Dr. V. P. Shetkari Shikshan Mandal’s

**Padmabhooshan Vasantraodada Patil**

 **Institute of Technology**,

Budhgaon – 416304.

 STUDENTS INFORMARTION MANUAL

(SY PART-II)



 **Department of Electronics & Telecommunication**

**Engineering**

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

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

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

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

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

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

Academic Year: 2022-23

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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)**

|  |  |  |
| --- | --- | --- |
| **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.



**Rules and Regulations**

1. The normal duration of the course leading to B.Tech degree will be EIGHT semesters.

2. The normal duration of the course leading to M.Tech. degree will be FOUR semesters.

3. Each academic year shall be divided into 2 semesters, each of 20 weeks duration, including evaluation and grade finalization, etc. The Academic Session in each semester shall provide for at least 90 Teaching Days, with at least 40 hours of teaching contact periods in a five to six days session per week. The semester that is typically from Mid-July to November is called the ODD SEMESTER, and the one that is from January to Mid-May is called the EVEN SEMESTER. Academic Session may be scheduled for the Summer Session/Semester as well.For 1st year B. Tech and M. Tech the schedule will be decided as per the admission schedule declared by Government of Maharashtra.

4. The schedule of academic activities for a Semester, including the dates of registration, mid-semester examination, end-semester examination, inter-semester vacation, etc. shall be referred to as the Academic Calendar of the Semester, which shall be prepared by the Dean (Academic), and announced at least TWO weeks before the Closing Date of the previous Semester.

 5. The Academic Calendar must be strictly adhered to, and all other activities including co-curricular and/or extra -curricular activities must be scheduled so as not to interfere with the Curricular Activities as stipulated in the Academic Calendar.

**REGISTRATION**

1. Lower and Upper Limits for Course Credits Registered in a Semester, by a FullTime Student of a UG/PGProgramme: A full time student of a particular UG/PGprogramme shall register for the appropriate number of course credits in each semester/session that is within the minimum and maximum limits specific to that UG/PGprogramme as stipulated in the specific Regulations pertaining to that UG/PGprogramme.

2. Mandatory Pre-Registration for higher semesters: In order to facilitate proper planning of the academic activities of a semester, it is essential for the every institute to inform to Dean (Academics) and COE regarding details of total no. of electives offered (Course-wise) along with the number of students opted for the same. This information should be submitted within two weeks from the date of commencement of the semester as per academic calendar.

3. PhD students can register for any of PG/PhD courses and the corresponding rules of evaluation will apply.

4. Under Graduate students may be permitted to register for a few selected Post Graduate courses, in exceptionally rare circumstances, only if the DUGC/DPGC is convinced of the level of the academic achievement and the potential in a student.

EVALUATION SYSTEM

1. Absolute grading system based on absolute marks as indicated below will be implementeds from academic year 2019-20,starting from I year B.Tech.

|  |  |  |
| --- | --- | --- |
| Perentage of marks | Letter grade | Grade point |
| 91-100  | EX  | 10.0 |
| 86-90  | AA  | 9.0 |
| 81-85  | AB  | 8.5 |
| 76-80  | BB  | 8.0 |
| 71-75  | BC  | 7.5 |
| 66-70  | CC  | 7.0 |
| 61-65  | CD  | 6.5 |
| 56-60  | DD  | 6.0 |
| 51-55  | DE  | 5.5 |
| 40-50 | EE  | 5.0 |

2. Class is awdared based on CGPA of all eigth semster of B.Tech Program.

|  |
| --- |
| **CGPA for pass is minimum 5.0** |
| CGPA up to<5.50  | Pass Class |
| CGPA ≥ 5.50 & <6.00 | Second Class |
| CGPA ≥ 6.00 &<7.50 | First Class |
| CGPA ≥ 7.50 | Distinction |
|  **[Percentage of Marks =CGPA\*10.0]**  |

3. A total of 100 Marks for each theory course are distributed as follows:

|  |  |
| --- | --- |
| Mid Semester Exam (MSE) Marks | 20 |
| Continuous Assesment Marks | 20 |
| End Semester Exam (ESE) Marks | 40 |

