural, Decision, Strategy) — Analyzing the case — Dos and don'ts for case preparation — Discussing and Presenting of Case Studies

Unit IV: Employment Communication (12 Hrs)

Introduction — Composing Application Messages - Writing CVs — Group discussions — Interview skills Impact of Technological Advancement on Business Communication — Technology-enabled Communication - Communication networks — Intranet — Internet — e mails — SMS teleconferencing — videoconferencing; Case Studies

Unit V: Meetings (12 Hrs)

Meetings — Planning meetings — objectives — participants — timing — venue of meetings —

leading meetings. Meeting Documentation: Notice, Agenda, Resolution & Minutes; Case Studies

References:

Text:

1. Business Communication: Concepts, Cases And Applications — Chaturvedi P. D, & Mukesh Chaturvedi ,2/e, Pearson Education,201 1
2. Business Communication: Process and Product — Mary Ellen Guffey,3/e, Cengage Learning, 2002.
3. Communication — Rayudu C. S, Himalaya Publishing House
4. Business Communication — Lesikar, Flatley, Rentz & Pande, 11/e, TMH, 2010
5. Basic Business Communication — Raj Kumar, Excel Books, 2010

Suggested Reading:

1. Advanced Business Communication — Penrose, Rasberry, Myers, *She*, Cengage Learning, 2004.
2. BCOM — Lehman, DuFrene, Sinha, Cengage Learning, 2/e 2012
3. Business Communication — Madhukar R. K, 2/e, Vikas Publishing House.
4. Effective Technical Communication - Ashraf Rizvi M, TMH, 2005.
5. Business Communication - Sehgal M. K & Khetrapal V, Excel Books.
6. Business Communication — Krizan, Merrier, Jones, 8/e, Cengage Learning, 2012.

Second Year: Semester IV
General Academic Components

VOC 402: Financial Managements and Accounts

(4 Credits: 100 Marks)

Learning Objectives:

- To provide students with primary aspects of financial management
- To acquaint students with basic terminologies of finance and accounting
- To introduce students to the basic rules of accounting and journal
- To provide necessary tools so that students can prepare Trading and Profit and Loss A/c and Balance Sheet

Course Outcomes:

On completion of the course, students should be able to

- Explain concepts, terminologies and functioning of financial accounting
- Elaborate accounting terms, equation and journal
- Apply Voucher approach in accounting
- Prepare trading, profit/loss account and balance sheet

Course Content

Unit I: Financial Management- I

(12 Hrs)

Concept and Definition, Purpose of Investment, Types of Capital, Working Capital, Sources of Finance, Reserve, Surplus, Financial Accounting, Book-keeping, Terms used in Book-keeping, Assets, Liabilities, The Journal and the Ledger, Trial Balance, Trading Account

Unit II: Financial Management- II

(12 Hrs)

Financial Statements, Financial Ratios, Sources of Finance, Capital, Working Capital, Capitalization, Capital Structure, Difference between Capital, Capitalisation and Capital Structure, Capital Gearing, Factors affecting Requirements for working capital, Return on Investment, International Financial Management

Unit III: Introduction to Financial Accounting

(12 Hrs)

Accounting-An Introduction: Business transactions, Book-keeping, Accounting and its branches. Nature, functions and objectives of Financial Accounting. Accounting Assumptions-Accounting Concepts: Meaning, concepts: Matching, Accrual, Realisation and Dual Aspect Concept.

Unit IV: Accounting Terms, Accounting Equation and Journal

(12 Hrs)

Accounting Terms-Accounting Equation, Need of Accounting equation, Meaning and

preparation of accounting equation. Rules of Accounting -Journal Meaning, classification of journal into General journal and special journals (with examples). Incorporation of journal entries involving different accounts. Cash Book Meaning, types-Simple Cash Book, Two column Cash Book and Three column Cash Book.

Unit V: Voucher Approach in Accounting and Financial Statements (12 Hrs)

Vouchers and their preparation - Day Book and Subsidiary Day Books -Recording the vouchers into Day Books -Recording the Vouchers into Subsidiary Day Books Ledger Posting of Day Book -Posting of Subsidiary Day -Trial Balance -Errors and their Rectification. Capital and Revenue - Preparation of Trading and Profit and Loss Account and Balance Sheet - Preparation of Trading and Profit and Loss A/c and Balance Sheet (with adjustments).

References:

Text:

1. Accounting Principles -Anthony, R.N., and J.S. Reece, , Richard D. Irwin, Inc.
2. Financial Accounting: Concepts and Applications -Monga, j.R., Mayoor Paper Backs, New Delhi.
3. Advanced Accounts-Shukla, M.C., T.S. Grewal and S. C. Gupta, Vol-I, S. Chand & Co., New Delhi.

Suggested Reading:

1. Advanced Accountancy Vol-1 - Gupta, R.L. and M. Radhaswamy, Sultan Chand & Sons, New Delhi.
2. Financial Accounting- Maheshwari, S.N. and. S. K. Maheshwari, Vikas Publishing House, New Delhi.
3. Advanced Accounting-Tulsian, P.C.; Tata Me Graw Hill, New Delhi.
4. Compendium of Statements and Standards of Accounting- The Institute of Chartered Accountants of India, New Delhi.

Second Year: Semester IV
General Academic Components

VOC -403: Industrial Management

(4 credits: 100 Marks)

Learning Objectives:

- To make students, understand the role of industrial management in organizations
- To enable students to differentiate between strategic and tactical operations/ decisions
- To introduce students with typical managerial decisions under specific situations
- To provide students with basic concepts of JIT and Lean Operations

Course Outcomes:

On completion of the course, students should be able to-

- Explain key terminologies of Industrial Management
- Describe concept and process of organization
- Discuss basic aspects of product development process
- Emphasize of quality of product and process
- Implement JIT practices in operation realm

Course Contents:

Unit I: Industrial Engineering and Management Science (12 Hours)

Concept of Industrial engineering, Roles of Industrial Engineer, Production Management Versus Industrial Engineering, Operation Management, Managerial Economics, Managerial Accounting.

Unit II: Organization (12 Hours)

Concept of organization, importance of organization, The process of organization, principles of organization, organizational structure, types of organization. Departmentation, authority, Delegation of authority, group dynamics, organizational change, organizational development, organizational conflict, managerial leadership, communication system, committees, project organization.

Unit III: Product Design, Planning and Development (12 Hours)

Introduction to product design, effect of design on cost, requirements of a good product design, factors affecting product design, design by imitation, design of specification and drawings, product planning, product classification, product development, standardization, simplification, specialization, diversification, interchangeability, Process Selection, Process Design, Process Analysis.

Unit IV: Inspection and Quality Control

(12 Hours)

Definition and concept, purposes or objectives of inspection, inspection of incoming materials, raw or received material, In process inspection, inspection of finished goods, statistical quality control, probability concept, normal distribution, measures of central tendency, sampling inspection, sampling plans, the zero effect concept, quality circle.

