Dr. V. P. Shetkari Shikshan Mandal’s

**Padmabhooshan Vasantraodada Patil**

**Institute of Technology**,

Budhgaon – 416304.

STUDENTS INFORMARTION MANUAL

(SY PART-I)



**Department of Electronics & Telecommunication**

**Engineering**

Name of Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Roll Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exam Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Academic Year: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mobile Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

E-mail ID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Academic Year: 2021-22

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**Vision of the Institute**

To become a leading institute in providing high quality technical and engineering education to the aspirants and serve the industry and society through excellent educational programmers, creativity and research.

**Mission of the Institute**

* To meet the short and long term engineering man power needs for social, techno-economical development of region and nation, through teaching, research, consultancy and service.
* To contribute advancing of knowledge and wisdom in science and technology for the human welfare.
* To cultivate skills, lifestyle and habits of lifelong learning to adopt knowledge based global civilization.
* To create highest standards of education with noble values of ethics, morality, integrity and humanity.

**Quality Policy**

* Institution quality policy is based on the following principles
* To develop and maintain, state of art education practices.
* To give every possible facility to students, faculties & Staff so that they can deliver the best.
* To provide secular, disciplined, caring environment for all learners.
* To be the forefront of the education to satisfy the local, national & global needs.

**Institute Information**

Dr. V. P. S. S. M.’s Padmabhooshan Vasantraodada Patil Institute of Technology, Budhgaon is one of the esteemed technical institutes in western Maharashtra was established in the year 1983 which is affiliated to Shivaji University, Kolhapur, D.T.E. Govt. of Maharashtra and is approved by A.I.C.T.E., New Delhi.

The institute offers:

* Ten Under Graduate (U.G.) programmes leading to Bachelor’s degree in Engineering (B. Tech.)
* Five Post Graduate (P.G) programmes leading to Master degree in Technology (M.Tech.)

**Undergraduate Programme**

|  |  |
| --- | --- |
| **Branch** | **Intake** |
| Mechanical Engineering | 60 |
| Civil Engineering | 120 |
| Electrical and Computer Engineering | 60 |
| Electronics & Telecommunication Engineering | 60 |
| Electronics and Computer Engineering | 60 |
| Computer Science and Engineering  (Artificial Intelligence and Data Science) | 60 |
| Computer Science and Engineering | 60 |
| Instrumentation and Control Engineering | 30 |
| Mechatronics | 60 |
| Chemical Engineering | 60 |

**Post Graduate Programme**

|  |  |
| --- | --- |
| **Branch** | **Intake** |
| Electronics & Telecommunication Engineering | 12 |
| Civil(Structure ) Engineering | 18 |
| Electrical Engineering | 24 |
| Mechanical(Design) Engineering | 12 |
| Mechanical(Heat Power) Engineering | 12 |

**Department of Electronics & Telecommunication Engineering**

The Department of Electronics & Telecommunication was established in the year 1985 with a sanctioned intake of 30 increased to 60 in the academic year 1999-2000. The department has a good intermingle of experienced, young & dynamic faculty which works as a team to strengthen the department. The department has produced about 1000 graduates so far out of which about 70% are having good positions in the reputed organizations.

**Vision of the Department**

To prepare students for understanding of recent technology in the field of Electronics and Telecommunication and facilitate them to acquire necessary skills to serve industry and society.

**Mission of the Department**

* To provide necessary infrastructure and academic support to the aspirants.
* To motivate the students for higher education and upgradation of skills.
* To provide quality education to introduce recent advances in the field of Electronics and Telecommunication Engineering.

**Programme Educational Objectives (PEO’s)**

* To imbibe skills necessary to engage in lifelong learning for successful career in Industry & Higher education.
* To enable student to analyze and solve Electronics and Telecommunication Engineering problems by applying basic concepts of mathematics, science, and modern engineering techniques.
* To train the students to innovate, design and develop systems with advanced knowledge of digital, analog electronics and programming concepts.
* To prepare students with professional ethics, soft skills, social response-bilities and develop leadership qualities and work in multidisciplinary environments.

**Program Educational Objectives (PEOs)**

1. Inculcate the habit of lifelong learning for successful career in Industry & Higher Education.
2. Prepare Graduates to analyze and solve Electronics and Telecommunication Engineering problems by applying basic principles of mathematics, science, and modern engineering tools.
3. Apply skills for researchand innovation using state-of-the-art technologies for continuous improvement.
4. Prepare graduates to be sensitive to ethical, societal and environmental issues while engaging in their professional duties, and develop leadership qualities in multidisciplinary environments.

