SANT GADGE BABA AMRAVATI UNIVERSITY GAZETTE

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PART- TWO

(Extra-Ordinary)

Wednesday , the 10th August, 2022

NOTIFICATION

No. 104 /2022 Date : 10/08/2022

Subject : Implementation of new Syllabi of Open Elective subjects of Semester V & VI and revised syllabus of Semester VII of B.E. (Electronics & Telecommunication Engg.) (C.B.C.S.) as per A.I.C.T.E. Model Curriculum.

It is notified for general information of all concerned that the authorities of the University have accepted to implement new Syllabi of Open Elective subjects of Semester V & VI and revised syllabus of Semester VII of B.E. (Electronics & Telecommunication Engg.)(C.B.C.S.) as per A.I.C.T.E. Model Curriculum to be implemented from the academic session 2022-23 onwards as per "**Appendix – A**" given below:

Sd/-
(Dr.T.R.Deshmukh)
Registrar

"**Appendix – A**"

SYLLABUS OF SEMESTER V, VI & VII OF B.E. (ELECTRONICS & TELECOMN. ENGG.)

SEMESTER V

5ETC05: Open Elective - I (ii) BASIC ELECTRONIC DEVICES AND CIRCUITS

Course Requisite:

1. Engineering Physics

Course Objectives:

1. To study construction and working of different types of Resistors and Capacitors
2. To study construction and working of different types of Fuse, Cable and connectors
3. To Understand the PCB layout and its manufacturing
4. To understand detail analysis of Electronic devices.

Course Outcomes:

After successfully completing the course, the students will be able to

1. Understand the working and construction of Resistors and capacitors
2. Comprehend the types of fuses, connectors and cables
3. Learn the PCB layout and its manufacturing
4. Comprehend the knowledge of diode and its characteristics
5. Understand basics of different special semiconductor devices
6. Understand the basics of BJT with characteristics of different modes

Unit I: Construction, selection and failures of Resistors: Fixed type, Variable Type, Network and Chip type, Capacitors: fixed and variable Type. (6)

Unit II: Switches & Relays: Types, Construction and Testing of Fuses, Cables, Connectors: Types, Construction. (6)

Unit III: Basics of Electronic Component layout, PCB material, Properties and specifications, Basic manufacturing process of single layered PCB, Soldering and De-soldering Techniques. (6)

Unit IV: P-N Junction diode theory, V-I Characteristics, Static and dynamic resistance, Zener diode: characteristics, Avalanche & Zener breakdown, Testing of diode using Ohmmeter and CRO. (6)

Unit V: Theory, Construction, Characteristics and application of Tunnel diode, Varactor diode, Shottkey diode, Opto-Devices: LED & Photo Diode. (6)

Unit VI : Theory of PNP and NPN Transistor, Transistor Configurations, Their Characteristics and current Components. Transistor as an amplifier, Testing of Transistor using Ohmmeter and CRO . (6)

Text Books:

1. Maduri Joshi, " Electronic Component and Material" 3rd Edition, Shroff Publication
2. Millman H Halkies, " Integrated Electronics" TMH Co. New Delhi.

References:

1. Bosshart, " Printed Circuit Board" TMH
2. David Bell' " Electronic Devices and Circuits" Oxford University Press, 2010.

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SEMESTER VI

6ETC04: Open Elective II: (i) ELECTRONIC COMMUNICATION SYSTEMS

Course Objectives:

After completing this course the students should be able to:
1. Understand the basics of Electronic Communication System.
2. Understand the AM transmitter working.
3. Understand the working of AM and receiver and its parameters.
4. Understand FM transmitter working.
5. Understand of FM and receiver and its parameters.
6. Understand the pulse modulation techniques.

Course Outcomes:

At the end of the course, students will demonstrate the ability to:
1. Demonstrate the basics of Electronic Communication systems.
2. Use the working of AM transmitter.
3. Demonstrate the working of AM receiver.
4. Able to understand working of FM transmitter.
5. Demonstrate the working of FM receiver.
6. Understand the various pulse modulation techniques.