Unit V: JIT and Lean Operations

(12 Hours)

Introduction, The Toyota Approach, Case Studies; Developing the JIT Philosophy, Transitioning to JIT System, JIT in Services, Operations Strategy, Wastes in an Industrial scenario, Concepts of Lean Operations, Case Studies.

References:

Text:

1. Industrial Engineering and Management - O. P. Khanna- Dhanpat Rai Publication.
2. Operations Management — W. J. Stevenson- Mc-Graw Hill Companies

Suggested Reading:

1. General Industrial Management- Henri Fayol.
2. Industrial Management- Bagad V. S.- Technical Publication

Second Year: Semester IV

Skill Development Components

(Specific Skill Course X)

VOC 411: Analog Communication Systems

(4 Credits: 100 marks)

Learning Objectives:

- The fundamentals of signals & linear time invariant systems used in communication systems.
- Knowledge of probability, random variables & random processes
- In depth knowledge of different types of analog communication system and different modulation techniques used in these systems.
- Analysis of noise and its impact on different modulation techniques.

Course Outcomes:

On Completion of this course the students will be able to:

- Analyze analog communications in time domain and frequency domain.
- Distinguish between different analog modulation techniques.
- Understand the importance of noise considerations in communication systems.

Unit I: Modulation Techniques

(15 Hrs)

Modulation Techniques Various frequency bands used for communication, Types of Communication and need of modulation. Introduction to AM, FM, PM, frequency spectrum of AM Waves, Representation of AM, Power relation in AM waves, Need and description of SSB, Suppression of carrier, Suppression of unwanted side-bands, independent sideband system, Vestigial sideband system, Mathematical representation of FM, Frequency spectrum of AM waves, Phase Modulation, Comparison between analog and digital modulation, wideband and narrow band FM.

Unit II: AM Transmitters and Receivers

(15 Hrs)

AM Transmitters: Generation of AM, low level and high-level modulation, comparison of levels, AM transmitter block diagram, collector class C modulator, Base Modulator, Transistor Vander Bil modulator, DSB S/C modulator. AM Receiver: Tuned radio frequency (TRF) receiver. Super heterodyne receiver, RF section and characteristics, mixers, frequency changing and tracking, IF rejection and IF amplifiers. Detection and automatic gain control (AGC), AM receiver characteristics.

Unit III: FM Transmitters and Receivers

(12 Hrs)

FM Transmitters: Basic requirements and generation of FM, FM Modulation methods: Direct methods, Variable capacitor Modulator, Varactor Diode Modulator, FET Reactance Modulator, Transistor Reactance Modulator, Pre-emphasis, Direct FM modulator, AFC in reactance modulator, Disadvantages of direct method, Indirect modulators, RC-phase shift modulators, Armstrong FM systems. FM Receivers: Limiters, single and double-tuned demodulators, balanced slope detector, Foster-Seely or Phase Discriminator, De-emphasis, ratio Detector, Block diagram of FM Receivers, RF Amplifiers, FM Receiver characteristics.

Unit IV: SSB Transmitters and Receivers

(08 Hrs)

Generator of SSB, balanced modulator circuit, filter method, phase shift method, third method, Phase cancellation method, Demodulation of SSB, product demodulator, Diode detection technique of SSB.

Unit V: Pulse Modulation Techniques

(10 Hrs)

Pulse amplitude modulation and demodulation, Pulse width modulation and demodulation, Pulse position modulation and demodulation, Sampling theorem, Time Division Multiplexing, Frequency Division Multiplexing.

Text Books:

1. Electronic communication systems by George Kennedy.
2. Principle of communication systems by Taub and schilling.
3. Electronics and Radio Engineering – M L Gupta, Dhanpat Rai & Sons.
4. Electronic Communications [IV Edition] –Dennis Roddy & J Coolen, PHI Private Ltd, New Delhi
5. Advanced Electronic Communication Systems –Wayne Tomasi, PHI publication 2001.
6. Introduction to Telecommunication –A A Gokhale, Thomson Learning.

Second Year: Semester IV
Skill Development Components

(Specific Skill Course XI)

VOC 412: 8086 Microprocessor and interfacing

(4 Credits: 100 marks)

Learning Objective:

Students will be able to-

- Understand outline the history of computing devices.
- Describe the architecture of 8086 microprocessors.
- Develop programs for microprocessor and interface with input and output devices.

Course Outcomes:

At the end of the course, students will develop ability to-

- Define the history of microprocessors.
- Describe the architectures of 8086 microprocessors.
- Draw timing diagram and write programs using 8086
- Distinguish between the different modules of operation of microprocessors.
- Evaluate the appropriateness of a memory expansion interface based on the address reference with particular application.
- Apply the above concepts to real world electrical and electronics problems and applications.

Course Contents

Unit I: The 8086 Microprocessor

(12 Hrs)

Generation of Microprocessor, registered organization of 8086, features of 8086, Pin diagram (Signal Description), CPU architecture, Physical Memory Organisation, general bus operation, I / O processing capability, special processor activities, minimum mode 8086 system and timing, maximum mode 8086 system and timing

Unit II: The 8086 Microprocessor Instruction set

(12 Hrs)

Machine language instruction formats, addressing modes of 8086, Data copy / transfer instructions, Arithmetic instructions, logical instruction, Branch instructions, loop instructions, machine control instructions, Flag manipulation instructions, Shift and rotate instructions, String instructions

Unit III: Assembly language programming

(12 Hrs)

Assembly language programs- addition of two numbers, addition of a series of 8 bit numbers, find the largest number from given array of 8 bit numbers, find out odd and even numbers from the given series of hexadecimal numbers, find out positive numbers and negative numbers from

a given series of signed numbers, move a string of data from one location to other location, arrange given array of 8 bit numbers in ascending order, arrange given array of 8 bit numbers in descending order, one byte BCD addition, factorial of a 8 bit number , average of block of 8 / 16 bit data.

Unit IV: Interface with 8255 and 8251

(12 Hrs)

Features of 8255, PIO 8255 pin diagram and architecture, modes of operation of 8255, Interfacing ADC, interfacing of DAC.

Communication Interface-Features of 8251, Methods of data communication, architecture and signal description, operating modes, interfacing and programming of 8251

Unit V: Interface with 8253 and 8257

(12 Hrs)

Features of 8253 Pin diagram and architecture, control word, operating modes, programming and interfacing 8253.

DMA 8257- pin description, block diagram, operating modes, programming and interfacing 8257.

Books Recommended:

1. Advanced Microprocessors and Peripherals (Second Edition) – A K Ray & K M Bhurchandi Tata McGraw Hill 2009
2. The INTEL Microprocessors 8086 /8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Processor –Barry B. Brey Printice-Hall INDIA
3. Microprocessors – S. K. Gupta Pragati Prakashan Meerut
4. Microprocessors – II –A. P. Godse Technical Publications PUNE

Second Year: Semester IV

Skill Development Components

(Specific Skill Course XII)

VOC 413: Properties of Electronic Materials

(4 Credits: 100 marks)

Learning Objective:

- To make students to understand basic phenomenon as conductivity, reflection and absorption
- To introduce students to electrical, dielectric, optical and magnetic properties of metal oxides and polymers

Course Outcomes:

After completion of the course students will be able to -

- Understand basic phenomenon as conductivity, reflection and absorption
- Understand electrical, dielectric, optical and magnetic properties of materials
- Analyze the order of magnetic materials
- Screen the wide range of materials for desired application
- Enable to understand the defects in crystals and their effects on various properties

Course Contents:

Unit - I: Electrical Properties of Metals

(10 Hrs.)

