SYLLABUS FOR UNDERGRADUATE PROGRAMME

ELECTRONICS TECHNOLOGY

(Skill Enhancement Course)

[Semester I, II & III]

Under National Education Policy – 2020

(Effective from the Academic Session 2023-2024)

MAHARAJA BIR BIKRAM UNIVERSITY
AGARTALA, TRIPURA: 799004

Electronics Technology

Course 1 - ET1
(SEM 1)

Paper-I

UNIT-I

Basics of Measurement: Scale, Range, Accuracy, precision, sensitivity of measuring instruments
Errors in experiments: Errors of observations-Random and systematic error, Practical determination of errors, significant figures, Estimation of errors- Proportional error, percentage error, standard deviation from a given set of sample data
Mechanical Devices: slide calipers, screw gauge, spherometer, travelling microscope, calculation of least count, their application in measuring length, diameter, thickness, height etc

UNIT-II

Electric circuits: Elements of a simple electric circuit-various types of resistors, resistors as heating elements, variable resistors, various capacitors and their uses, electric switch
Domestic circuit: AC signals, power transmission through AC signals, Power loss, choke coil, electric circuit connection at home, Distribution of power, electricity meter, main switch and fuse, live wire, neutral wire, earth wire, necessity of proper earthing connection, MCB and its use for protection of electrical appliances, Use of electric motors and generators, power consumed at home and calculation of electric bill.

UNIT-III

Power sources: Different types of batteries, primary and secondary or rechargeable batteries, advantages of secondary batteries, Rechargeable batteries such as Lead acid batteries, Li-ion batteries, Battery eliminator
Measuring devices in electric circuits: Connection of Voltmeter and ammeter in a circuit and their uses, use of multimeter for measuring electric components and other circuit parameters.

UNIT-IV

Electronic circuits: Elements of electronic circuits, transformers, step-up and step down transformers, power loss in a transformer, conversion of AC to DC, identification of semiconductor diode terminals, idea about the working of diode as rectifier, necessity of filter circuits, use of transistor and FET as amplifier, idea about clippers and clampers and their applications, Integrated circuits.

Hands-on Laboratory Exercises/ Projects/Assignments:

1. Calculation of least count of measuring instruments
2. Calculation of proportional error, standard deviation from a given set of data
3. Construction of simple electric circuits and measurement of voltage and current using voltmeter and ammeter
4. Using multimeter for measuring various circuit components such as resistance, AC and DC voltage and current in a circuit
5. Construction of simple rectifier circuits with a specific output voltage
6. Construction of filter circuits for use in rectifier circuits to achieve smooth DC voltage

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Course 2 - ET 2
(SEM 2)

UNIT-I

Introduction to computer: Essential parts of an electronic computer, History of computers, Types and generations of Computers.

Data Representation: Number systems and character representation, decimal, binary, Octal and hexadecimal system, conversion from one number system to another number system, binary arithmetic (addition, subtraction using 1's complement & 2's complement).

UNIT-II

Devices: Input and output devices, keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter

Representation of data/Information: Definition of Information and data, Basic data types, Storage of data/information as files, concepts of data processing.

Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks

UNIT-III

Human Computer Interface: Types of software, Operating system as user interface, utility programs.

Using Software: Handling Microsoft word, working with slides in Power point, Graph plotting in Microsoft Excel

UNIT-IV

Internet and email: Internet surfing, various search engines, creating and using email account, e-Library

Cyber security: cyber security, necessity, Communication security, Network security, Information security, cyber crime, types of cyber - crime, advantages of cyber security

Introduction to AI: Artificial intelligence, applications of AI, Benefits of AI, various fields of AI, AI in daily life

Hands-on Laboratory Exercises/ Projects/Assignments:

1. Data analysis using Microsoft Excel
2. Plotting of pie chart and bar graph in excel using given set of data
3. Designing of slides for effective power point presentation
4. Various applications of Microsoft Word

SKILL ENHANCEMENT COMPULSORY COURSE - 3 CREDITS

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Electronics Technology

Course 3 -
ET 3

UNIT-I

Digital circuits: Basic elements of digital circuits, Use of bread board, carbon resistors, values of resistance and tolerance from colour coding, Light emitting diode, Logic gates, designing basic gates with discrete components, Digital ICs, use of digital ICs in circuit designing, idea about flipflops as basic memory element.

UNIT-II

Energy efficient systems: Energy efficiency, Energy efficient Products, necessity of such products for green future, Choice of Energy Star, Smart thermostats, incandescent bulb vs CFL or LED bulb
Optoelectronic devices: Basic operating principle and applications in photodiodes and solar cells

UNIT-III

Physics of Communication: Radio spectrum, Various modes of radio wave propagation, Idea of modulation and demodulation, Overview of Satellite communication, Telecommunication and Mobile communication

UNIT-IV

Optical fibre and LASER: Communication through optical fibre, different types of losses in fibre, advantage of optical fibre, LASER vs ordinary light, idea about solid state and gas LASERs, application of LASER in various fields
Display devices: Cathode Ray Oscilloscope (CRO), Uses of CRO, Liquid Crystal Display, LED Display

Hands-on Laboratory Exercises/ Projects/Assignments:

1. To find the value of resistance using both colour code and multimeter.
2. Construction of basic gates using discrete components
3. Construction of simple digital circuits with digital ICs such as 7400, 7402, 7404, 7408, 7432
4. Use of CRO in measuring voltages and studying output waveforms of a rectifier.