4. A total of 100 Marks for each practical course are distributed as follows:

|  |  |
| --- | --- |
| Continuous Assesment Marks | 40 |
| End Semester Exam (ESE) Marks | 60 |

***[It is mandatory for every student of B.Tech to score a minimum of 40 marks out of 100, with a minimum of 20 marks out of 60 marks in End Semester Examination for theory course.***

***This will be implemented from the first year of B.Tech starting from Academic Year 2019-20]***

Description of Grades:

1. EX Grade: An ‘EX’ grade stands for outstanding achievement.
2. EE Grade: The ‘EE’ grade stands for minimum passing grade.
3. The students may appear for the remedial examination for the subjects he/she failed for the current semester of admission only and his/her performance will be awarded with EE grade only.
4. If any of the student remain Absent for the regular examination due to genuine reason and the same will be verified and tested by the Dean (Academics) or committee constituted by the University Authority.
5. FF Grade: The ‘FF’ grade denotes very poor performance, i.e. failure in a course due to poor performance .The students who have been awarded ‘FF’ grade in a course in any semester must repeat the subject in next semester.

Evaluation of Performance

1. Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

(A)Semester Grade Point Average (SGPA):

The performance of a student in a semester is indicated by Semester Grade Point Average (SGPA) which is a weighted average of the grade points obtained in all the courses taken by the student in the semester and scaled to a maximum of 10. (SGPI is to be calculated up to two decimal places). A Semester Grade Point Average (SGPA) will be computed for each semester as follows:



Where ‘n’ is the number of subjects for the semester,

 ‘ci’ is the number of credits allotted to a particular subject, and ‘gi’ is the grade-points awarded to the student for the subject based on his performance as per the above table.

\*SGPA will be rounded off to the second place of decimal and recorded as such.

(B) Cumulative Grade Point Average (CGPA):

An up to date assessment of the overall performance of a student from the time he entered the Institute is obtained by calculating Cumulative Grade Point Average (CGPA) of a student. The CGPA is weighted average of the grade points obtained in all the courses registered by the student since s/he entered the Institute. CGPA is also calculated at the end of every semester (upto two decimal places).Starting from the first semester at the end of each semester (S), a Cumulative Grade Point Average (CGPA) will be computed as follows:



Where ‘m’ is the total number of subjects from the first semester onwards up to and including the semester S, ‘ci’ is the number of credits allotted to a particular subject, and ‘gi’ is the grade-points awarded to the student for the subject based on his/her performance as per the above table.

\*CGPA will be rounded off to the second place of decimal and recorded as such.

**Activity Record**

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

**Counseling Staff Name**

|  |  |  |
| --- | --- | --- |
| **Date** | **Topic** | **Suggestion** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**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- NT (CMP)S2- SS (AGP)S3- Semi. (/RPO)S4- Semi. (DOS) | NT (CMP) | CO&A (DBK) | S1- SS (AGP)S3- NT (CMP)S4- Semi. (DOS) | PT&RP (/RPO) |  |
| **2** | **11.00 am TO 12.00 noon** | CO&A (DBK) | NT (CMP) | SS (AGP) |
| **12.00 TO 12.45 pm LUNCH BREAK** |
| **3** | **12.45 pm TO 01.45 pm** | NT (CMP) | S1- Semi. (DOS)S2- NT (CMP)S3- SS (AGP) | PT&RP (/RPO) | CO&A (DBK) | S1- CO&A (DBK) (T)S2- Semi. (DOS)S3- Semi. (/RPO)S4- NT (CMP) |  |
| **4** | **01.45 pm TO 02.45 pm** | PT&RP (/RPO) | BHR (SVP) | SS (AGP) |
| **02.45 pm TO 03.00 pm TEA BREAK** |
| **5** | **03.00 pm TO 04.00 pm** | SS (AGP) | BHR (SVP) | S1- Semi. (DOS)S2- Semi. (/RPO)S4- SS (AGP) | BHR (SVP) | S1- SS (AGP) (T)S4- NT (CMP) (T) |  |
| **6** | **04.00 pm TO 05.00 pm** | S1- NT (SVP) (T)S2- SS (AGP) (T)S3- CO&A (DBK) (T) | S2- NT (SVP) (T)S3- SS (/RPO) (T)S4- CO&A (DBK) (T) | S2- CO&A (DBK) (T)S3- NT (SVP) (T)S4- SS (AGP) (T) |  |

**BTETC401: Network Theory 4 Credits**

***Course Objectives:***

1.To learn about the basic laws of electric circuits as well as the key fundamentals of the communication channels, namely transmission lines. 2.To understand the need of simplification techniques of complicated circuits

3.To learn about the comprehensive insight into the principle techniques available for characterizing circuits, networks and their implementation in practice.

