

Department of Electronics and Telecommunication Engineering

Dr. V. P. Shetkari Shikshan Mandal's

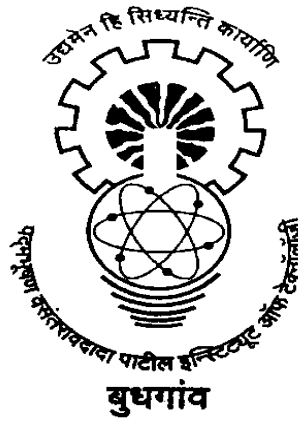
Padmabhooshan Vasantodada Patil

Institute of Technology,

Budhgaon – 416304.

STUDENTS INFORMATION MANUAL

(TY 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



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

Department of Electronics and Telecommunication Engineering

concepts.

- To prepare students with professional ethics, soft skills, social responsibilities 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 research and 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.

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

Department of Electronics and Telecommunication 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.

Department of Electronics and Telecommunication Engineering



Dr. Vasantrodada Patil Shetkari Shikshan Mandal's
Padmabhooshan Vasantrodada Patil
Institute of Technology, Budhgaon – 416 304
 Academic Calendar (2022-23) Semester II (TY & B. Tech)

February 2023 - Academic Days: 8

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

Commencement of Term	20 th Feb 2023
List of students not reported	28 th Feb 2023
1 st Defaulter List	28 th Feb 2023

March 2023 - Academic Days: 22

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Late Vasantdada Punyatithi	1 st Mar 2023
Dhulivandan	7 th Mar 2023
Gudi Padwa	22 nd Mar 2023
Ram Navmi	30 th Mar 2023
2 nd Defaulter List	31 st Mar 2023

April 2023 - Academic Days: 19

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Mahavir Jayanti	4 th Apr 2023
Good Friday	7 th Apr 2023
Dr. Babasaheb Ambedkar Jayanti	14 th Apr 2023
Ramzan Id	22 nd Apr 2023
Mid Semester Exam	19 th – 21 st Apr 2023
Display of Mid Sem Marks	24 th – 26 th Apr 2023
Annual Social Gathering	
3 rd Defaulter List	30 th Apr 2023

May 2023 - Academic Days: 24

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Maharashtra Day	1 st May 2023
Buddha Pournima	7 th May 2023
Sports Week	
4 th Defaulter List	31 st May 2023

June 2023 - Academic Days: - 11

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

End of Classes	14 th June 2023
Practical Examination	
Uploading Internal Marks/MSE Marks on portal	
End Semester & Supplementary Exam	
Bakri Id	29 th June 2023
Final Defaulter List	30 th June 2023

Dr. K.K. Pandeyaji
 Dean Academics

Dr. D.V. Ghewade
 Principal

Academic Activity
 Co-curricular activity
 Holidays
 Events
 Academic Compliance

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.

Department of Electronics and Telecommunication Engineering

EVALUATION SYSTEM

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

Percentage 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 awarded based on CGPA of all eighth semester of B.Tech Program.

CGPA for pass is minimum 5.0	
CGPA up to <5.50	Pass Class
CGPA \geq 5.50 & <6.00	Second Class
CGPA \geq 6.00 & <7.50	First Class
CGPA \geq 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 Assessment Marks	20
End Semester Exam (ESE) Marks	40

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

Continuous Assessment 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]

Department of Electronics and Telecommunication Engineering

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:

$$SGPA = \frac{[\sum_{i=1}^n c_i g_i]}{[\sum_{i=1}^n c_i]}$$

Where 'n' is the number of subjects for the semester,

'c_i' is the number of credits allotted to a particular subject, and 'g_i' 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:

$$CGPA = \frac{[\sum_{i=1}^m c_i g_i]}{[\sum_{i=1}^m c_i]}$$

Department of Electronics and Telecommunication Engineering

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.