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**Program outcomes (POs)**

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| --- | --- | --- |
| **a** | **PO1** | **Engineering knowledge:**Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problem. |
| **b** | **PO2** | **Problem analysis:**Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. |
| **c** | **PO3** | **Design and development of solutions:**Design solution for complex engineering problems and design system components or processes that meet the specified needs with appropriate considerations for public health and safety and the cultural, societal and environmental considerations. |
| **e** | **PO4** | **Conduct investigation of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusion. |
| **k** | **PO5** | **Modern tool usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with understanding of limitations. |
| **c** | **PO6** | **The engineer and society:** Apply reasoning, informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice. |
| **h** | **PO7** | **Environment and sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| **f** | **PO8** | **Ethics:**Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| **d** | **PO9** | **Individual and Teamwork:** Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings. |
| **g** | **PO10** | **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions. |
| **j** | **PO11** | **Project management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and multidisciplinary environment. |
| **i** | **PO12** | **Lifelong learning:** Recognize the need for, and have the preparations and ability to engage in independent and lifelong learning in the broadest context of technological change. |
| **l** | **PSO1** | An ability to develop ideas and project which will cater the professional and competitive needs in electronics and telecommunication engineering. |
|  | **PSO2** | Graduates will be able to use techniques and skills to design, analyze and simulate electronics and telecommunication components and systems for societal needs. |

**Short Term Goals**

* Arranging expert/guest lecturers for the students.
* Arranging training programmers/workshops for the students.
* Arranging aptitude tests, workshops, project competition, quiz contests for students.
* Maintain team spirit in the department

**Long Term Goals**

* Strengthening the Training & Placement activities.
* Increasing the interaction of the department with outside world.
* Develop the research culture in the department.

**Students Role**

As our society/ nation grows & becomes technologically more strong / complex, it needs more trained Engineers. Students can contribute to this professional growth by playing an effective & disciplined role during their studies.

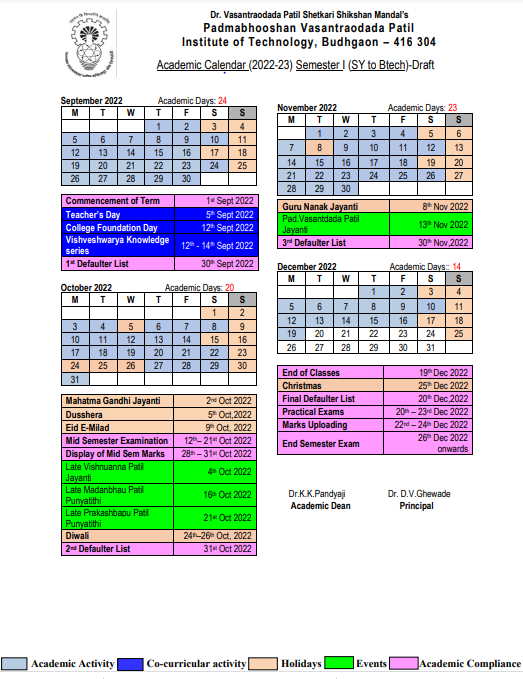
**Responsibilities**

1. Punctuality, 100% Attendance & Active participation in All Academic Activities
2. Self Discipline & good relations with other students, teaching & support staff.
3. Positive attitude, motivation and technical thinking.
4. Participation in Co-Curricular & Extra-Curricular activities.
5. Always carrying Identity Card & following the College Dress Code.
6. Pursuing all-round personality development with good generic skills.

7. Following the Code-of-Conduct by the Department, Institute & University.

**Code-of-Conduct**

1. Coming late to Lectures/Practical’s, common off, leave without permission is serious offence.
2. Roaming in the campus during academic work or disturbing the campus activities through shouting/ misconduct is not permitted.
3. Use of personal unauthorized electronic gadgets in department premises is objectionable.
4. Attendance less than 75% will lead to semester defaulter & make you ineligible for Exams.
5. Any form of violence, ragging, use of tobacco, alcohol or drugs on campus are serious offences punishable with rustication from the institute &/ legal action.



