***Lesson Plan***

***Prof.Jagruti Nagaonkar***

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CLASS | | | | | | | TE Electronics, Semester V | | | | | | | |
| Academic Term | | | | | | | July – Nov 2020 | | | | | | | |
| Subject | | | | | | | **Digital Communication (ELX 502)** | | | | | | | |
| ***Periods (Hours) per week*** | | | | | ***Lecture*** | | | ***4*** | | | | | | |
| ***Practical*** | | | ***4*** | | | | | | |
| ***Tutorial*** | | | ***--*** | | | | | | |
| ***Evaluation System*** | | | | |  | | | ***Hours*** | | ***Marks*** | | | | |
| Theory examination | | | 3 | | 80 | | | | |
| Internal Assessment | | | -- | | 20 | | | | |
| Practical Examination | | | -- | | -- | | | | |
| Oral Examination | | | -- | |  | | | | |
| Term work | | | -- | |  | | | | |
| Total | | | -- | | 100 | | | | |
|  | | | | | | | | | | | | | | |
| ***Time Table*** | | | | | ***Day*** | | | ***Time*** | | | | | | |
|  | | |  | | | | | | |
|  | | |  | | | | | | |
|  | | |  | | | | | | |
|  | | |  | | | | | | |
| ***Course Content and Lesson plan*** | | | | | | | | | | | | | | |
| ***Module 1: Information theory and source coding*** | | | | | | | | | | | | | | |
| **Week** | **Lecture No.** | **Date** | | | | **Topic** | | | **Remarks**  **(If any)** | | **Mapped CO** | | | **Mapped PO** |
| **Planned** | | **Actual** | |
| 1 | 1 |  | |  | | Introduction of Digital communication with block diagram and other parameters | | |  | | ELX 502.2 | | | PO1,  PO2 |
| 2 |  | |  | | Concept of information and entropy(H) | | |  | | ELX 502.2 | | | PO1,  PO2 |
| 3 |  | |  | | Examples based on H and Shannon Fano theorem for source coding | | |  | | ELX 502.2.2 | | | PO1,  PO2 |
| 4 |  | |  | | Shanon Fano coding examples, Huffman coding examples | | |  | | ELX 502.2 | | | PO1,  PO2 |
| 5 |  | |  | | Proof on channel capacity parameters, Bandwidth S/N trade off | | | QUIZ1 | | ELX 502.2 | | | PO1,  PO2 |
|  | | | | | | | | | | | | | |
| ***Module 2:* *Digital Modulation Techniques*** | | | | | | | | | | | | | | |
|  | 6 |  | |  | | coherent and non- coherent reception BPSK modulation and demodulation , PSD and constellation diagram | | |  | | | ELX 502.1 | PO1,PO5 | |
|  | 7 |  | |  | | DPSK modulation and demodulation, DEPSK | | |  | | | ELX 502.1 | PO1 | |
|  | 8 |  | |  | | QPSK transmitter, QPSK receiver,offset and nonoffset QPSK | | |  | | | ELX 502.1 | PO1,  PO2 | |
|  | 9 |  | |  | | Mary PSK | | |  | | | ELX 502.1 | PO1,  PO2 | |
|  | 10 |  | |  | | FSK and Mary FSK , QAM | | |  | | | ELX 502.1 | PO1,  PO2 | |
|  | 11 |  | |  | | MSK modulator, waveforms **,** MSK constellation diagram, phase continuity, MSK demodulator | | |  | | | ELX 502.1 | PO1,  PO2 | |
|  | 12 |  | |  | | Comparison of all techniques based on spectral efficiency, power efficiency. Probability of error in detection | | |  | | | ELX 502.1 | PO1,  PO2 | |
|  | 13 |  | |  | | A baseband signal receiver and its Probability of error | | |  | | | ELX 502.1 | PO1,  PO2 | |
|  | 14 |  | |  | | Optimum receiver and its transfer function, matched filter and its properties | | | **QUIZ2** | | | ELX 502.1 | PO1,  PO2 | |
| ***Module 3:* *Introduction to Digital communication system*** | | | | | | | | | | | | | | | 15 |
|  | 15 |  | |  | | Random variables, Mean and variance of random variables (R.V.), Numericals based on R.V | | |  | | | ELX 502.2 | PO1 | |
|  | 16 |  | |  | | Binomial distribution, Poisson distribution, Gaussian PDF, Rician PDF | | |  | | | ELX 502.2 | PO1 | |
|  | 17 |  | |  | | Central limit theorem, Binary synchronous channel.Optimal receiver | | |  | | | ELX 502.2 | PO1 | |
| ***Module 4:Error Control Codes*** | | | | | | | | | | | | | | |
|  |  |  |  | | |  | | |  | | |  |  | |
| ***Module 5:Pulse Shaping for Optimum Transmission*** | | | | | | | | | | | | | | |
|  |  |  | |  | |  | | |  | | |  |  | |
| ***Module 6 :Application of Digital Communication*** | | | | | | | | | | | | | | |
|  |  |  | |  | |  | | |  | | |  |  | |

**Text- Books:**

1. Simon Haykin, “*Communication System*”, John Wiley And Sons ,4th Ed
2. Taub Schilling And Saha, “*Principles Of Communication Systems*”, Tata Mc-Graw Hill, Third Ed
3. John G. Proakis, “*Digital Communications*”, Mcgraw Hill , 5th Ed
4. Anil Maini and Varsha Agarwal,”Satellite Communication”,Wiley publication

**Internal Assessment:**

Two tests will be conducted which will cover at least 80% of syllabus.

The average marks of both the tests will be considered as final IA marks

**Semester End Theory Examination**:

1.      Question paper will comprise of total 6 questions, each of 20 marks.

2.      Only 4 questions need to be solved.

3.      Question number 1 will be compulsory and will cover all modules whereas sub questions

of 2 to 5 marks will be asked

4.      Remaining questions will be asked from all the modules

|  |  |
| --- | --- |
| **Submitted By** | **Approved By** |
|  |  |
| Prof. Jagruti Nagaonkar | ii) Prof. K. Narayanan Sign: |
|  |  |
| Sign: | ii) Prof. Sapna Prabhu Sign: |
|  |  |
|  | iii) Prof. Shilpa PatiL Sign: |
|  | iv) Prof. Monica Khanore Sign: |
|  |  |
| **Date of Submission:** | **Date of Approval:** |
|  | |
| **Remarks by PAC (if any)** | |
|  | |
|  | |