Conductivity, reflection and absorption, Fermi surfaces, superconductivity, thermoelectric phenomena, Conduction in metals oxides, amorphous materials

Unit - II: Dielectric Properties of Materials

(10 Hrs.)

Macroscopic electric field, local electric field at atom, dielectric constant and polarizability, ferroelectricity, antiferroelectricity, phase transition, piezoelectricity, ferroelasticity, electrostriction.

Unit - III: Optical Properties of Materials

(15 Hrs.)

Optical constants and their physical significance, Kramers – Kronig Relations, Electronic inter bond and intra bond transitions, Relations between Optical properties and band structure – colour of material (Frenkel Excitons), Bond Structure determination from optical spectra reflection, refraction, diffraction, scattering, dispersion, photoluminescence, Electroluminescence.

Unit - IV: Magnetic Properties of Materials

(15 Hrs.)

Dimagnetism, paramagnetism, various contributions to para and dia magnetism, Adiabatic demagnetization, Paramagnetic susceptibility; Ferromagnetism, ferrimagnetism, ferrites, antiferromagnetism, Curie point, temperature dependence of saturation magnetization, saturation magnetization at absolute zero, magnons and their thermal excitation, dispersion relation, Neutron Magnetic scattering, Ferrimagnetic and antiferrimagnetic order, domains and domain walls, magnetic resonance. Coercive force, hysteresis, methods for parameters measurements

Unit – V: Polymers:

(10 Hrs.)

Structure of polymers, polymerization mechanism, characterization techniques, optical, electrical, thermal and dielectric properties of polymers. Defects in crystals and their effects on mechanical, electrical and optical properties; Diffusion in materials

References:

1. Electronic Properties of materials, R. E. Hummel Springer New York publication
2. Solid State Physics, Dekkar, Mcgraw Higher Ed publication
3. Introduction to Solid State Physics, C. Kittel, Wiley publication
4. Solid State Physics, Ashcroft, Mermin, Cengage Learning Publication
5. Principles of Electronic materials & dev, S. O. Kasap, Mcgraw Higher Ed Publication
6. Elementary Solid state physics, M. Ali Omar; Pearson Publication.

Second Year: Semester IV

Skill Development Components

Lab Course 10-Specific Skill Course-X VOC -421: Analog Communication Systems

List of Experiment: (At least six experiments have to be performed)

1. To design and implement Amplitude modulator and Demodulator.
2. To design and implement DSB-SC modulator using Balance modulator.
3. To implement a Phase Lock Loop circuit and calculate it's Specifications.
4. To design and implement Frequency Modulator and Demodulator
5. To design and implement Frequency Division Multiplexer and De-multiplexer
6. To design and implement Pulse Amplitude Modulator (PAM) and Demodulator.
7. To design and implement Pulse Width Modulator (PWM)
8. To design and implement Pulse Position Modulator (PPM)
9. To design and implement sample and hold circuit.
10. To design and obtain the characteristics of a mixer circuit.
11. To design and implement the Pre-emphasis and De-emphasis circuits

Second Year: Semester IV

Skill Development Components

Lab Course 11-Specific Skill Course-XI

VOC -422: 8086 Microprocessor and interfacing

List of Experiment: (At least six experiments have to be performed)

1. Write an ALP for Addition, subtraction, multiplication and division of two 8-bit numbers using 8086 microprocessor.
2. Write an ALP for Data transfer using 8086 microprocessor.
3. Write an ALP for Sum of series using 8086 microprocessor.
4. Write an ALP to find Factorial of a number using 8086 microprocessor.
5. Write an ALP to find Square of a number using 8086 microprocessor.
6. Write an ALP to arrange number of array for Ascending/descending order using 8086 microprocessor.
7. Write an ALP to find square of number using 8086 microprocessor.
8. Interfacing of SPDT switches using 8086 microprocessor.
9. Interfacing of DC motor
10. Interfacing of DAC to generate ramp wave, triangular wave and square wave.

Second Year: Semester IV
Skill Development Components

Lab Course 12-Specific Skill Course-XII

VOC -423: Properties of Electronic Materials

List of Experiment: (At least six experiments have to be performed)

1. Study of band gap of semiconductor using 4 probe method
2. Study the dielectric constant of solids as a function of temperature
3. Study of verification of the Curie law
4. Study of variation of resistivity of given specimen using 4-probe method and determination of its energy bandgap
5. Recording of spectra of given specimen using spectrophotometer
6. Polymerization and study of electrical (I/V) and optical properties of given polymer.
7. Study of reflectance, absorbance and transmission spectra of given specimen.
8. Determination of magnetic susceptibility of diamagnetic and paramagnetic samples using Guoy balance method
9. Study of variation of dielectric constant as a function of temperature and verification of the Curie law and determination of the Curie temperature
10. Study of variation of photoconductivity using polarized light.

Bharat Shikshan Sanstha's

**Shri Chhatrapati Shivaji College, Omerga. Dist. Osmanabad-
413606**

**(Affiliated to Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad.)**



**B. VOC. in
(Electronic Manufacturing Services)**

Syllabus V & VI Semester

Effective From 2022-23

Dr. Chak

20/6/22
Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

B.VOC. in Electronic Manufacturing Services

Third Year: Semester V

Sr. No.	Course Code	Name of the Course	Contact Hours Per Week		Evaluation Scheme		Credit
			L	P	CIA	SEE	
Semester- V		General Academic Components					
1	VOC 501	Personality Development and Stress Management	04	0	20	80	4
2	VOC 502	Audio and Video Systems	04	0	20	80	4
3	VOC 503	PC Software	04	0	20	80	4
Semester -V		Skill Development Components					
4	VOC 511	Power Electronics	04	0	20	80	4
5	VOC 512	Embedded system and Interfacing	04	0	20	80	4
6	VOC 521	Lab Course 13- Power Electronics	0	04	25	25	2
7	VOC 522	Lab Course 14- Embedded system and Interfacing	0	04	25	25	2
8	VOC 541	Major Project-I	0	12	75	75	6
Total			20	20	225	525	30

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 29/5/22
 Dean
 Faculty of Science & Technology
 Dr. Babasaheb Ambedkar Marathwada
 University, Aurangabad

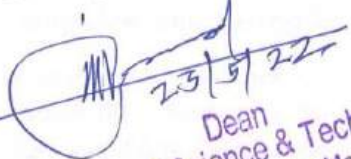
B.VOC. in Electronic Manufacturing Services

Third Year: Semester VI

Sr. No.	Course Code	Name of the Course	Contact Hours Per Week		Evaluation Scheme		Credit
			L	P	CIA	SEE	
Semester VI		General Academic Components					
1	VOC 601	Entrepreneurship Development	04	0	20	80	4
2	VOC 602	Research Methodology	04	0	20	80	4
3	VOC 603	Mobile & Smart Phone Repair and Maintenance	04	0	20	80	4
Semester VI		Skill Development Components					
4	VOC 611	Instrumentation	04	0	20	80	4
5	VOC 612	Programmable Logic Controllers	04	0	20	80	4
6	VOC 621	Lab Course 15- Instrumenation	0	04	25	25	2
7	VOC 622	Lab Course 16- Programmable Logic Controllers	0	04	25	25	2
8	VOC 631	In-Plant Training* (Summer training)	0	120	50	50	4
9	VOC 641	Major Project-II	0	12	75	75	6
Total			20	20	275	575	34

*Students have to undertake 120 contact hours internship in respective industry during summer vacation at the end of each academic year. This is off campus activity.

