

# PROJECT MANAGEMENT

## BEG 494 MS

Year: IV

Semester: I

Teaching Schedule Hours/Week			Examination Scheme			
Theory	Tutorial	Practical	Internal Assessment		Final	
3	0	1	Theory	Practical*	Theory	Practical**
			20	-	80	-
						Total
						100

\* Continuous

\*\* Duration: 3 hours

Course Objectives: To provide students with fundamental principles and basic tools and methodology of initiating, planning, scheduling and controlling of the projects.

- |           |  |           |
|-----------|--|-----------|
| <b>1.</b> | <b>Introduction</b>  | <b>3</b>  |
|           | 1.1 Project Definition   |           |
|           | 1.2 Project cycles, Project phases                                       |           |
|           | 1.3 Setting of Project Objectives and Goals                              |           |
| <b>2.</b> | <b>Pre Project work</b>  | <b>2</b>  |
|           | 2.1 Feasibility study  |           |
|           | 2.2 Project Appraisal  |           |
|           | 2.3 Project Proposal   |           |
| <b>3.</b> | <b>Project Planning</b>  | <b>18</b> |
|           | 3.1 Definition   |           |
|           | 3.2 Planning function  |           |
|           | 3.3 Network models CPM/PERT  |           |
|           | 3.4 Goal oriented Project Planning (ZOPP Planning)                       |           |
|           | 3.5 Project Scheduling with limited resources                            |           |
|           | 3.6 Wiest's Algorithm  |           |
|           | 3.7 Manpower leveling  |           |
|           | 3.8 Materials scheduling   |           |
|           | 3.9 Multi project scheduling   |           |
|           | 3.10 Mathematical programming for minimum cost or maximum project return |           |
|           | 3.11 Plan of operation and its different forms of presentation           |           |
| <b>4.</b> | <b>Project Monitoring and Evaluation (M&amp;E) and Control</b>           | <b>8</b>  |
|           | 4.1 Definition of M&E  |           |
|           | 4.2 Method and Technique in M&E  |           |
|           | 4.3 Technique in formulating monitoring indicators                       |           |
|           | 4.4 Controlling systems  |           |
|           | 4.5 Project control cycle  |           |
|           | 4.6 Feedback control system  |           |
|           | 4.7 Cost control   |           |
|           | 4.8 Work breakdown structure   |           |
|           | 4.9 Project Management information system                                |           |
| <b>5.</b> | <b>Capital Planning and Budgeting</b>                                    | <b>10</b> |
|           | 5.1 Capital Planning Procedure   |           |
|           | 5.2 Operating and Capital budget   |           |
|           | 5.3 Fixed and Flexible budget  |           |
|           | 5.4 Revision of budget   |           |
|           | 5.5 Budget control method (Audit)  |           |
| <b>6.</b> | <b>Impact Analysis</b>   | <b>4</b>  |
|           | 6.1 Social Impact Analysis   |           |
|           | 6.2 Environmental Impact Analysis  |           |
|           | 6.3 Economic Impact Analysis   |           |

### References:

1. Arnold M. Ruskin and W. Eugene Estes, "Project Management", Marcel Dekker Publishers, 1982.
2. Joseph J. Moder and Cecil R. Philips, "Project Management with CPM and PERT", Van Nostrand Reinhold Publishers, Latest edition.
3. L.S. Srinath, "PERT and Application", East-west press.
4. A. Bhattacharya and S.K. Sorkhel, "Management by Network Analysis", The Institutions of Engineers, India.
5. Prasanna Chandra, "Projects: Preparation, Appraisal, Implementation", Tata Mc Graw Hill Publishing Company Ltd. New Delhi.



# ORGANIZATION AND MANAGEMENT

## BEG EC

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
2	-	-	Theory	Practical*	Theory	Practical**	50
			10	-	40	-	

\* Continuous

\*\* Duration: 3 hours

Course Objectives: The objective of this course to make the students understand and analyze the professional environment where they have to practice their profession.

- |           |   |          |
|-----------|---|----------|
| <b>1.</b> | <b>Introduction</b>                               | <b>3</b> |
|           | 1.1 Organization and Management                   |          |
|           | 1.2 Function and roles of management              |          |
| <b>2.</b> | <b>Organization</b>                               | <b>4</b> |
|           | 2.1 Organization and its characteristics          |          |
|           | 2.2 Formal and informal organization              |          |
|           | 2.3 Organization chart and types of organization  |          |
| <b>3.</b> | <b>Leadership and Motivation</b>                  | <b>8</b> |
|           | 3.1 Motivation and incentives                     |          |
|           | 3.2 Theories of motivation                        |          |
|           | 3.3 Leadership style                              |          |
|           | 3.4 Management by objectives                      |          |
|           | 3.5 Management by exception                       |          |
| <b>4.</b> | <b>Personnel Management</b>                       | <b>8</b> |
|           | 4.1 Functions of personnel management             |          |
|           | 4.2 Job analysis and description                  |          |
|           | 4.3 Recruitment and promotion                     |          |
|           | 4.4 Performance appraisal                         |          |
|           | 4.5 Wages and methods of wage payment             |          |
|           | 4.6 Upgrading and Training                        |          |
| <b>5.</b> | <b>Industrial Relations</b>                       | <b>7</b> |
|           | 5.1 Necessity of relationship                     |          |
|           | 5.2 Trade union and Trade union movement in Nepal |          |
|           | 5.3 Collective Bargaining                         |          |
|           | 5.4 Health, safety and compensation               |          |
|           | 5.5 Arbitration                                   |          |