Notes -

**Activity Record**

**(Counseling, Co/Extra Curricular, Leave)**

**Counseling Staff Name**

|  |  |  |
| --- | --- | --- |
| **Date** | **Topic** | **Suggestion** |
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**Co/Extra Curricular Activities**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Activity Name** | **Participation level** | **Outcome** |
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**Leave Record**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **From** | **To** | **Reason** | **Permitting Staff** | **Remark** |
|  |  |  |  |  |  |
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**Laboratory and Classroom Instructions**

**Laboratory Instructions**

# Handle all electronics Devices /equipments carefully

# Follow safety procedures & avoid damage to self and equipment

# Inform to respective faculty before beginning your experiment

# Help to conserve energy, Switch off the equipments tubes & fans before leaving the laboratory

# Inform the lab assistant or lab in-charge when any fault arises during the performance of an experiment

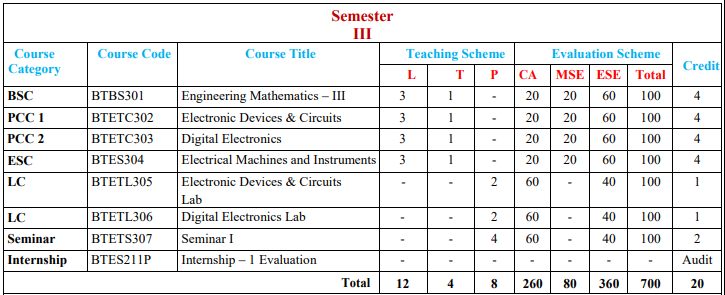
# Report any not working equipment to the lab instructor; don’t open/ remove the cover/ attempt to repair any equipment.

* Do not move the instruments from one laboratory to another, without permission.

**Classroom Instructions**

* Maintain silence in class rooms.
* Don’t write anything on seating bench and walls of classroom.
* Keep your mobiles switched off.
* Attend classes regularly and be punctual for your classes.
* Your reason of absence should be timely informed to your class teacher with written application.
* Help to conserve energy, Switch off fans and tubes before leaving the classroom.
* Keep Classroom Clean.

**Curriculum Structure**



**TIMETABLE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Time** | **MONDAY** | **TUESDAY** | **WEDNESDAY** | **THURSDAY** | **FRIDAY** | **SATURDAY** |
| **1** | **10.00 am TO 11.00 am** | S1- DE (RSM)  S2- Semi.(DBK)  S3- Semi.(CMP) | DE (RSM) | EDC (/RPO) | S1- Semi.(CMP)  S2- EDC (/RPO)  S3- DE (RSM) | DE (RSM) |  |
| **2** | **11.00 am TO 12.00 noon** | EMI (CMP) | EM-III | EDC (/RPO) |
| **12.00 TO 12.45 pm LUNCH BREAK** | | | | | | | |
| **3** | **12.45 pm TO 01.45 pm** | EDC (/RPO) | S1- EDC (/RPO)  S2- DE (RSM)  S3- Semi.(CMP) | EMI (CMP) | EM-III | S1- Semi.(SVP)  S2- Semi.(CMP)  S3- EDC (/RPO) |  |
| **4** | **01.45 pm TO 02.45 pm** | EMI (CMP) | S1- EMI (CMP)(T)  S2- EM-III(T)  S3- DE (RSM) (T) | DE (RSM) |
| **02.45 pm TO 03.00 pm TEA BREAK** | | | | | | | |
| **5** | **03.00 pm TO 04.00 pm** | EM-III | S1- EM-III(T)  S2- EMI (CMP)(T)  S3- EDC (/RPO)(T) | S1- DE (RSM) (T)  S2- EDC (/RPO)(T)  S3- EM-III(T) |  |  |  |
| **6** | **04.00 pm TO 05.00 pm** | S1- EDC (/RPO)(T)  S2- DE (RSM) (T)  S3- EMI (CMP)(T) |  |  |  |

**BTBS301: Engineering Mathematics-III 4 Credits**

***Course Objectives:***

1. Linear differential equations of higher order using analytical methods and numerical methods applicable to Control systems and Network analysis.

2. Transforms such as Fourier transform, Laplace transform and applications to Communication systems and Signal processing.

3. Vector differentiation and integration required in Electro-magnetics and Wave theory.

4. Complex functions, conformal mappings, contour integration applicable to Electrostatics, Digital filters, Signal and Image processing .

***Course Outcomes:***

1. Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.

2. Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing.

3. Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.

4. Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.

5. Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.