Department of Electronics and Telecommunication Engineering

Activity Record

(Counseling, Co/Extra Curricular, Leave)

Counseling Staff Name

Date	Topic	Suggestion

Co/Extra Curricular Activities

Date	Activity Name	Participation level	Outcome

Leave Record

Sr. No.	From	To	Reason	Permitting Staff	Remark

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

Semester VI										
Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
PCC 8	BTETC601	Antennas and Wave Propagation	3	1	-	20	20	60	100	4
PCC 9	BTETC602	Digital Communication	3	1	-	20	20	60	100	4
PEC 3	BTETPE603	Group A	3	1	-	20	20	60	100	4
OEC 2	BTETOE604	Group B	3	1	-	20	20	60	100	4
HSSMC	BTHM605	Employability and Skill Development	3	-	-	20	20	60	100	3
LC	BTETL606	Digital Communication Lab & Professional Elective Course 3 Lab	-	-	4	60	-	40	100	2
Project	BTETM607	Mini Project – 2	-	-	4	60	-	40	100	2
Internship	BTETP608 (Internship – 3)	Field Training / Internship/Industrial Training (minimum of 4 weeks which can be completed partially in third semester and fourth semester or in at one time).	-	-	-	-	-	-	-	Audit (evaluation will be in VII Sem.)
Total			15	4	8	220	100	380	700	23

BSC = Basic Science Course, ESC = Engineering Science Course, PCC = Professional Core Course, PEC = Professional Elective Course, OEC = Open Elective Course, LC = Laboratory Course, HSSMC = Humanities and Social Science including Management

TIMETABLE

Sr · No.	Time	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	10.00 am TO 11.00 am	CN (MSC)	AWP (DOS)	T1- Mi.Pr.(SVP)	VLSI (BPK)	AWP (DOS)	
2	11.00 am TO 12.00 noon	DCOM (/SSS)	CN (MSC)	T2- VLSI (BPK) T3- DCOM (/SSS) T4- Mi.Pr.(MSC)	CN (MSC)	E&SD (CMP)	
12.00 TO 12.45 pm LUNCH BREAK							
3	12.45 pm TO 01.45 pm	T1- DCOM (/SSS) T2- AWP (DOS)(T)	VLSI (BPK)	AWP (DOS)	T1- VLSI (BPK) T2- Mi.Pr.(CMP)	DCOM (/SSS)	
4	01.45 pm TO 02.45 pm	T3- Mi.Pr.(DBK) T4- Mi.Pr.(MSC)	DCOM (/SSS)	VLSI (BPK)	T3- Mi.Pr.(SVP) T4- DCOM (/SSS)		
02.45 pm TO 03.00 pm TEA BREAK							
5	03.00 pm TO 04.00 pm	E&SD (CMP)	T2- DCOM (/SSS)	E&SD (CMP)	T1- VLSI (BPK)(T) T2- CN (MSC) (T) T3- AWP (DOS)(T) T4- DCOM (/SSS)(T)	T1- Mi.Pr.(SVP) T2- Mi.Pr.(DBK)	
6	04.00 pm TO 05.00 pm	T1- AWP (DOS)(T) T2- DCOM (/SSS)(T) T3- VLSI (BPK)(T) T4- CN (MSC) (T)	T3- VLSI (BPK)	T1- CN (MSC) (T) T3- DCOM (/SSS)(T) T4- VLSI (BPK)(T)	T1- DCOM (/RPO)(T) T2- VLSI (CMP)(T) T3- CN (MSC) (T) T4- AWP (DOS)(T)	T4- VLSI (BPK)	

BTETC601 Antennas and Wave Propagation 4 Credits

Course Objectives:

1. To understand the applications of electromagnetic engineering.
2. To formulate and solve the Helmholtz wave equation and solve it for Uniform Plane Wave.
3. To analyze and understand the Uniform plane wave propagation in various media.
4. To solve the electric field and magnetic fields for a given wire antenna.

Course Outcomes:

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

1. Formulate the wave equation and solve it for uniform plane wave.
2. Analyze the given wire antenna and its radiation characteristics.
3. Identify the suitable antenna for a given communication system.

UNIT – 1 Wave Propagation: 07 Hours

Fundamental equations for free space propagation, Friis Transmission equation, Attenuation over reflecting surface, Effect of earth's curvature. Ground, sky & space wave propagations. Structure of atmosphere. Characteristics of ionized regions. Effects of earth's magnetic field. Virtual height, MUF, Skip distance. Ionospheric abnormalities. Multi-hop propagation. Space link geometry. Characteristics of Wireless Channel: Fading, Multipath delay spread, Coherence Bandwidth, and Coherence Time.

UNIT – 2 Antenna Fundamentals and Wire Antennas: 07 Hours

Introduction, Types of Antenna, Radiation Mechanism, Antenna Terminology: Radiation pattern, radiation power density, radiation intensity, directivity, gain, antenna efficiency, half power beam width, bandwidth, antenna polarization, input impedance, antenna radiation efficiency, effective length, effective area, reciprocity. Radiation Integrals: Vector potentials A, J, F, M, Electric and magnetic fields electric and magnetic current sources, solution of inhomogeneous vector potential wave equation, far field radiation. Wire Antennas: Analysis of Linear and Loop antennas: Infinitesimal dipole, small dipole, and finite length dipole half wave length dipole, small circular loop antenna. Complete Analytical treatment of all these elements.