### References:

1. Essentials of Management by Harold Koontz and Heinz Weihrich
2. Organization and Management in Nepal by Govinda Ram Agrawal
3. The Economics of development and Planning by M.L. Jhingan
4. Modern Economic Theory by K.K. Dwent
5. Personnel Management by C.B. Mamoria

# Communication System II

## BEG 431 EC

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory	Practical**	125
			20	25	80	-	

\* Continuous

\*\* Duration: 3 hours

Course Objectives: To introduce the students to the principles and practices of Digital Communication Systems.

- 1. Introduction to Digital Communication System 4**
  - 1.1 Sources of information, signal types, transmitters, channels and receivers in digital communication systems.
  - 1.2 Distortion, noise and interference.
  - 1.3 Nyquist sampling theory, reconstruction of original analog message signal from its samples,
- 2. Pulse Modulation Systems 7**
  - 2.1 Pulse Amplitude Modulation: Techniques, bandwidth requirement, reconstruction methods, Introduction to Time Division Multiplexing (TDM)
  - 2.2 Introduction to Pulse Duration Modulation (PDM) and Pulse Width Modulation (PWM)
  - 2.3 Pulse code Modulation (PCM): quantization and coding techniques, Analog to Digital conversion Method
  - 2.4 Uniform quantization : method, quantization noise and signal to quantization ratio (SQNR).
  - 2.5 Non-Uniform quantization: companding methods: A and  $\mu$  law companding.
  - 2.6 Differential PCM: Principle and operation.
  - 2.7 The Delta Modulation (DM): Principle and operation, Q-noise and slope overload noise in DM, SQNR in DM, Adaptive Delta Modulation, Comparison between DM and PCM.
  - 2.8 Introduction to linear prediction Theory and Speed coding.
- 3. Time Division Multiplexing (TDM) systems: 3**
  - 3.1 Introduction to TDM principles, PAM and PCM systems as an example of TDM.
  - 3.2 The TI and EI hierarchy.
  - 3.3 Time Division Multiple Access (TDMA) systems.
- 4. Base – band Digital Communication systems: 6**
  - 4.1 introductions to Information Theory: Definition of information, information sources, measure and units of information, Entropy, Relation between message, information and entropy
  - 4.2 Shannon's channel capacity theory, limitations.
  - 4.3 Base-band (BB) digital communication system, multilevel coding using PAM
  - 4.4 Inter-symbol interference (ISI) in BB digital communication. Nyquist pulse shaping criteria for zero ISI, bandwidth and data speed consideration. Practical pulse shaping method (raised cosine, duo-binary and modified duo-binary encoding techniques)
  - 4.5 The Eye diagram.
- 5. Modulated Digital Communication System: 6**
  - 5.1 Binary Amplitude shift keying (ASK), modulator-demodulator systems.
  - 5.2 Binary phase shift keying (PSK), modulator-demodulator systems, carrier recovery circuits in PSK system, the  $180^\circ$  phase ambiguity problem, differential phase shift keying (DPSK).
  - 5.3 Demodulation techniques for DPSK singles.
  - 5.4 M-ary data communication systems: quadrature Amplitude Modulation (QAM) and four phase PSK system.
  - 5.5 Binary frequency shift keying (FSK), modulator-demodulator system.
  - 5.6 Application of modems for data transmission and reception over telephone lines.

