

**RIMT UNIVERSITY MANDI GOBINDGARH
PUNJAB**



RIMT
UNIVERSITY

**Pattern of Course Work & Detailed Syllabus
For
Ph.D Programme in Electronics & Communication Engineering**

Pattern of Course Work for Ph.D Programme in Electronics & Communication Engineering

Name of Course		Contact Hours/Week			Credit	Evaluation Scheme (% of Total Marks)					Exam Duration (Hours)
		L	T	P		CWA	LWA	MTE	ETE	Total	
PHDRM 1101	Research Methodology & Statistical Technique	5	0	0	5	16	---	24	60	100	
PHDCA 1102	Computer Applications in Research	3	0	0	3	16	---	24	60	100	
PHDECE 1103 A 1103 B 1103 C	*Core Subject of the Discipline in which Ph.D degree to be Awarded	5	0	0	5	16	---	24	60	100	
PHD 1104	Mini Project/Term Paper	-	-	-	2	---	---	---	100	100	
Total											

*This course is to be suggested by guide/supervisor in specific domain area of research undertaken by the research candidate. The candidate has to select any one from the following

- PHDECE 1103 A Information Theory & Coding
- PHDECE 1103 B Optical Communication Systems
- PHDECE 1103 C Advanced Communication Systems

L	T	P	CWA	LWA	MTE	ETE
Lecture	Tutorial	Practical	Class Work Assessment	Lab Work Assessment	Mid Term Exam	End Term Exam

SUBJECT TITLE: Information Theory & Coding

SUBJECT CODE: PHDECE 1103 A

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

1. Elements of information theory

Source coding theorem, Huffman coding, Channel coding theorem, channel capacity theorem, Shenonfano theorem, entropy

2. Sampling Process

Base band and band pass sampling theorems reconstruction from samples, Practical aspects of sampling and signal recovery TDM

3. Waveform Coding Techniques

PCM Channel noise and error probability DPCM and DM Coding speech at low bit rates Prediction and adaptive filters. Base band shaping for data transmission, PAM signals and their power spectra Nyquist criterion ISI and eye pattern Equalization.

4. Digital Modulation Techniques

Binary and M-ary modulation techniques, Coherent and non-coherent detection, Bit Vs symbol error probability and bandwidth efficiency. Bit error analysis, using orthogonal Signaling

5. Error Control Coding

Rationale for coding Linbear block codes, cyclic codes and convolution codes Viterbi decoding algorithm and trellis codes.

Books Recommended:

1. Principles of digitals communication: J. Dass. , S.K. Malik & P.K. Chatterjee, 1991.
2. Introduction to the theory of Error correcting codes: Vera Press, 1992
3. Information Theory and Reliable Communication: Robert G. Gallanger Mc Graw Hill, 1992
4. Related IEEE/IEE publications

SUBJECT TITLE: Optical Communication Systems

SUBJECT CODE: PHDECE 1103 B

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

1. Introduction to optical fibers

Wave propagation Dispersion and its limitations, losses and non-linear effects

2. Optical transmitters

LEDs Semiconductor lasers and their characteristics. Transmitter Design

3. Optical receiver

Photo detectors and their characteristics. Receiver Design. Noise and Sensitivity in Optical

Receivers Sensitivity degradation

4. Optical Amplifiers

Semiconductor Optical Amplifier Raman Amplifier. EDFA

5. Dispersion management

Need Pre-compensation Schemes Best Compensation Techniques. Dispersion Compensatory

Fibers Optical Filters Fiber Bragg Grating

6. Multichannel Systems

WDM Light wave Systems WDM Components System Performance tissues TDM. CDM

7. Solution Systems

Fiber Solutions Soliton based Communications Loss Managed Solitons Dispersion -Managed

Solitons High Speed Soliton Systems WDM Soliton Systems

Books Recommended:

1. Fiber-Optic Communication Systems - by GP Aggarwal - John Wiley & Sons

2. Fiber-Optic Communication Systems - by Mynbev - John Wiley & Sons

3. Related IEEE/IEE publications

SUBJECT TITLE: Advanced Communication Systems

SUBJECT CODE: PHDECE 1103 C

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

ADVANCED COMMUNICATION SYSTEMS

1. Introduction

Introduction to communications systems, analog and digital communication systems, Applications of communication systems.

2. Digital Communication

Introduction, Digital Modulation techniques, BPSK, QPSK, PCM, DPCM, Delta Modulation, Digital Transmission and Transmission Impairments.

3. Optical Networks

WDM, TDM, Telecommunication Infrastructure, Switching, 3G systems, SONET, SDH, Architecture of Optical Transport Network, Link Management Protocols, Solutions.

4. Satellite Communication

Basic Transmission Theory, System Noise Temperature and G/T Ratio, Design Of Down Links, Domestic Satellite Systems Using Small Earth Stations, Uplink Design, Design Of Satellite Link For Specified (C/N). Multiple Access Techniques, Frequency Division Multiple Access (FDMA), TDMA, CDMA, Estimating Channel Requirements, Practical Demand Access Systems, Random Access, Multiple Access With On Board Processing. VSAT

5. Mobile Communications

Mobile telephone service, Transmission protocols, Introduction to GSM, GPRS, CDMA, Switching techniques, Fading, Quality of service (QOS).

Books Recommended:

1. Advanced Communication Systems - by Wayne Tomasi; Pearson.
2. Digital Communication - by Proakis; PHI
3. Optical Networks - by Uyles Black; Pearson
4. Satellite Communication - by Timothy Pratt; Addison Wesley.