UNIT – 3 Antenna Arrays: 07 Hours

Antenna Arrays: Two element array, pattern multiplication N-element linear array, uniform amplitude and spacing, broad side and end-fire array, N-element array: Uniform spacing, nonuniform amplitude, array factor, binomial and Dolph-Tchebyshev array. Planar Array, Circular Array, Log Periodic Antenna, Yagi-Uda Antenna Array.

UNIT – 4 Concepts of Smart Antennas: 07 Hours

Introduction, Smart Antenna Analogy, Cellular Radio System Evolution, benefits and drawbacks of smart antennas, fixed weight beam forming basics, Antenna beamforming

UNIT – 5 Antennas and Applications: 07 Hours

Structural details, dimensions, radiation pattern, specifications, features and applications of following Antennas: Hertz & Marconi antennas, V- Antenna, Rhombic antenna. TW antennas. Loop antenna, Whip antenna, Biconical, Helical, Horn, Slot, Microstrip, Turnstile, Super turnstile & Lens antennas. Antennas with parabolic reflectors.

Text Books/ Reference Books:

1. C. A. Balanis, "Antenna Theory - Analysis and Design", JohnWiley.
2. Mathew N O Sadiku, "Elements of Electromagnetics" 3rd edition, Oxford University Press.
3. John D Kraus, Ronald J Marhefka, Ahmad S Khan, Antennas for All Applications, 3rd Edition, the McGraw Hill Companies.
4. K. D. Prasad, "Antenna & Wave Propagation", SatyaPrakashan, NewDelhi.
5. John D Kraus, "Antenna & Wave Propagation", 4th Edition, McGraw Hill, 2010.
6. Vijay K Garg, Wireless Communications and Networking, Morgan Kaufmann Publishers, An Imprint of Elsevier, 2008.

NOTES

BTETC602 Digital Communication 4 Credits

Course Objectives:

1. To understand the building blocks of digital communication system.
2. To prepare mathematical background for communication signal analysis.
3. To understand and analyze the signal flow in a digital communication system.
4. To analyze error performance of a digital communication system in presence of noise and other interferences.
5. To understand concept of spread spectrum communication system.

Course Outcomes:

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

1. Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
2. Perform the time and frequency domain analysis of the signals in a digital communication system.
3. Select the blocks in a design of digital communication system.
4. Analyze Performance of spread spectrum communication system.

UNIT – 1 Digital Transmission of Analog Signal: 07 Hours

Introduction to Digital Communication System: Why Digital?, Block Diagram and transformations, Basic Digital Communication Nomenclature. Digital Versus Analog Performance Criteria, Sampling Process, PCM Generation and Reconstruction, Quantization Noise, Non-uniform Quantization and Companding, PCM with noise: Decoding noise, Error threshold, Delta Modulation, Adaptive Delta Modulation, Delta Sigma Modulation, Differential Pulse Code Modulation, LPC speechsynthesis.

UNIT – 2 Baseband Digital Transmissions: 07 Hours

Digital Multiplexing: Multiplexers and hierarchies, Data Multiplexers. Data formats and their spectra, synchronization: Bit Synchronization, Scramblers, Frame Synchronization. Inter- symbol interference, Equalization.

UNIT – 3 Random Processes: 07 Hours

Introduction, Mathematical definition of a random process, Stationary processes, Mean, Correlation & Covariance function, Ergodic processes, Transmission of a random process through a LTI filter, Power spectral density, Gaussian process, noise, Narrow band noise, Representation of narrowband noise in terms of in phase & quadrature components.

UNIT – 4 Baseband Receivers: 07 Hours

Detection Theory: MAP, LRT, Minimum Error Test, Error Probability, Signal space representation: Geometric representation of signal, Conversion of continuous AWGN channel to vector channel, Likelihood functions, Coherent Detection of binary signals in presence of noise, Optimum Filter, Matched Filter, Probability of Error of Matched Filter, Correlation receiver.