Unit 1: Laplace Transform 09 Hours

Definition – conditions for existence ; Transforms of elementary functions ; Properties of Laplace transforms - Linearity property, first shifting property, second shifting property, transforms of functions multiplied by tn, scale change property, transforms of functions divided by t, transforms of integral of functions, transforms of derivatives ; Evaluation of integrals by using Laplace transform ; Transforms of some special functions- periodic function, Heaviside-unit step function, Dirac delta function

Unit 2: Inverse Laplace Transform 09 Hours

Introductory remarks ; Inverse transforms of some elementary functions ; General methods of finding inverse transforms ; Partial fraction method and Convolution Theorem for finding inverse Laplace transforms ; Applications to find the solutions of linear differential equations and simultaneous linear differential equations with constant coefficients.

Unit 3:Fourier Transform 09 Hours

Definitions – integral transforms ; Fourier integral theorem (without proof) ; Fourier sine and cosine integrals ; Complex form of Fourier integrals ; Fourier sine and cosine transforms ; Properties of Fourier transforms ; Parseval‟s identity for Fourier Transforms.

Unit 4: Partial Differential Equations and Their Applications 09 Hours

Formation of Partial differential equations by eliminating arbitrary constants and functions; Equations solvable by direct integration; Linear equations of first order (Lagrange‟s linear equations); Method of separation of variables – applications to find solutions of one dimensional heat flow equation (), and one dimensional wave equation

Unit 5: Functions of Complex Variables 09 Hours

Analytic functions; Cauchy- Riemann equations in Cartesian and polar forms;Harmonic functions in Cartesian form; Cauchy ‟sintegral theorem; Cauchy‟ sintegral formula; Residues; Cauchy‟s residue theorem (All theorems without proofs).

*Text Books:*

*1.Higher Engineering Mathematics by B. S. Grewal, Khanna Publishers, NewDelhi. 2.Higher Engineering Mathematics by H. K. Das and Er. Rajnish Verma, S. Chand & CO. Pvt. Ltd., New Delhi.*

*3.A course in Engineering Mathematics (VolIII) by Dr. B. B. Singh, Synergy Knowledge ware, Mumbai.*

*4.Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi.*

*Reference Books:*

*1.Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley & Sons, NewYork.*

*2.A Text Book of Engineering Mathematics by PeterO‟Neil, Thomson Asia Pte Ltd. , Singapore.*

*3.Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata Mcgraw-Hill Publishing Company Ltd., NewDelhi.*

*4.Integral Transforms and their Engineering Applications by Dr. B. B. Singh, Synergy Knowledge ware, Mumbai.*

*5.Integral Transforms by I. N. Sneddon, Tata McGraw-Hill , NewYork. General*

**BTETC302 Electronic Devices and Circuits 4 Credits**

***Course Objectives:***

1.To introduce Static characteristics of ideal two terminal and three terminal devices.

2.To introduce semiconductor devices BJT, JFET and MOSFET, their characteristics, operations, circuits and applications.

3.To analyze and interpret BJT, FET and MOSFET circuits for small signal at low and high frequencies.

4.To simulate electronics circuits using computer simulation software and verify desired results.

***Course Outcomes:***

1.Comply and verify parameters after exciting devices by any stated method. 2.Implement circuit and test the performance.

3.Analyze BJT, JFET and MOSFET for various applications.

4.Analyze Feedback amplifiers and oscillators

UNIT – 1 Bipolar Junction Transistor: 07 Hours

BJT: construction, working, characteristics, Transistor as switch, Transistor configurations, current gain equation, stability factor. BJT Biasing and basic amplifier configurations: Need for biasing BJT, Transistor biasing methods, Transistor as amplifier , Analysis of Single Stage Amplifier, RC coupled Amplifiers, Effects of bypass and coupling capacitors, Frequency response of CE amplifier, Emitter follower, Cascaded Amplifier, Need for multistage amplifiers and suitability of CE, CC and CB configurations in multistage amplifiers.

UNIT – 2 Junction Field Effect Transistor and MOSFET 07 Hours

JFET: JFET and its characteristics, Pinch off voltage, Drain saturation current, JFET amplifiers, CS,CD,CG amplifiers ,their analysis using small signal JFET model ,Biasing the FET, The FET as VVR. MOSFET: Overview of DMOSFET, EMOSFET, Power MOSFET, n MOSFET, p -MOSFET and CMOS devices, Handling precautions of CMOS devices, MOSFET as an Amplifier and Switch, Biasing in MOSFET, Small signal operation and models, Single stage MOS amplifier, MOSFET capacitances, CMOS Inverter, Comparison of FET with MOSFET and BJT w.r.t. to device and Circuit parameter.