*Students should submit report of the in-plant training within seven (07) days after completion of training.



 Dean
 Faculty of Science & Technology
 Dr. Babasaheb Ambedkar Marathwada
 University, Aurangabad

B. VOC. Third Year: Semester V
General Academic Components

VOC -501: Personality Development and Stress Management

(4 Credits: 100 Marks)

Learning Objectives:

- To enable the students to understand the necessity of a pleasant personality.
- Equip students with stress handling practices.
- Provide effective verbal and non-verbal communication skills to students.
- Provide effective interview, group discussion and professional skills necessary for global job sector to students.

Course Outcomes:

On completion of the course, students should be able to-

- Recognize self-management and interpersonal management skills
- Identify habits leading to stress.
- Implement effective verbal and non-verbal communication skills in professional and personal realm.
- Apply appropriate interview and group discussion skills.

Course Contents:

Unit I: Changed Approach to Learning (12 Hrs.)

Introduction, planning and goal setting, understanding people, self-management skills, developing potential and self-actualization, need achievement, conflict resolution skills-seeking Win-Win situation, Interpersonal conflicts, Types of Conflict, Conflict resolution.

Unit II: Stress and Habits (12 Hrs.)

Introduction, type of stress-self-awareness about stress, regulating stress- Making the best out of stress, stress coping strategies, Habits-guiding principles, identifying good and bad habits, Habit cycle, Breaking bad habits, Zeigarnik effect for productivity and personal growth, forming habit of success.

Unit III: Effective Communication (12 Hrs.)

Introduction, Barriers to communication- arising out of sender's/ Receiver personality, Interpersonal transactions, Miscommunication; Non-verbal communication, introduction and importance, issues and types, basics and universals, interpreting non-verbal Cues.

Unit IV: Becoming a Professional

(12 Hrs.)

Importance of Body Language, Body language-for interview, for group discussion, presentation skills for a professional, Role of body language during presentation, using visuals in presentation, effective reading; Developing trust and Integrity.

Unit V: Tutorial, assignments and presentation based on UNIT I to IV. (12 Hrs.)

References:

1. Personality Development and Soft Skills- Barun Mitra; Oxford University Press, 2012; ISBN 9780198066217
2. Personality Development and Soft Skills: Preparing for Tomorrow-S. Kapoor, Willey India; 2016; ISBN: 9789389583090
3. Effective Communication Skills- Dr. M. Sinha; Avishkar publishers: ISBN: 978-8179103500
4. MTD Training-Effective Communication Skills; MTD Training and Ventus publishing APS; ISBN: 987-87-7681-598-1.
5. Managing Stress- Ann Edworthy; Open University Press
6. Stress management- P. K. Datta, Himalaya Publishing House Pvt. Ltd. ISBN: 978-81-8488-607-8

B. VOC. Third Year: Semester V

General Academic Components

(Generic Skill-V)

VOC 502: Audio and Video Systems

Learning Objectives:

- The learners will be groomed up to understand different channel allocations, difference between various systems present in this world, their transmission and reception techniques.
- Students will get insight on functioning of individual blocks, different standards of compression and they will be acquainted with different types of analog, digital TV and HDTV systems.
- The students will get overview of fundamentals of Audio systems and basics Acoustics

Course Outcomes:

After completion of the course the student will able-

- To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver, Picture Tubes and Television Camera Tubes.
- To study the various Colour Television systems with a greater emphasis on television standards.
- To study the advanced topics in Digital Television and High-Definition Television.
- To study audio recording systems such CD/DVD recording, Audio Standards, and Acoustics principles.

Course Contents:

Unit-I: Acoustics, Microphone and Recording

Acoustics: Brief idea of sound, Amplitude, frequency and wave length.

Microphone and Loudspeaker: Characteristics of Microphone and Loud speaker. Principle of operation of microphone and loud speaker. Brief idea of head phone, wireless microphone, woofer, squawker, sub - woofer and tweeter. Cross - over network, two -way and three - way network, bass - reflex system, baffle and enclosure.

Digital Recording: Principle of digital recording, different kinds of digital storage, ICs, card, HD etc. Storage on CD, VCD, DVD and blue ray disk.

Unit – II: Sound System and Public Address System

Stereo sound system: Principle of recording and reproduction, Bass, Treble, volume and balance control, Graphic Equalizer. Noise and Distortion, Dolby system, Hi - fi stereo, quadraphonic sound, 5. 1 channel sound system.

Public Address system: Basic principle, requirements of PA system. Working of PA system with associated controls.

Unit-III: Transmission of CCVS and TV Receiver

Transmission of CCVS: Primary colours, Mixing of colours, meaning of R - Y, G - Y, B - Y, U, V etc. Transmission of CCVS. Colour burst signal, CCVS for 1 - scanning line.

TV Receiver sub - sections: Tuner, IF sub - system, Deflection processor & synchronizing, Luminance processing, AGC and AFT, Deflection amplifiers, Monochrome picture tube, Colour picture tube, Chroma signal processing, Video output and R- G - B amplifiers, Remote control & OSD, System control & memory, SMPS.

Unit-IV: Satellite TV

Off - set dish, Alignment of dish as per look angle, Global coverage of TV transmission, UP Link, Down link and foot print, Components of satellite, satellite bands - C band and KU band frequencies, DTH broadcasting system, broadcasting parameters. Components of SDU, Components of MDU, Cable TV system, CAS.

Unit- V: Advanced TV Technology

Advanced TV Technology: Digital TV system, Projection TV & video projector, DVBH and DVBT, LCD TV Technology, LCD Display panel, Plasma display panel, LED TV, IPTV, Features of latest TV, CCTV and DVR.

CD/VCD/DVD: Features of VCD & DVD, DVD Encoding process, DVD decoding process, DVD format, DVD types, DVD HT

Digital wireless audio transmission, DVD input and out ports, servo, pick up unit. Blue ray disks.

Reference Book

1. Monochrome and Colour TV, R. R. Gulati
2. CTV Principle and Practice, R. R. Gulati
3. Audio and Video System, R. G. Gupta

B. VOC. Third Year: Semester V

General Academic Components

(Generic Skill-VI)

VOC 503: PC Software

Learning Objectives:

- The objective of this subject is to familiarize students with Fundamentals of Information Technology and its applications. It enables the student to get practical exposure towards MS - Office tools.
- Give students an in-depth understanding of why computers are essential components in business, education and society.
- Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.