UNIT–5 Passband Digital Transmission & Spread Spectrum Techniques: 07 Hours

Pass band transmission model, Signal space diagram, Generation and detection, Error Probability derivation and Power spectra of coherent BPSK, BFSK and QPSK. Geometric representation, Generation and detection of - M-ary PSK, M-ary QAM and their error probability, Generation and detection of -Minimum Shift Keying, Gaussian MSK, Non- coherent BFSK, DPSK and DE PSK ,Introduction to OFDM. Spread Spectrum Techniques: Introduction, Pseudo noise sequences, A notion of spread spectrum, Direct sequence spread spectrum with coherent BPSK, Signal space dimensionality & processing gain, Probability of error, Concept of jamming, Frequency hop spread spectrum, Wireless Telephone Systems, Personal Communication System.

TEXT/REFERENCE BOOKS:

1. Simon Haykin, "Digital Communication Systems", John Wiley & Sons, Fourth Edition.
2. A.B Carlson, P B Crully, J C Rutledge, "Communication Systems", Fourth Edition, McGraw Hill Publication.
3. Ha Nguyen, Ed Shwedyk, "A First Course in Digital Communication", Cambridge University Press.
4. B P Lathi, Zhi Ding "Modern Analog and Digital Communication System", Oxford University Press, Fourth Edition.
5. Bernard Sklar, Prabitra Kumar Ray, "Digital Communications Fundamentals and Applications" Second Edition, Pearson Education.
6. Taub, Schilling, "Principles of Communication System", Fourth Edition, McGrawHill.
7. P RamkrishnaRao, Digital Communication, Mc Graw Hill Publication.

NOTES

BTETPE603G VLSI Design & Technology 4 Credits

Course Objectives:

1. To study HDL based design approach.
2. To learn digital CMOS logic design.
3. To nurture students with CMOS analog circuit designs.
4. To realize importance of testability in logic circuit design.
5. To overview SoC issues and understand PLD architectures with advanced features.

Course Outcomes:

1. Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
2. Understand chip level issues and need of testability.
3. Design analog & digital CMOS circuits for specified applications

UNIT – 1 VHDL Modeling: 07 Hours

Data objects, Data types, Entity, Architecture & types of modeling, Sequential statements, Concurrent statements, Packages, Sub programs, Attributes, VHDL Test bench, Test benches using text files. VHDL modeling of Combinational, Sequential logics & FSM, Meta-stability.

UNIT – 2 PLD Architectures: 07 Hours

PROM, PLA, PAL: Architectures and applications. Software Design Flow, CPLD Architecture, Features, Specifications, Applications, FPGA Architecture, Features, Specifications, Applications.

UNIT – 3 SoC & Interconnect: 07 Hours

Clock skew, Clock distribution techniques, clock jitter, Supply and ground bounce, power distribution techniques. Power optimization, Interconnect routing techniques; wire parasitic, Signal integrity issues, I/O architecture, pad design, Architectures for low power.

UNIT – 4 Digital CMOS Circuits: 07 Hours

MOS Capacitor, MOS Transistor theory, C-V characteristics, Non ideal I-V effects, Technology Scaling. CMOS inverters, DC transfer characteristics, Power components, Power delay product, Transmission gate. CMOS combo logic design, Delays: RC delay model, Effective resistance, Gate and diffusion capacitance, Equivalent RC circuits;

Department of Electronics and Telecommunication Engineering

Linear delay model, Logical effort, Parasitic delay, Delay in a logic gate, Path logical efforts.

UNIT – 5 Analog CMOS Design and Testability: 07 Hours

Current sink and source, Current mirror, Active load, Current source and Push-pull inverters, Common source, Common drain, Common gate amplifiers. Cascade amplifier, Differential amplifier and Operational amplifier. Testability: Types of fault, Need of Design for Testability (DFT), Testability, Fault models, Path sensitizing, Sequential circuit test, BIST, Test pattern generation, JTAG & Boundary scan, TAP Controller.

TEXT/REFERENCE BOOKS:

1. Charles H. Roth, "Digital systems design using VHDL", PWS.
2. Wyane Wolf, "Modern VLSI Design (System on Chip)", PHI Publication.
3. Allen Holberg, "Analog CMOS Design", Oxford University Press.
4. Neil H. E. Weste, David Money Harris, "CMOS VLSI Design: A Circuit & System Perspective", Pearson Publication.

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Course Objectives:

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
3. To provide an opportunity to do network programming
4. To provide a WLAN measurement idea.