4.To learn about the use of mathematics, need of different transforms and usefulness of differential equations for analysis of networks.

5.To train the students for handling analog filter design through theory of NA along with practical, this is basic requirement of signal processing field

***Course Outcomes:***

On completion of the course, students will be able to:

1.Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze thesame.

2.Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.

3.Identify issues related to transmission of signals, analyze different RLC networks.

4.Find technology recognition for the benefit of the society.

**UNIT – 1 Network Theorems: 07 Hours**

Basic nodal and mesh analysis, linearity, superposition and source transformation, Thevinin‟s, Norton‟s and maximum power transfer theorem and useful circuit analysis techniques, network topology, introduction to SPICE in circuit analysis.

**UNIT – 2 Transient Analysis and Frequency Domain Analysis: 07 Hours**

Transient Analysis: Source free RL and RC circuits, unit step forcing function, source free parallel and series RLC circuit, complete response of the RLC circuit, lossless LC circuit. Frequency Domain Analysis: The phasor concept, sinusoidal steady state analysis; AC circuit power analysis.

**UNIT – 3 Laplace transform and its circuit applications: 07 Hours**

 Laplace transform, initial and final value theorem, circuit analysis in s domain, frequency response

**UNIT – 4 Two Port Networks: 07 Hours**

Two Port Networks: Z, Y, h and ABCD parameters, analysis of interconnected (magnetically coupled) two port, three terminal networks

**UNIT – 5 State Variable Analysis and RL & RC Network Synthesis: 07 Hours**

State Variable Analysis: State variables and normal-form equations, matrix-based solution of the circuit equations. RL & RC Network Synthesis: Synthesis of one-port networks, transfer function synthesis, basics of filter design.

*Text Books/ Reference Books:*

*1.Hayt, Kemmerley and Durbin, “Engineering Circuit Analysis”, 8th 2012 Ed., Tata McGraw-Hill 2.DeCarlo, R.A. and Lin, P.M., “Linear Circuit Analysis: Time Domain, Phasor and Laplace Transform Approaches”, Oxford University Press.2003.*

*3.M.E. Van Valkenburg, “Network Analysis”, 3rd ed., Pearson2006.*

*4.M.E. Van Valkenburg, “Network Synthesis,” PHI2007.*

*5.Kuo, F.F., “Network Analysis and Synthesis”, 2nd Ed., Wiley India.2008.*

*6.D Roy Choudary, “Network and Systems” 1st edition, New Age International,1988*

*7.Boylestead, “Introductory Circuit Analysis”, 4th edition, Charles & Merrill,1982.*

*8.Royal Signal Handbook on Line Communication*

**NOTES**

**BTETC402 Signals and Systems 4 Credits**

***Course Objectives:***

1.To understand the mathematical description of continuous and discrete time signals and systems.

 2.To classify signals into different categories.

3.To analyze Linear Time Invariant (LTI) systems in time and transform domains.

4.To build basics for understanding of courses such as signal processing, control system and communication.

***Course Outcomes:***

On completion of the course, students will be able to:

1.Understand mathematical description and representation of continuous and discrete time signals and systems.

2.Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system. 3.Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.

4.Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.

**UNIT – 1 Introduction to Signals and Systems: 07 Hours**

Introduction and Classification of signals: Definition of signal and systems, Continuous time and discrete time signal, Classification of signals as even, odd, periodic and non-periodic, deterministic and nondeterministic, energy and power, elementary signals used for testing: exponential, sine, impulse, step and its properties, ramp, rectangular, triangular, signum, sinc Operations on signals: Amplitude scaling, addition, multiplication, differentiation, integration (Accumulator for DT), time scaling, time shifting and time folding, Sampling Theorem and reconstruction of sampled signal, Concept of aliasing, examples on under sampled and over sampledsignals. Systems: Definition, Classification: linear and non-linear, time variant and invariant, causal and non-causal, static and dynamic, stable and unstable, invertible.