Course Outcomes:

Upon completion of this course, the student will be able apply technical knowledge and perform specific technical skills, including:

- Describe the usage of computers and why computers are essential components in business and society.
- Utilize the Internet Web resources and evaluate on-line e-business system.
- Solve common business problems using appropriate Information Technology applications and systems.
- Identify categories of programs, system software and applications. Organize and work with files and folders.
- Describe various types of networks network standards and communication software.

Course Contents

Unit I: DOS

(12 Hrs.)

Versions of DOS: Booting sequence; Warm and cold reboot, Concept of file and directory, redirecting command input and output pipes, Wildcard characters, Types of DOS commands: Internal and External; Internal Commands: DIR, MD, CD, CLS, COPY, DATE, DEL, PATH, PROMPT, REN, RD, TIME, TYPE, VER, VOL; External Commands: XCOPY, ATTRIB, BACKUP, RESTORE, FIND, SYS, FORMAT, CHKDSK, DISKCOPY, LABEL, MOVE, TREE, DELTREE, DEFRAG, SCANDISK, UNDELETE. Batch Files: Introduction to simple batch files; Introduction to CONFIG. SYS and AUTOEXEC. BAT files.

Unit II: Graphical User Interface

(12 Hrs.)

Fundamentals of windows, types of windows, anatomy of windows, Icons, Recycle bin
Operations on window: Opening a Window, Minimizing and Maximizing a window, Moving window, Resizing Window, Closing the window windows explorer Folders: Creating and deleting folders, copying, renaming folders, folder properties. Control panel.

Unit III: Word Processing Package

(12 Hrs.)

Basics of Word processing, Opening and Closing of documents; Text creation and Manipulation; Finding and replacing text, Printing of document, Formatting of text; Margin setting, Adding Borders and shading, Adding Headers and Footers, setting up Multiple columns, Working with tables, Spell check, Grammar facility, Auto text, language setting and thesaurus; Mail merging. Installation of Word Processing Software.

Unit IV: Spreadsheet Package

(12 Hrs.)

Worksheet Basics, Data Entry in Cells: Entry of numbers, text and formulae, Moving data in a worksheet, workbooks, Cell referencing; Formatting and Calculations: using Auto fill, Working with Formulae, Efficient Data Display with Data formatting (number formatting, date formatting etc.), Working with Ranges, Worksheet Printing; Working with Graphs and Charts : Creating Embedded Chart using char wizard, sizing and moving parts, updating charts, Changing chart types, Chart wizard, Adding Titles, Legends and Gridlines, Printing Charts; Database Management.

Unit V: Presentation Packages

(12 Hrs.)

Basics, General Features, creating a presentation, formatting and enhancing text, Incorporation of Animation, adding charts, multimedia, page setup and printing slides. Installation of Presentation software. Internet and WWW: Evolution of Internet, services provided on Internet, Access Methods, application of Internet.

Books Recommended:

1. Mathur Rajiv, 1996: Learning Word 6 for Windows Step - by - Step, Galgotia.
2. Mathur Rajiv, 1996: Learning Excel 5 for Windows Step - by - Step, Galgotia.
3. Jamsa, Kris A. , 1993: Rescued by Windows 3. 1, Galgotia. 5. Basandra, S. K. , 1995
4. Computers Today, Galgotia.
5. Kasser, Barbara, 1998: Using the Internet, PHI, 4th ed. , New Delhi.
6. Wall, David A. & Others, 1996: Using the World Wide Web, PHI, 2nd ed., New Delhi.

B. VOC. Third Year: Semester V

Skill Development Components

Specific Skill Course-XIII

VOC-511: Power Electronics

Learning Objectives:

- To introduce students to the basic theory of power semiconductor devices and passive components, their practical applications in power electronics.
- To familiarize students to the principle of operation, design and synthesis of different power conversion circuits and their applications.
- To provide strong foundation for further study of power electronic circuits and systems.

Course Outcomes:

At the end of the course, a student will be able to:

- Relate basic semiconductor physics to properties of power devices, and combine circuit mathematics and characteristics of linear and non-linear devices.
- Describe basic operation and compare performance of various power semiconductor devices, passive components and switching circuits
- Formulate and analyze a power electronic design at the system level and assess the performance.
- Identify the critical areas in application levels and derive typical alternative solutions, select suitable power converters to control Electrical Motors and other industry grade apparatus.
- Recognize the role power electronics play in the improvement of energy usage efficiency and the applications of power electronics in emerging areas.

Course Content:

Unit I: Thyristor: Principles and Characteristics

(12 Hrs.)

Introduction, principle of operation of SCR, static anode-cathode characteristics of SCR, two transistor analogy, construction, gate characteristics, turn-on methods, turn-off mechanism,

thyristors parameters, comparison between transistors and thyristors. Unijunction transistor, Diac, Triac, IGBTs.

Unit II: Detection Sensors

(12 Hrs.)

Limit switches, proximity detectors, inductive proximity switches (ports, output stages, operation), capacitive proximity switches, photoelectric sensors, methods of detection, operating specifications, sensor interfacing- electromagnetic relays, resistive load, inductive load, solid state relay, two wire system.

Unit III: D.C. Drives

(12 Hrs.)

Introduction, basic machine equations, DC motor speed control, braking operation of rectifier controlled motor, single phase series DC motor drives, three phase separately excited drives, DC choppers drives

Unit IV: A. C. Drives

(12 Hrs.)

AC drive fundamentals, AC drive system, drive controller internal circuitry, circuit operation of AC drive, PWM control methods, Control panel input drive functions, inverter self-protection function, motor braking.

Unit V: Choppers

(12 Hrs.)

Introduction, basic chopper classification, operation, control strategies, chopper configuration, thyristor chopper circuits, Jones chopper, Morgan Chopper, A. C. Choppers, source filter, multiphase chopper.

Books Recommended:

1. Industrial electronics: Circuits, instruments and control techniques, Terry Bartelt, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2009
2. Introduction to power electronics- V Jagannathan, PHI, New Delhi, 2004.
3. Power Electronics- M. D. Singh and K. B. Khanchandani, Tata McGraw-Hill publishing Company Ltd. New Delhi.

B. VOC. Third Year: Semester V

Skill Development Components

Specific Skill Course-XIV

VOC-512: Embedded System and Interfacing

Learning Objectives:

Students will facilitate to –

- understand and explain microcontroller architecture, programming and interfacing
- analyze the process of industrial automation and design automation system using microcontroller
- provide an opportunity to the students to enter into entrepreneurship

Course outcomes:

After completion of the course students will be able to -

- Design and develop automated system based on 8051 Microcontroller
- Apply the basics of number system to solve arithmetic and logical operations of 8051 microcontroller.
- Develop assembly language programming for 8051 microcontroller.
- Analyse and debug assembly language programme for 8051 microcontroller
- Interface I/O devices

Course Contents:

Unit - I: 8051 Microcontroller

(12 Hrs.)