UNIT – 3 Power Amplifiers: 07 Hours

Introduction, classification of power amplifiers -A, B, AB, C and D, transformer coupled class A amplifier, Class B push pull and complementary symmetry amplifier, efficiency, calculation of power output, power dissipation, cross over distortion and its elimination methods, need of heat sink and its design.

UNIT – 4 Feedback amplifiers: 07 Hours

Principle of Negative feedback in electronic circuits, Voltage series, Voltage shunt, Current series, Current shunt types of Negative feedback, Typical transistor circuits effects of Negative feedback on Input and Output impedance, Voltage and Current gains, Bandwidth, Noise and Distortion

UNIT – 5 Oscillators & Voltage Regulator Circuits 07 Hours

Principle of Positive feedback, Concept of Stability in electronics circuits, Barkhausen criteria for oscillation, RC, Clapp, Wien Bridge, Colpitt, Hartley, Tuned LC, UJT, Relaxation Oscillators. Transistor application: Discrete transistor voltage Regulation, series voltage regulator, shunt voltage regulator. IC Voltage Regulators: Three terminal voltage regulator, Variable voltage regulator

***TEXT/REFERENCE BOOKS:***

*1.D. A. Neamen, Semiconductor Physics and Devices (IRWIN), Times Mirror High Education Group, Chicago)1997.*

*2.E.S. Yang, Microelectronic Devices, McGraw Hill, Singapore, 1988.*

*3.Brijesh Iyer, S. L. Nalbalwar, R. Dudhe, “Electronics Devices & Circuits”, Synergy Knowledge ware Mumbai, 2017.ISBN:9789383352616*

*4.B.G. Streetman, Solid State Electronic Devices, Prentice Hall of India, New Delhi,1995.*

*5.J. Millman and A. Grabel, Microelectronics, McGraw Hill, International,1987.*

*6.A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.*

*7.R.T. Howe and C.G. Sodini, Microelectronics: An integrated Approach, Prentice Hall International,1997.*

**NOTES**

BTETC303 Digital Electronics 4 Credits

***Course Objectives:***

1.To acquaint the students with the fundamental principles of two-valued logic and various devices used to implement logical operations on variables.

2.To lay the foundation for further studies in areas such as communication, VHDL, computer.

***Course Outcomes:***

1.Use the basic logic gates and various reduction techniques of digital logic circuit in detail.

2.Design combinational and sequential circuits.

3.Design and implement hardware circuit to test performance and application.

4.Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.

UNIT – 1 Combinational Logic Design: 07 Hours

Standard representations for logic functions, k map representation of logic functions (SOP and POS forms), minimization of logical functions for min-terms and max-terms (upto 4 variables), don’t care conditions, Design Examples: Arithmetic Circuits, BCD - to - 7 segment decoder, Code converters. Adders and their use as subtractor, look ahead carry, ALU, Digital Comparator, Parity generators/checkers, Design of Multiplexers and De- multiplexers, Decoders.

UNIT – 2 Sequential Logic Design: 07 Hours

1 Bit Memory Cell, Clocked SR, JK, MS J-K flip flop, D and T flip-flops. Use of preset and clear terminals, Excitation Table for flip flops and Conversion of flip flops. Application of Flip- flops: Registers, Shift registers, Counters (ring counters, twisted ring counters), Sequence Generators, ripple counters, up/down counters, synchronous counters, definitions of lock out, Clock Skew, and Clock jitter.

UNIT – 3 State Machines: 07 Hours

Basic design steps- State diagram, State table, State reduction, State assignment, Mealy and Moore machines representation, Implementation, finite state machine implementation, Sequence detector.

UNIT – 4 Digital Logic Families: 07 Hours

Classification of logic families, Characteristics of digital ICs-Speed of operation, power dissipation, figure of merit, fan in, fan out, current and voltage parameters, noise immunity, operating temperatures and power supply requirements. TTL logic, Operation of TTL NAND gate, active pull up, wired AND, open collector output, unconnected inputs. Tri-State logic. CMOS logic – CMOS inverter, NAND, NOR gates, unconnected inputs, wired logic, open drain output. Interfacing CMOS and TTL, Comparison table of Characteristics of TTL, CMOS, ECL, RTL, I2L and DCTL

UNIT – 5 Programmable Logic Devices, Semiconductor Memories and Introduction to VHDL: 07Hours

Programmable logic devices: Detail architecture, Study of PROM, PAL, PLA, Designing combinational circuits using PLDs. General Architecture of FPGA and CPLD Semiconductor memories: memory organization and operation, expanding memory size, Classification and characteristics of memories, RAM, ROM, EPROM, EEPROM, NVRAM, SRAM, DRAM. Introduction to VHDL: Behavioral – data flow, and algorithmic and structural description, lexical elements, data objects types, attributes, operators; VHDL coding examples, combinational circuit design examples in VHDL and simulation.