**UNIT – 2 Time domain representation of LTI System: 07 Hours**

System modeling: Input-output relation, definition of impulse response, convolution sum, convolution integral, computation of convolution integral using graphical method, Computation of convolution sum. Properties of convolution, properties of the system based on impulse response, step response in terms of impulse response.

**UNIT – 3 Fourier Series: 07 Hours**

Fourier series (FS) representation of periodic Continuous Time (CT) signals, Dirichlet condition for existence of Fourier series, FS representation of CT signals using exponential Fourier series, Fourier spectrum representation, properties of Fourier series, Gibbs phenomenon, Discrete Time Fourier Series and its properties.

**UNIT – 4 Fourier Transform: 07 Hours**

Fourier Transform (FT) representation of aperiodic CT signals, Dirichlet condition for existence of Fourier transform, evaluation of magnitude and phase response, FT of standard CT signals, FT of standard periodic CT signals, Introduction to Fourier Transform of DT signals, Properties of CTFT and DTFT, Fourier Transform of periodic signals. Conceptof sampling and reconstruction in frequency domain, sampling of bandpass signals.

**UNIT – 5 Laplace and Z-Transform: 07 Hours**

Definition of Laplace Transform (LT), Limitations of Fourier transform and need of Laplace transform, ROC and its properties, properties of Laplace transform, Laplace transform evaluation using properties, Inverse Laplace transform based on partial fraction expansion, Application of Laplace transforms to the LTI system analysis. Introduction to Z-transform, and its properties, Inverse Z-transform, different methods of inverse Ztransform, Z-transform for discrete time system LTI analysis.

***TEXT/REFERENCE BOOKS:***

*1.Alan V. Oppenheim. Alan S. Willsky and S. Hamid Nawab, “Signals and Systems”,PHI*

*2.Dr. S. L. Nalbalwar, A.M. Kulkarni and S.P. Sheth, “Signals and Systems”, 2nd Edition, Synergy Knowledgeware,2017*

*3.Simon Haykins and Barry Van Veen, “Signals and Systems”, 2nd Edition, WileyIndia.*

 *4.ShailaApte, “Signals and Systems-principles and applications”, Cambridge University press,2016. 5.Mrinal Mandal and Amir Asif, Continuous and Discrete Time Signals and Systems, Cambridge University Press,2007.*

*6.Peyton Peebles, “Probability, Random Variable, Random Processes”, 4th Edition, Tata McGraw Hill. 7.A. NagoorKanni “Signals and Systems”, 2nd edition, McGrawHill.*

*8.NPTEL video lectures on Signals andSystems.*

*9.Roberts, M.J., “Fundamentals of Signals & Systems”, Tata McGraw Hill.2007.*

*10.Ziemer, R.E., Tranter, W.H. and Fannin, D.R., “Signals and Systems: Continuous and Discrete”, 4th 2001 Ed., Pearson Education.*

**NOTES**

BTHM403 Basic Human Rights 3 Credits

***Course Objectives:***

1.To train the young minds facing the challenges of the pluralistic society and the rising conflicts and tensions in the name of particularistic loyalties to caste, religion, region and culture.

2.To give knowledge of the major "signposts" in the historical development of human rights, the range of contemporary declarations, conventions, and covenants.

3.To enable them to understand the basic concepts of human rights (including also discrimination, equality, etc.), the relationship between individual, group, and national rights.

4.To develop sympathy in their minds for those who are denied rights.