<b>6.</b>	<b>Random signals and noise in communication system:</b>	<b>5</b>
6.1	Signal power and spectral representations, the AC function and psdf.	
6.2	White noise, thermal noise, psdf of white noise.	
6.3	Passage of random signal and noise through a LT! system. RC filtering of white noise, noise equivalent bandwidth.	
6.4	The matched filter as an optimum detector of a pulse in presence of white noise, comparison of MF for rectangular pulses with ideal LPF and simple RC filter.	
6.5	Narrow-band noise representation, generation of narrow-band noise, Time domain expression for narrow-band noise.	
<b>7</b>	<b>Noise performances of Analog and Digital Communication system:</b>	<b>6</b>
7.1	Signal to noise ratio and detection gain synchronous detection of DSB-SC signal.	
7.2	Detection gains for DSB-AM (synchronous and envelop detection) and SSB (synchronous detection), comparison of DSB-SC,DSB-AM and SSB in terms of noise performance and bandwidth.	
7.3	Threshold effects in non-linear detection of AM	
7.4	Detection gain in FM, threshold effect in FM, SNR improvement in FM using pre-emphasis and de-emphasis networks.	
7.5	Comparison of AM and FM.	
7.6	Probability of error expression for base-band binary and M-ary communication system for additive white noise channels. Comparison of binary and M-ary system.	
7.7	Probability of error expressions for modulated digital communication system comparison of modulated digital system in terms of error probability, data rate, digital bandwidth, input SNR and complexity.	
<b>8</b>	<b>Introduction to coding theory:</b>	<b>3</b>
8.1	Coding theory, parameters of a code, types of codes.	
8.2	Linear block coding for error detection and correction.	
8.3	Convolution codes.	
<b>9.</b>	<b>Introduction to modern communication system:</b>	<b>5</b>
9.1	High speed data communication through optical fibers.	
9.2	Wireless in local loop (WLL) technology.	
9.3	Cellular mobile communication technology (with particular reference to (GSM)	
9.4	Global mobile personal communication systems (GMPCS)	
9.5	Spread spectrum system (with particular reference to code division multiple access-CDMA)	

### **Laboratory works:**

At least five selected laboratory works on data format, sampling and reconstruction, the eye diagram, PLL, base-band data communication, duo-binary encoding, ASK, PSK, ESK etc

### **References:**

1. S. Haykin, "Digital communication" John Wiley and sons,1988
2. Leon W.couch II,"Digital and Analog communication systems", Sixth Edition, Pearson Education Asia,2001
3. B.P.Lathi, "Modern Digital and Analog communication systems", Third Edition, Oxford University Press,1999.
4. J.Proakis, M. Salehi, "communication system engineering",Prentice Hall, New Jersey,1994.
5. J.Das. SK Mullick, PK Chatarjee, "Principles of Digital communication" Wiley Eastern Limited,1992.

# ANTENNAS AND PROPAGATION

## BEG 430 EC

Year: IV

Sem: I

Teaching Schedule Hours/Week			Examination Scheme				Total
Theory	Tutorial	Practical	Internal Assessment		Final		
2	1	3/2	Theory	Practical*	Theory	Practical**	
			20	25	80	-	125

\* Continuous

\*\* Duration: 3 hours

Course Objectives: To provide the fundamental knowledge of antennas, propagation and to introduce optical fibre communications.

- 1. Introduction 9**
  - 1.1 Review of electromagnetic waves and equations.
  - 1.2 Alternating current element for retarded vector potential.
  - 1.3 Relationship between a current element and an electric dipole.
  - 1.4 Power radiated by a current element, Input impedance of short and longer antennas.
  - 1.5 Electromagnetic field close to an antenna: Quadrature and inphase terms, Antenna theorems
- 2. Antenna fundamentals 11**
  - 2.1 Antenna gain, effective area and terminal impedance
  - 2.2 Directional properties of dipole antennas
  - 2.3 Radiation pattern for traveling wave antenna
  - 2.4 Two - element array
  - 2.5 Horizontal pattern for broadcast arrays
  - 2.6 Multiplication of patterns, patterns in other planes
  - 2.7 Yagi - Udi type dipole arrays, log-periodic array, Aperture antenna: Parabolic dish antenna, Horn antenna and mattress antenna.
- 3. Antennas propagation 10**
  - 3.1 Transmission loss between antennas
  - 3.2 Transmission loss as a function of frequency
  - 3.3 Antenna temperature and signal to noise ratio
  - 3.4 Plane earth propagation: Ground reflection, reflection factor and ground wave attenuation factor, different propagation regions and fresnel diffraction at a knife edge.
- 4. Propagation in the radio frequency 10**
  - 4.1 Reflection from ionosphere layers
  - 4.2 Reflections at medium and high frequencies
  - 4.3 Experimental determination of critical frequencies and virtual heights, ionograms
  - 4.4 Maximum usable and optimal frequency, lowest useful high frequency
  - 4.5 Irregular variation of the ionosphere
  - 4.6 Tropospheric waves: Formula for VHF propagation, tropospheric scattering
  - 4.7 Microwave propagation: atmospheric bending and refractivity chart.
- 5. Introduction to optical fibres 5**
  - 5.1 Basis of light propagation, snell's law, total internal reflection
  - 5.2 Acceptable angle and numerical aperture
  - 5.3 Number of modes in a fibre
  - 5.4 Light sources and detectors.

### Laboratory:

The students should perform six laboratory exercises covering the all the topics.

### References:

1. John D. Krauss, Tata McGraw Hill book company ltd.
2. E.C. Jordan and K.G. Balmain, "Electromagnetic waves and Radiating system", 2nd edition, Prentice Hall, Englewood Cliffs, New Jersey, 1997.
3. R.E. Collin, "Antennas and Radio wave propagation", McGraw Hill Book company 1985.
4. Gerd Kelser, "Optical Fibre Communications", McGraw Hill Book company, 1997.