*TEXT/REFERENCE BOOKS:*

*1.R.P. Jain, ―Modern digital electronics‖, 3rd edition, 12threprint Tata McGraw Hill Publication,2007.*

*2.M. Morris Mano, ―Digital Logic and Computer Design‖ 4th edition, Prentice Hall of India,2013.*

*3.Anand Kumar, ―Fundamentals of digital circuits‖ 1st edition, Prentice Hall of India, 2001.*

*4.Pedroni V.A., “Digital Circuit Design with VHDL”, Prentice Hall India, 2nd 2001 Edition.*

**NOTES**

BTES304 Electrical Machines and Instruments 4 Credits

***Course Objectives:***

1. Model and analyze the performance of different types of DC machines

2. Learn the applications of DC generators

3. Analyze the performance of different types of DC motors

4. Analyze the performance of different types of Sensors and Transducers

5. Familiarize with the applications of DC machines

6. To prepare students to perform the analysis of any electromechanical system.

7. To empower students to understand the working of electrical equipment used in everyday life.

***Course Outcomes:***

1. The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.

2. The skill to analyze the response of any electrical machine.

3. The ability to troubleshoot the operation of an electrical machine.

4. The ability to select a suitable measuring instrument for a given application.

5. The ability to estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument.

UNIT – 1 DC Machines: 07 Hours

DC machines construction, working principle (motor & generator), EMF equation of DC Machine (motor and generator), Types and its characteristics of DC machines (motor and generator), back emf, starters of dc machine, Speed control of DC motor Breaking of DC motor, applications of DC machines (motor and generator).

UNIT – 2 Induction Motor and Synchronous Motor: 07 Hours

Induction Motor: Construction, working principle, types, torque equation, torque slip characteristics, power stages, losses and efficiency, starters speed control, breaking, applications. Synchronous motor: Construction, working principle, starting methods, effect of load, hunting, V-curve, synchronous condenser, applications.

UNIT – 3 Special Purpose Machines: 07 Hours

Construction, working and application of steeper motor, variable reluctance motor, servo motor, FHP motor, hysteresis, repulsion, linear IM.

UNIT – 4 Sensors and Transducers: 07 Hours

Classification selection of transducers strain gauges, LVDT, Temperature transducers, piezoelectric, photosensitive transducers, Hall Effect transducers, proximity devices Digital transducers need of signal conditioning and types, interfacing techniques of transducers with microprocessor and controller.

UNIT – 5 Industrial Measurement and Industrial Applications: 07 Hours

Measurement of vibration, electrical telemetry thickness, humidity, thermal conductivity and gas analysis emission computerized tomography, smoke and fire detection, burglar alarm, object counter level measurement, on /off timers, RTC, sound level meter, tachometer, VAW meter, Recorder X- Y plotters and its applications, optical oscillograph.

*TEXT/REFERENCE BOOKS:*

*1. A course in Electrical and Electronic Measurement and Instrumentation" by A. K. Sawhney (Publisher name: Dhanpat Rai&Co.)*

*2. Electronics Instrumentation by H.S. Kalsi (Publisher McGrawHill)*

*3. Electrical Machines by Ashfaqu Husain, Dhanpatrai andpublication*

*4. Instrumentation Devices System edition C. S. Rajan, G. R.sharma*

*5. AbhijitChakrabarti&SudiptaDebnath, “Electrical Machines”, Tata McGraw-hill Publication.*

*6. William H Hayt, Jack E Kimmerly and Steven M. Durbin, “Engineering Circuit Analysis”, Tata McGrawHill.*

*7. A.E. Fitzgerald, Charles Kingsley & Jr. Stephen D. Umans, “Electrical Machinery”, Tata McGraw-hill Publication 6thEdition.*

*8. I.J Nagarath & D.P Kothari, “Electrical Machines”, Tata McGraw-hill Publication 4th Edition.*

*9.T. J. E. Miller, “Brushless permanent-magnet and reluctance motor drives”, Oxford University Press(1989).*

*10.Ned Mohan, “Electric Machines and Drives”: A first course,Wiley. 11.B. L. Theraja, “Electrical technology” volume 2, S.Chand.*

**NOTES**