5.To make the students aware of their rights as well as duties to the nation

***Course Outcomes:***

1. Students will be able to understand the history of human rights.

2. Students will learn to respect others caste, religion, region and culture.

 3. Students will be aware of their rights as Indian citizen.

4. Students will be able to understand the importance of groups and communities in the society.

5. Students will be able to realize the philosophical and cultural basis and historical perspectives of human rights.

**UNIT – 1**

The Basic Concepts: -Individual, group, civil society, state, equality, justice. Human Values, Human rights and Human Duties: - Origin, Contribution of American bill of rights, French revolution. Declaration of independence, Rights of citizen, Rights of working and exploited people

**UNIT – 2**

Fundamental rights and economic programme. Society, religion, culture, and their inter relationship. Impact of social structure on human behavior, Social Structure and Social Problems: - Social and communal conflicts and social harmony, rural poverty, unemployment, bonded labor

**UNIT – 3**

Migrant workers and human rights violations, human rights of mentally and physically challenged. State, Individual liberty, Freedom and democracy. NGOs and human rights in India: - Land, Water, Forest issues.

**UNIT – 4**

Human rights in Indian constitution and law:- i)The constitution of India: Preamble ii) Fundamental rights. iii) Directive principles of state policy. iv) Fundamental duties. v) Some other provisions.

**UNIT – 5**

Universal declaration of human rights and provisions of India. Constitution and law. National human rights commission and state human rights commission.

 *TEXT/REFERENCE BOOKS:*

*1. Shastry, T. S. N., India and Human rights: Reflections, Concept Publishing Company India (P Ltd.), 2005*

*2. Nirmal, C.J., Human Rights in India: Historical, Social and Political Perspectives(Law in India), Oxford India.*

**NOTES**

BTBS404 Probability Theory and Random Processes 3 Credits

***Course Objectives:***

1. To develop basic of probability and random variables.

2. The primary objective of this course is to provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve probabilistic problems in engineering and applied science.

***Course Outcomes:***

At the end of this course students will demonstrate the ability to

1. Understand representation of random signals

 2. Investigate characteristics of random processes

3. Make use of theorems related to random signals

4. To understand propagation of random signals in LTI systems.

**UNIT – 1 Introduction to Probability: 07 Hours**

Definitions, scope and history; limitation of classical and relative-frequency-based definitions, Sets, fields, sample space and events; axiomatic definition of probability, Combinatorics: Probability on finite sample spaces, Joint and conditional probabilities, independence, total probability; Bayes‟ rule and applications

**UNIT – 2 Random variables: 07 Hours**

Definition of random variables, continuous and discrete random variables, cumulative distribution function (cdf) for discrete and continuous random variables; probability density functions (pdf) and properties, Jointly distributed random variables, conditional and joint density and distribution functions, Function of one random variable, pdf of the function of one random variable; Function of two random variables; Sum of two independent random variables, Expectation: mean, variance and moments of a random variable, conditional expectation; covariance and correlation; independent,

**UNIT – 3 Random vector and distributions: 07 Hours**

 Random vector: mean vector, covariance matrix and properties, Some special distributions: Uniform, Gaussian and Rayleigh distributions; Binomial, and Poisson distributions; MultivariateGaussiandistribution,Vector-spacerepresentationofrandomvariables,linear independence, inner product, Schwarz Inequality, Moment-generating functions, Bounds and approximations: Tchebysheff inequality and Chernoff Bound

**UNIT – 4 Sequence of random variables 07 Hours**

Almost sure convergence and strong law of large numbers; convergence in mean square sense with examples from parameter estimation; convergence in probability with examples; convergence in distribution, Central limit theorem and its significance.

**UNIT – 5 Random process: 07 Hours**

Random process: Probabilistic structure of a random process; mean, autocorrelation and auto - covariance functions, Stationarity: strict - sense stationary (SSS) and wide- sense stationary (WSS) processes, Autocorrelation function of a real WSS process and its properties, cross- correlation function, Ergodicity and its importance, Power spectral density, properties of power spectral density, cross- power spectral density and properties; auto- correlation function and power spectral density of a WSS random sequence, examples with white - noise as input; Examples of random processes: white noise process and white noise sequence; Gaussian process; Poisson process, Markov Process.