An introduction: microprocessors and microcontrollers, comparing microprocessors and microcontrollers, a microcontrollers survey, development system for microcontrollers, 8051 oscillator and clock, program counter and data pointer, A and B CPU registers, flags and program status word, internal memory, internal RAM, the stack and the stack pointer, special function registers, internal ROM; Input/ Output pins, ports and circuits: port pin circuits, port 0, port 1, port 2, port 3; external memory, counters and timers, serial data input/ output, interrupts.

Unit - II: Moving data and logical operations

(12 Hrs.)

Move operation: Introduction, addressing modes, external data moves, code memory read only data moves, push and pop op-codes, data exchange, simple programs, logical operation: Introduction, byte level logical operations, bit level logical operation, rotate and swap operations, examples programs.

Unit - III: Arithmetic operations, Jump and call instruction

(12 Hrs.)

Introduction, flags, instructions affecting flags, incrementing and decrementing, addition: unsigned and signed, multiple byte signed arithmetic, subtraction: unsigned and signed subtraction, multiplication and division, decimal arithmetic, examples programs; Introduction,

to the jump and call program range, relative range, short absolute range, long absolute range, jumps, byte jumps, unconditional jumps, calls and subroutine, subroutines, calls and the stacks, calls and returns, interrupts and returns, examples problems.

Unit - IV: 8051 Interfacing

(12 Hrs.)

Interfacing 8051 microcontroller to simple switch, LED, 7-segment display, DAC, ADC, LCD, matrix keyboard and Stepper motor as well as their Assembly language programming.

Unit- V: Applications of MCS-51

(12 Hrs.)

Pin diagrams of 89C51 and 89C2051, square wave generation, pulse generation, staircase ramp generation, pulse width measurement.

Books Recommended:

1. Mazidi M. A., Mazid J. G. I and McKinlay R. D- The 8051 microcontroller and embedded system – Pearson, 2nd edition 2013
2. 8051 architecture, programming and interfacing K. J. Ayala; pen ram international
3. Peat man John B – Design with microcontroller, pearson edition asia, 1998
4. Burns, alan and wellings, andy, real time systemand programming languages, 2013, harlow; Addison- Wesley
5. Raj kamal – embedded systems, TMH, new Delhi

B. VOC. Third Year: Semester V

Skill Development Components

(Lab Course 13-Specific Skill Course-XIII)

VOC 521- Power Electronics

List of Experiment: (At least six experiments have to be performed)

1. Study of SCR characteristics.
2. Study of UJT characteristics.
3. Study of DIAC characteristics.
4. Study of TRIAC characteristics.
5. Study of IGBT characteristics.
6. Study of firing of two SCRs using one UJT for power control.
7. Study of Triac as light dimmer.
8. Half wave and Full wave rectifier using SCR.
9. Diac operated temperature sensitive switch using thermistor.
10. UJT as relaxation oscillator
11. Study of inductive switch
12. Study of capacitive switch.

B. VOC. Third Year: Semester V

Skill Development Components

(Lab Course 14-Specific Skill Course-XIV)

VOC 522- Embedded System and Interfacing

List of Experiment: (At least six experiments have to be performed)

1. Addition, subtraction, multiplication, and division using 8051 microcontroller trainer.
2. Data transfer using 8051 microcontroller trainer.
3. Sorting of data (Ascending/Descending), using 8051 trainer kit.
4. Obtaining square root of number using 8051 trainer kit.
5. Find maximum and minimum number using 8051 trainer kit.
6. Program for temperature control interface using 8051 microcontroller.
7. Program to interface simple switch and LED using 8051 microcontroller
8. Program to interface seven segment display using 8051 microcontroller
9. Program for analog to digital converter interfacing using 8051 microcontroller.
10. Program to generate ramp, square and triangular wave using DAC interfaced to 8051 microcontroller.
11. Program for interfacing stepper motor with 8051 microcontroller.
12. Program to interface an LCD using 8051 microcontroller.
13. Program to interface matrix keyboard using 8051 microcontroller.

B. VOC. Third Year: Semester V

VOC- 541 Major Project-I

Guidelines:

1. Every student or group of maximum four students should undertake a project work under the guidance of teacher allotted.
2. The project work could be theoretical on trouble shooting, design, development, fabrication of model, implementing a research paper or application of advanced electronic material.
3. It is essential that the student should concentrate on need, feasibility, economy, usefulness, effects on environment and global warming.

4. The students should get their project topic approved by the project committee under the leadership of project in charge/ HOD appointed by Principal.
5. Students has to collect information from hand book, research journals, reference books, proceeding of conference through library or internet.
6. Student should prepare a spiral binding report with detail schedule of activities planned for completion of project and its presentation similar to the seminar report and shall be presented by all the partners dividing presentation among them at the time of examination in presence of guide and external examiner.
7. It is compulsory to continue with same project in next semester and copy of report shall be produced at the time of final dissertation.
8. Student will prepare paper / project to participate in state level / National / International competition. The projects participated shall get additional benefit in final semester based on certificate of participation.
9. It is recommended to follow schedule of activities planned and accordingly have to work for completion of project under the guidance of allotted teacher.
10. Regular monitoring and guidance are expected to complete project in specified duration.
11. Pre-demonstration session shall be arranged at the term end, in order to observe completion of project, corrections, shall be done by guide and committee. Suggestions are to be given for minor improvement in the project/ project report. (If any).
12. Projects / project report must be ready in all respect at the time of final dissertation. Term work marks will be allotted based on pre-demonstration performance, presentation and percentage of theme achieved.
13. Practical examination shall be based on final demonstration / presentation, performance and percentage of theme achieved.

B. VOC. In Electronic Manufacturing Services

Third Year: Semester VI

General Academic Components

VOC -601: Entrepreneurship Development

(4 Credits: 100 Marks)

Learning Objectives:

- to develop and strengthen the entrepreneurial quality,
- to motivate them for achievement and to enable participants to be independent, capable, promising businessmen.
- The objective is to make the trainees prepared to start their own enterprise after the completion of the training program.

Course outcomes:

After studying this course, you should be able to:

- understand the nature of entrepreneurship
- understand the function of the entrepreneur in the successful, commercial application of innovations
- confirm an entrepreneurial business idea
- identify personal attributes that enable best use of entrepreneurial opportunities
- explore entrepreneurial leadership and management style.

Unit I: Entrepreneurial Development Perspective

(12 Hrs.)

Evaluation of the concept of entrepreneur, concepts of Entrepreneurship development, Entrepreneur Vs. Entrepreneur, Entrepreneur Vs. Entrepreneurship, Entrepreneur Vs. Manager, Attributes and characteristics of a successful entrepreneur, role of entrepreneur in development of Indian Economy.

Unit II: Business Organizations

(12 Hrs.)

Meaning, types of business organization-sole proprietorship, partnership, Co-operative society, Joint-stock company, selection of an appropriate form of business organization.

Unit III: Creating Entrepreneurial Venture

(12 Hrs.)

Business planning process, Environmental analysis- search and scanning Identifying problems and opportunities, Defining business Idea.

Unit IV: Project Identification and Report

(12 Hrs.)