Unit I: **Introduction to Electronic Communication System**:
Introduction Basic block diagram of Communication System, Modulation, Need for Modulation, Noise: Internal and external Noise. (No numericals expected)

Unit II: **Introduction to AM Transmitter**:
Amplitude Modulation Theory, Frequency Spectrum of AM, Representation of AM, Mathematical Expression of AM wave (only derivation, No numerical expected). Definitions of Modulation Index, SNR.

Unit III: **Introduction to AM Receiver**:
TRF Radio Receiver, Block diagram of Superheterodyne radio Receiver, Comparison. Definitions of Selectivity, Sensitivity and Fidelity

Unit IV: Introduction to FM Transmitter:
Frequency Modulation Theory, Frequency Spectrum of FM, Wideband and Narrowband FM. Advantages of FM over AM.

Unit V: **Introduction to FM Receiver**:
Block Diagram of FM Receiver, Comparison with AM Receiver. Stereo FM multiplex reception.

Unit VI: Pulse Modulation Techniques:
Introduction to pulse Modulation Techniques, PAM, PWM and PPM. Comparison.

Text Books:
1. Electronic Communication Systems, George Kennedy and Bernard Davis, Fourth Edition. Tata McGraw Hill Publishing Company Ltd.
2. Analog and Digital Communication Engineering, J. S. Chitode, Technical Publications.

Reference Books:
1. Communication Systems, 3rd Edition, Simon Haykin, John Wiley & Sons.
2. Telecommunications Principles Circuits Systems and Experiments, S. Ramabhadran, Khanna Publishers, Sixth Edition, 1997.

6ETC04: Open Elective II (ii) WIRELESS COMMUNICATION

Course Objectives:
1. To understand basics of Cellular System.
2. To study the fundamentals of cellular radio system, capacity & Coverage improvement techniques.
3. To understand mobile radio propagation mechanism and Multiple access techniques.
4. To understand operation of GSM in detail.
5. To study the CDMA techniques in.
6. To understand the WiFi and Bluetooth technology.

Course Outcomes:
Upon successful completion of this course, the student will be able to:
1. Illustrate the evolution of cellular mobile system and understand cellular concepts.
2. Use fundamentals of cellular radio system.
3. Understand propagation mechanism in mobile radio system.
4. Demonstrate concepts of various 2nd and 3rd generation cellular systems and wireless data communication networks.

Unit I: Introduction to Wireless Communication:
Evolution of Mobile Communication, Basic Cell Fundamentals, Introduction to Cellular Telephone Systems: 1G, 2G, 3G, 4G and 5G, Comparison of these systems.

Unit II: Basic Cellular Concept:
Frequency Reuse, Hand off Strategies, Types of Hand off, Cell improvement techniques : Cell Sectoring, Cell Splitting, Repeaters.

Unit III: Basic Radio Propagation and Multiple Access Techniques:
Basic propagation techniques: Reflection, Diffraction and Scattering, Comparison.Introduction to fading (numericals and types not expected). Introduction to FDMA, TDMA and CDMA, Comparison.

Unit IV: Introduction to GSM:
Basic GSM architecture block diagram, GSM Channels, Frame Structure, GSM handoffs such as NCHO, MAHO.

Unit V: Introduction to CDMA Digital Cellular Standard:
Basic Architecture block diagram of CDMA System, Comparison of CDMA and GSM. Introduction to WCDMA.

Unit VI: Bluetooth and WiFi:
Introduction to Bluetooth, Overall architecture, Advantages and Applications. Introduction to Wi-Fi, Advantages and Disadvantages.

Text Books:

1. Theodore S. Rappaport, “Wireless Communications: Principles & Practice”, Second edn., Pearson Edn. (2002).
2. K. Pahlavan and P. Krishnamurthy, “Principles of Wireless Networks”, Pearson Educn. Asia Publication (2002).
3. T. L. Singal, “Wireless Communication”. McGraw Hill Education.

Reference Books:

1. A. F. Molisch, “Wireless Communications”, Second Edition, Wiley Publication.
2. K. Shammugham, “Digital and Analog Communication.