*TEXT/REFERENCE BOOKS:*

*1.T. Veerrajan, “Probability, Statistics and Random Processes”, Third Edition, McGraw Hill. 2.Probability and Random Processes by Geoffrey Grimmett, DavidStirzaker*

*3.Probability, random processes, and estimation theory for engineers by Henry Stark, John WilliamWoods.*

*4.H. Stark and J. Woods, ``Probability and Random Processes with Applications to Signal Processing,'' Third Edition, Pearson Education*

*5.A. Papoulis and S. Unnikrishnan Pillai, “Probability, Random Variables and Stochastic Processes,'' Fourth Edition, Mc GrawHill.*

*6.K. L. Chung, Introduction to Probability Theory with Stochastic Processes, Springer International*

*7.P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability, UBSPublishers.*

*8.P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Stochastic Processes, UBS Publishers*

*9.S. Ross, Introduction to Stochastic Models, Harcourt Asia, AcademicPress.*

**NOTES**

BTETPE405C Computer Organization and Architecture 4 Credits

\*Prerequisites: Digital Electronic Circuits.

***Course Objectives:***

1. To introduce basic concepts of computer organization and to illustrate the computer organization concepts by Assembly Language programming.

 2. To understand operating systems and how they work with the computer and students will understand the relationship between hardware and software specifically how machine organization impacts the efficiency of applications written in a high-level language.

3. Students will be able to make use of the binary number system to translate values between the binary and decimal number systems, to perform basic arithmetic operations and to construct machine code instructions and students will be able to design and implement solutions for basic programs using assembly language.

4. Students will be able to design logical expressions and corresponding integrated logic circuits for a variety of problems including the basic components of a CPU such as adders, multiplexers, the ALU, a register file, and memory cells and to explain the fetch-execute cycle performed by the CPU and how the various components of the data path are used in this process.

***Course Outcomes:***

At the end of this course students will demonstrate the ability to

1. learn how computers work

2. know basic principles of compute working

3. analyze the performance of computers

4. know how computers are designed and built.

**UNIT – 1 Overview of computer organization: 07 Hours**

Overview of computer organization – components and system buses; Concepts of assembly and machine language programs. Machine language program execution – instruction cycles, machine cycles and bus cycles. Overview of memory and I/O addressing; CPU organization – components and subsystems, register banks, internal bus structure, information flow;

**UNIT – 2 Instruction set: 07 Hours**

Instruction set – characteristics and functions, types of operation and operands. Addressing modes – various ways of addressing memory and input-output devices and their timing characteristics;

**UNIT – 3 CISC and RISC architectures: 07 Hours**

CISC and RISC architectures – examples; ALU – flags, logical operations, fixed point number representations and arithmetic, floating point number representations and arithmetic, exceptions. Control Unit – how it operates, hardwired control unit, concepts of micro programs and micro programmed control unit;

**UNIT –4 Memory: 07 Hours**

Memory hierarchy – main memory – types and interfacing; Cache memory – its organizations and operations, levels of caches; Memory management module – paging and segmentation, virtual memory; Disk memory, RAIDs. Back-up memory.

**UNIT – 5 Interrupts and interrupt structures and DMA controller: 07 Hours** Interrupts and interrupt structures – interrupt cycles, handling multiple simultaneous interrupts, programmable interrupt controllers; I/O interfacing and modes of I/O data transfer. Direct memory access – DMA controller; Instruction level parallelism – instruction pipelining, pipeline hazards; Concepts of multiprocessor systems; Examples will be drawn from real life RISC and CISC processors.

*TEXT/REFERENCE BOOKS:*

*1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, “Computer Organization,” McGraw Hill, 2011.*

*2. D A Patterson and J L Hennessy, “Computer Architecture – A Quantitative Approach,” Morgan Kaufmann,2011.*

*3. W Stallings, “Computer Organization and Architecture – Designing for Performance,” Pearson,2013.*

*4. J. P. Hayes, “Computer Architecture and Organization,” McGraw-Hill,1998.*

*5. D A Patterson and J L Hennessy, “Computer Organization and Design – The Hardware/Software Interface,” ARM Edition, Morgan Kaufmann,2012.*

 *6. S. Tannenbaum, “Structured Computer Organization,” EEE Ed., Prentice Hall,2013.*

*7. Mano, M.M., “Computer System Architecture” 3rd Ed., Prentice-Hall of 2004India.*

**NOTES**