Concept of project, project identification, formulation, appraisal, selection implementation and management, preparation of project report.

Unit V: Tutorial, assignments and presentation based on UNIT I to IV. (12 Hrs.)

Books Recommended:

- 1) The Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, Mumbai, 6th Edition, 2010.
- 2) Entrepreneurial Development, Khanka S. S., Chand and Company Ltd, New Delhi, Third Revised Edition, 2001.
- 3) Entrepreneurship Development, Prof. E. Gordon and K. Natarajan.
- 4) Entrepreneurship Development- Theories and Practices, N. P. Singh.
- 5) Entrepreneurship and Entertainment Development-M. Gangadhar Rao.

B. VOC. Third Year: Semester VI
General Academic Components

(Generic Skill VII)

VOC -602: Research Methodology

(4 Credits: 100 Marks)

Learning Objectives:

- To define research and describe the research process and research methods
- To understand qualitative research and methods used to execute and validate qualitative research
- To know how to apply the basic aspects of the research process in order to plan and execute a research project.
- To provide insight into the processes that lead to the publishing of research.
- To be able to present, review and publish scientific articles

Course Outcomes:

Students will be able to -

- understand and explain research process
- do systematic literature survey, formulation of a research topic, study design, analysis and interpretation of data.
- to design a research approach for a specific research issue of their choice.
- select a suitable analytical method for a specific research approach.
- demonstrate a good understanding of how to write a research report.
- critically assess published quantitative research with regard to the statistical methods and approaches adopted
- create a research document for implementation research project

Course Contents:

Unit - I: Research Fundamentals:

(12 Hrs.)

Introduction: Definition, objectives of the research, characteristics of the research, what makes people to do research, importance of research,

Unit - II: Identification of Research Problem

(12 Hrs.)

Defining the research problem: Identification of research problems, selection of research problem, facts one should know regarding selection of research problem, the process of research problem definition, some facts involved in defining research problem, Case Studies

Unit - III: Formulation of Research Problem

(12 Hrs.)

Formulation of the problems: steps involved in defining a problem, formulation of the problems, Formulation of hypothesis: Concept of hypothesis, hypothesis testing, Developing the research plan: implementation, interpreting and reporting the findings, Importance of hypothesis in decision making, Case Studies.

Unit - IV: Research Report and Proposal Writing

(12 Hrs.)

Introduction, research proposal writing: costing, the research proposal, rationale for the study, research objectives, research methodology, target respondents, research Centres, sample size and sample composition, sampling procedures, research project execution, research units; An insight into research report and proposal, research project synopsis, research report writing :

types of research reports, guidelines for writing reports; Steps in writing report, report presentation, typing the report, documentation and bibliography, formatting guidelines for writing a good research report / research paper, Case Studies.

Unit - V: Presentations, case studies, Assignments, Tutorials based on Module I to IV (12 Hrs.)

Books Recommended:

- 1) Research Methodology by Dr. S. L. Gupta, Hitesh Gupta; International Book House Pvt Ltd (2013), ISBN-10: 8191064278, ISBN-13: 978-8191064278
- 2) Basic Research Methods-Gerard Guthrie SAGE Publications, India, Pvt Ltd, New Delhi (2010), ISBN-10: 8132104579, ISBN-13: 978-8132104575
- 3) Research Methodology-methods and techniques By C. R. Kothari, New Age International Publishers (2011) ISBN 978-81-224-1522-3
- 4) Principles of Research Methodology- Phyllis G. Supino, Jeffrey S. Borer; Springer, Verlag New York (2012), ISBN-ebook: 1461433592, ISBN (Hardcover): 978-1461433590
- 5) Research Design Qualitative, Quantitative. and Mixed Methods Approaches- John W. Creswell; SAGE Publications Ltd, UK (2011), ISBN-9780857023452
- 6) Research Methodology -A Step-by-Step Guide for Beginners- Ranjit Kumar; Sage Publications Ltd. (2010), ISBN- 1849203016.
- 7) Scientific Writing and Communication- Angelika Hofmann; Oxford University Press, US (2010), ISBN-13-: 978-0 199947560, ISBN-10: 01 99947562
- 8) Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded- Joshua Schimel, Oxford University Press, (2011), ISBN: 9780199760237
- 9) Handbook of Scientific Proposal Writing- A.YavuzOruc; CRC Press, Taylor & Francis group (2011), ISBN: 9781439869185

B. VOC. Third Year: Semester VI **General Academic Components**

(Generic Skill VIII)

VOC -603: Mobile & Smart Phone Repair and Maintenance **(4 Credits: 100 Marks)**

Learning Objectives: The objective is to familiarize the students with Mobile and Smart Phone Repairing, Maintenance and Troubleshooting.

Course Outcomes:

After Completion of this course, student will able to-

- Identify different types of mobile cell phones.
- Recognize potential hazards in the repair of mobile cell phones.
- Identify the parts, use the correct hardware tools to repair
- Assembly and disassembly a mobile cell phone.
- Identify faults and solve them

Unit I: Basics and Basic Electronics

(15 Hrs.)

Basics of mobile Communication, Assembling and disassembling of various models of mobile phones. Study of various tools and equipment used in mobile phone repairs. Study of parts inside a mobile phone. Using a multimeter. Use of DC Power Supply.

Unit II: Hardware Repair:

(15 Hrs.)

Introduction and study of Printed circuited Board (Motherboard). Details of various components on the PCB. Testing of various parts and components. Study of different ICs (chips) used on the motherboard. How to recognize various ICs. Soldering & desoldering of components by using a soldering iron. Soldering & desoldering of components by using a rework station. Reheating and mounting of various BGA and SMD chips. Ultrasonic cleaning procedure.

Unit III: Software Repair

(15 Hrs.)

Detailed study of various faults arising due to corrupt software. Introduction of various flasher boxes and software. Flashing of various brands of handsets. Removing virus from infected phones. Unlocking of handsets through codes and/or software. Use of various secret codes.

Unit IV: Basic and Advanced Troubleshooting

(15 Hrs.)

Fault finding, troubleshooting and repairing of various faults. Common repair procedure for hardware related faults. Common repair procedure for software related faults. Water damaged repair techniques. Circuit tracing, jumper techniques and solutions. Troubleshooting through schematic diagrams. Use of internet for troubleshooting faults. Advanced troubleshooting techniques.

Books Recommended:

- 1) Mobile Phones and Tablets Repairs: A Complete Guide for Beginners and Professionals, Chukky Oparandu
- 2) Android & Windows Mobile Phone Repairing, Sanjib. Pandit
- 3) William L. Armstrong, Learn Cell Phone Repair, kindle edition, 2013
- 4) Pandit Sanjib, Advance Mobile Repairing: Multicolour Circuits, Service Diagrams & Repairing, BPB publications. 2010.
- 5) Mobile repairing Books, Manohar Lotia, BPB Publication, New Delhi, latest edition

B. VOC. Third Year: Semester VI

Skill Development Components

Specific Skill Course-XV

VOC-611: Instrumentation

(4 Credits: 100 Marks)

Learning Objectives:

- To introduce to the students the operation of various electronic Instruments which are used to measure the electronic parameters.
- Explain the importance of measurement system.
- Explain basic concepts and definitions, errors in measurement.
- Describe the display and recorders in electronic measurements.