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SEMESTER VII

7ETC08 PROJECT MANAGEMENT AND ENTREPRENEURSHIP – LAB. GUIDELINES

Lab goals include:

• Gaining experience with fast-paced, massively scalable companies

• Applying academic knowledge to the problems faced by entrepreneurial firms in a context of uncertainty, extreme time pressure and decision making based on limited information
• Learning quickly about a new industry, technology, market
• Strengthening your ability to analyze technical feasibility, to identify early-adopters and the right target market, and define a path to commercialization, ultimately delivering real value to the startup.

List of Experiments for reference:

Expt-1: To Prepare of a real time project feasibility report containing Technical appraisal
Expt-2: To Prepare of a real time project feasibility report containing Environmental appraisal
Expt-3: To Prepare of a real time project feasibility report containing Market appraisal (including market Survey for forecasting future demand and sales)
Expt-4: To Prepare Project cost estimation for any project
Expt-5: To Prepare projected financial statements for Case Study.
Expt-6: To study Entrepreneurial motivation (Mc Clellend’s Achievement motivation theory)
Expt-7: To study Social Entrepreneurship Opportunities and Successful Models
Expt-8: To prepare a project report on any industry based on field visit.

Internal Evaluation:

- The lab manual will contain all the mentioned experiment write-ups duly signed by the concerned faculty. The marks shall be awarded to the student on the basis of knowledge acquired during the lab sessions, attendance and presentation based on Expt-8 followed by Viva-voce.

External Evaluation:

- The external evaluation shall be done on the basis of Via-Voce to be conducted during university practical examination.

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8ETC04 PROFESSIONAL ELECTIVE VI (PE-VI)

(i) 5G-6G MOBILE COMMUNICATION

Course Pre-requisites: 7ET04: Mobile Communication and Networks

Course Objectives:

1. To Understand latest trends in wireless technologies, a path towards 5G and 6G system.
2. To study network architecture, components, features and benefits of 5G system.
3. To understand various radio waveforms and channel model for 5G.
4. To understand different networking techniques in 5G system.
5. To study introduction of 6G system.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Illustrate the evolution of mobile communication leading to the introduction of 5G.
2. Explain the mm wave 5G and overview of MIMO.
3. Elaborate the Channel access methods of 5G.
4. Discuss key issues and challenges in 5G deployment.
5. Understand the applications of 5G.
6. Understand the concept of 6G.

Unit-1

INTRODUCTION TO 5G: Historical trend and evolution of LTE technology to beyond 4G – Key building blocks of 5G, Specification requirements for driving 5G technology , 5G Use Cases and System Concepts – The 5G Architecture – IoT in relation to 5G. (6)

Unit-2

RF FRONT END FOR 5G: Millimeter Wave Communications: Hardware technologies for mmW systems – Characteristics, Use cases, Advantages. Massive MIMO: Fundamentals, Advantages MIMO – Beamforming Overview.

(6)

Unit-3

5G WAVEFORMS AND CHANNEL MODELS: 5G Radio Access Technologies: Radio Access for V2X Communication - Radio access for massive machine-type communication – RAN introduction and types. 5G channel access methods. (6)

Unit-4

NETWORKING IN 5G: Coordinated multi-point transmission in 5G: Joint Transmission CoMP enablers - Distributed cooperative transmission - Relaying techniques, Multi-flow wireless backhauling. (6)

Unit-5

APPLICATIONS of 5G: Machine-type communications: Fundamental techniques for MTC - Massive MTC - Ultra-reliable low-latency MTC - Device-to-device (D2D) communications- Multi-operator D2D communication.

(6)

Unit-6

INTRODUCTION TO 6G:

Key building blocks of 6G – 6G use cases and System Concepts – The 6G Architecture (6)

Text Books:

1. Wei Xiang, Kan Zheng, Xuemin (Sherman) Shen, - 5G Mobile Communications, Springer, 2017.
2. Afif Osseiran, Jose F. Monserrat and Patrick Marsch, - 5G Mobile and Wireless Communications Technology, Cambridge University Press, 2016.

Reference Book: Jonathan Rodriguez, - Fundamentals of 5G mobile networks, John Wiley & Sons, Ltd, 2015.