Course Outcomes:

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

1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
3. To be familiar with wireless networking concepts.
4. To be familiar with contemporary issues in networking technologies.
5. To be familiar with network tools and network programming.
6. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component.
7. For a given problem related TCP/IP protocol developed the network programming.
8. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

UNIT – 1 Physical Layer: 07 Hours

Data Communications, Networks, Network types, Protocol layering, OSI model, Layers in OSI model, TCP / IP protocol suite, Addressing, Guided and Unguided Transmission media. Switching: Circuit switched networks, Packet Switching, Structure of a switch.

Department of Electronics and Telecommunication Engineering

UNIT – 2 Data Link Layer: 07 Hours

Introduction to Data Link Layer, DLC Services, DLL protocols, HDLC, PPP, Media Access Control: Random Access, Controlled Access, Channelization. Wired LAN: Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet.

UNIT – 3 Wireless LANS & Virtual Circuit Networks and Network Layer: 07 Hours

Introduction, Wireless LANS: IEEE 802.11 project, Bluetooth, Zigbee, connecting devices and Virtual LANS: Connecting devices, Virtual LANS. Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols

UNIT – 4 Transport Layer: 07 Hours

Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT – 5 Application Layer: 07 Hours

Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography.

TEXT/REFERENCE BOOKS:

1. *Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill.*
2. *TCP/IP Protocol Suite, 4th Edition, Behrouz A. Forouzan, TataMcGraw-Hill.*
3. *Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.*
4. *Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.*
5. *Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.*
6. *TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.*

Course Objectives:

1. To develop analytical abilities.
2. To develop communication skills.
3. To introduce the students to skills necessary for getting, keeping and being successful in a profession.
4. To expose the students to leadership and team-building skills.

Course Outcomes:

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

1. Have skills and preparedness for aptitude tests.
2. Be equipped with essential communication skills (writing, verbal and non-verbal)
3. Master the presentation skill and be ready for facing interviews.
4. Build team and lead it for problem solving.

UNIT – 1 Soft Skills & Communication basics: 07 Hours

Soft skills Vs hard skills, Skills to master, Interdisciplinary relevance, Global and national perspectives on soft skills, Resume, Curriculum vitae, How to develop an impressive resume, Different formats of resume – Chronological, Functional, Hybrid, Job application or cover letter, Professional presentation planning, preparing and delivering presentation, Technical writing.

UNIT – 2

07 Hours

Interpersonal Skills: Critical Thinking, Assertiveness, Decision Making, Problem Solving, Negotiation, Building Confidence, Time Management, Personal Presentation, Assertiveness, negotiation, avoiding Stress. Commercial Awareness: Professional etiquettes and manners, Global negotiating and Persuading, Integrity. Global trends and statistics about civil engineering businesses.

UNIT – 3 Grammar and Comprehension: 07 Hours

English sentences and phrases, Analysis of complex sentences, Transformation of sentences, Paragraph writing, Story writing, Reproduction of a story, Letter writing, précis writing, Paraphrasing and e-mail writing.

UNIT –4 Skills for interviews: 07 Hours

Interviews- types of interviews, preparatory steps for job interviews, interview skill tips, Groupdiscussion- importance of group discussion, types of group discussion, difference between group discussion, panel discussion and debate, personality traits evaluated in group discussions, tips for successful participation in group discussion, Listening skills- virtues of listening, fundamentals of good listening, Non-verbal communication-body movement, physical appearance, verbal sounds, closeness, time.

UNIT – 5 Problem Solving Techniques: 07 Hours

Problem solving model: 1. Define the problem, 2. Gather information, 3. Identify various solution, 4. Evaluate alternatives, 5. Take actions, 6. Evaluate the actions. Problem solving skills: 1. Communicate. 2. Brain storming, 3. Learn from mistakes.

TEXT/REFERENCE BOOKS:

1. R. Gajendra Singh Chauhan, Sangeeta Sharma, "Soft Skills- An integrated approach to maximize personality", ISBN: 987-81-265-5639-7, First Edition 2016, WileyWren and Martin, "English grammar and Composition", S. Chandpublications.
2. R. S. Aggarwal, "A modern approach to verbal reasoning", S. Chandpublications.
3. Philip Carter, "The Complete Book of Intelligence Test", John Willey & SonsLtd.
4. Philip Carter, Ken Russell, "Succeed at IQ test", KoganPage.
5. Eugene Ehrlich, Daniel Murphy, "Schaum`s Outline of English Grammar", McGraw Hills.
6. David F. Beer, David A. McMurrey, "A Guide to Writing as an Engineer", ISBN: 978- 1-118- 30027-5 4th Edition, 2014, Wiley.

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