Course Outcomes:

After the end of course, student able to-

- Recognize the evolution and history of units and standards in Measurements.
- Identify the various parameters that are measurable in electronic instrumentation.
- Employ appropriate instruments to measure given sets of parameters.
- Practice the construction of testing and measuring set up for electronic systems.
- To have a deep understanding about instrumentation concepts which can be applied to Control systems.

Unit I: Qualities of Measurements

(12 Hrs)

Performance characteristics, static characteristics, Errors in measurement, types of static errors, sources of errors, dynamic characteristics, standard, atomic frequency and time standards.

Unit II: Displays and Recorders

(12 Hrs)

LED display, LCD display, strip chart recorder, galvanometer type recorder, X-Y recorder, Magnetic Tape recorder, frequency modulation recording, digital data recording.

Unit III: Digital Instruments

(12 Hrs)

Introduction, digital multimeters, digital frequency meter, digital measurement of time, universal counter, decade counter, electronic counter, digital tachometer, digital pH meter, automation in digital instruments, digital phase meter, digital capacitance meter, microprocessor-based instruments

Unit IV: Transducers

(12 Hrs)

Electrical transducers, selecting a transducer, resistive transducer, resistive position transducer, inductive transducer, differential output transducer, linear variable differential transducer (LVDT), capacitive (pressure) transducer, Load cell, piezoelectric transducer, photo electric transducer, photo multiplier tube, photo cells, photovoltaic cell, semiconductor photodiode, photo transistor. Temperature transducer: RTD, resistance thermometer, thermistor, thermocouple.

Unit V: Data Acquisition and Conversion

(12 Hrs)

Introduction, objective of DAS, signal conditioning of the inputs, single Channel DAS, Multi-channel DAS, computer-based DAS, digital to analog and analog to digital converters, data loggers, electromechanical A/D Converter, digital transducer.

Books Recommended:

1. Electronic Instrumentation-second edition by H. S. Kalsi (McGraw Hill Company).
2. Transducers and instrumentation by D V S Murty (PHI)

B. VOC. Third Year: Semester VI

Skill Development Components

Specific Skill Course-XVI

VOC-612: Programmable Logic Controllers

(4 Credits: 100 Marks)

Course Objectives:

- To introduce students with programmable logic components and systems
- To make students understand various instructions required for PLC
- To enable students to program PLCs for various applications

Course Outcomes:

After completion of the course students will be able to –

- Evaluate PLCs for various applications
- Apply and explain basic concepts of ladder logic, its relationships with PLC instruction sets.
- Develop a simple ladder logic program for timer and counter applications
- Design a small prototype-based production line using PLC

Course Contents:

Unit - I: Programmable Logic Controllers (PLC) (12 Hrs.)

Introduction to PLC, definition, PLC system and components of PLC input output module, advantages and disadvantages of PLC. Ladder diagram & PLC programming fundamentals: Basic components and other symbols, Fundamentals of ladder diagram, Difference between physical components and program components in PLC.

Unit - II: PLC Instructions (12 Hrs.)

Bit Logic Instructions: NO, NC, Set, Reset, Falling Edge Pulse, rising edge Pulse RS, SR, NOP, OUTPUT. Clock: READ, RTC, SET_RTC. Logical operation Instructions: INVERT BIT, BYTE, WORD DOUBLE WORD. OR: BIT, BYTE, WORD DOUBLE WORD. AND: BIT, BYTE, WORD DOUBLE WORD. X-OR: BIT, BYTE, WORD DOUBLE WORD.

Unit - III: PLC Programming (12 Hrs.)

PLC input Instructions, outputs, coils, indicators, operational procedures, Contact and coil input output, programming example, fail safe circuits, Simple industrial applications. PLC Functions PLC timer functions Introduction, timer functions, industrial applications, industrial process Timing applications, PLC control functions –PLC counters and its industrial applications, nesting of ladders.

Unit - IV: Applications of PLC (12 Hrs.)

Interfacing Input and Output devices with PLC, Switches: Push button Switches, Toggle Switches, Proximity switches, Temperature Switch, Pressure Switch, and Level Switch, Flow Switches, manually operated switches, Motor starters, Transducers and sensors, Transmitters etc. Their working, specification and interfacing with PLC.

Different types of Output devices: Electromagnetic Control Relays, Latching relays, Contactors, Motors, Pumps, Solenoid Valves etc. Their working, specification and interfacing with PLC.

Unit - V: Presentations, Case studies, Assignments, Tutorials based on Unit I to IV (12 Hrs.)

Books Recommended:

1. John W. Webb, Ronold A Reis, "Programmable Logic Controllers, Principles and Applications"; 5th Edition, Prentice Hall of India Pvt. Ltd.
2. Programmable Logic Controllers Programming Method and Applications by JR.
3. Hackworth, "Programmable Logic Controller", 1st edition.
4. Frank Petruzella. D "Programmable Logic Controllers", Tata McGraw Hill
5. Bolton. W, "Programmable Logic Controllers" Fifth Edition, 2009.

B. VOC. Third Year: Semester VI

Skill Development Components

(Lab Course 15-Specific Skill Course-XV)

VOC 621- Instrumentation

List of Experiment: (At least six experiments have to be performed)

1. Study of IC AD590 as Temperature sensor.
2. Study of PT100 as Temperature sensor.
3. Study of Thermistor as Temperature sensor.
4. Study of photo transistor as light sensor
5. Study of photo diode as light sensor
6. Study of photo voltaic cell as light sensor.
7. Study of photo LDR as light sensor.
8. Study of temperature sensing transducer.
9. Study of strain gauge transducer.

B. VOC. Third Year: Semester VI

Skill Development Components

(Lab Course 16-Specific Skill Course-XVI)

VOC 622- Programmable Logic Controllers

List of Experiments:

1. Study of water level controller, using PLC simulator.
2. Study of lift control, using PLC Simulator.
3. Study of traffic light control, using PLC simulator.
4. Study of Bottling plant with counter, using PLC simulator.
5. Develop ladder programming to implement basic logic gates operations employing timers (lamp output)
6. Develop ladder programming to implement sequencing operations employing timers (lamp output)
7. Develop ladder programming to implement counter operation (proximity sensor to be used as event indicator) for triggering an enunciator after a certain batch of count is over
8. Develop ladder programming to operate a conveyor based liquid vending station.
9. Develop ladder programming to operate a density based traffic light arrangement
10. Develop ladder programming to operate an X-Y plotter
11. Develop ladder programming to address different sequence of operation in a real time batch process unit (should contain at least two liquid tanks as main storage, one mixing tank, stirrer, heater, liquid dispenser, conveyor based handling, liquid level indicators etc.).
12. Develop program for at least two real time industrial processes with ITS – PLC virtual platform


HEAD
Department of Physics
S. College, OMERGA
Dist. Osmanabad 413606


Principal
Shri Chhatrapati Shivaji College
OMERGA Dist. Osmanabad