

## CMP 482 Business Process and IT strategy (2 - 0 - 0)

### Evaluation:

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

### Course Objectives:

The main objectives of this course are:

1. Understand how emerging trends in information technology and innovation affect business processes and potentially create value (Emerging Technologies).
2. Utilize the fundamentals of business process innovation and how to manage business process innovation initiatives and process configurations to impact business agility

### Course Contents:

1. **Introduction of Business process and Information System** (5 hrs)
  - 1.1. Organization process
  - 1.2. Flows in business process
  - 1.3. Monitor process performance
  - 1.4. Application Infrastructure
  - 1.5. Information system and business process
  - 1.6. Importance of information system (data and information, Functional information system)
  - 1.7. Functional organizational structure (Delay in execution the process, excess inventory, lack of visibility across processes)
  
2. **Enterprise System** (7 hrs)
  - 2.1. Role of enterprise system in organization
  - 2.2. Execute the process
  - 2.3. Capture and store process data
  - 2.4. Stand-alone mainframe systems
  - 2.5. Client server architecture
  - 2.6. Service Oriented Architecture
  - 2.7. Types of Enterprise system
  - 2.8. Types of Data in enterprise system (transaction data, master data, organizational data)
  - 2.9. SAP Overview
  - 2.10. SAP software
  
3. **IT and Strategy** (5 hrs)
  - 3.1. Information revolution
  - 3.2. Business and Strategy
  - 3.3. Information Technology Strategy
  - 3.4. Strategies and success
  - 3.5. Design parameters and Strategic positioning
  - 3.6. Evolution and development of strategy
  - 3.7. Strategic planning and IT strategies

3.8. Evolving a dynamic nature of the Business

**4. Managing IT**

**(5 hrs)**

- 4.1. IT management and Its Role
- 4.2. IT governance and infrastructure
- 4.3. IT Governance and Strategy
- 4.4. Technology Management Process
- 4.5. Steps in Technology Management
- 4.6. Strategic Aspects of IT and Positioning the company for change
- 4.7. IT and business alignment
- 4.8. Risk management
- 4.9. Implementing and Exploiting IT capabilities
- 4.10. Using IT in a Strategic Manner
- 4.11. Measuring IT with Performance measures and Balanced Score card
- 4.12. Implementing change in IT management

**5. E - Strategy**

**(5 hrs)**

- 5.1. Introduction
- 5.2. E business and E-strategy
- 5.3. Developing an E-strategy
- 5.4. E-business objectives
- 5.5. E-commerce and E-business
- 5.6. Business –model and E-business model
- 5.7. Making E-strategy and E-economy
- 5.8. Best practice and Competitive advantage

**6. IT Strategy for Knowledge Management**

**(5 hrs)**

- 6.1. Knowledge Management and IT strategies
- 6.2. IT strategies and Knowledge management road map
- 6.3. Role of Knowledge management in It strategies
- 6.4. Knowledge industry and knowledge strategy-knowledge Workers
- 6.5. IT strategic Services, Product and Consulting

**7. IT strategy for IT companies**

**(5 hrs)**

- 7.1. Strategic aspects for an IT product companies and IT strategic development
- 7.2. IT strategy and innovation driving factor of start-up product companies
- 7.3. IT strategies for product life cycle and dealing with chasm
- 7.4. Project life cycle ad Strategies at various stages
- 7.5. Technology Selection and IT strategic aspects
- 7.6. Technology change management

**8. IT Strategy Implementation**

**(4 hrs)**

- 8.1. Introduction and Development of IT strategic plan
- 8.2. System and Technology strategies: Implementation Aspects
- 8.3. IT strategy Implementation and leadership
- 8.4. Implementation of an IT innovation Strategy



- 8.5. IT strategy and Specialization
- 8.6. Implementing IT strategies for execution
- 8.7. IT strategy Audit

(4 hrs)

9. **Global IT strategies**
  - 9.1. IT strategy in global environment
  - 9.2. Global Product life cycle
  - 9.3. The Technology Environment and Global IT strategy
  - 9.4. IT strategic Issues
  - 9.5. Project management
  - 9.6. innovation and knowledge management
  - 9.7. Convergence Model for IT and IS in a Global Organization

**Project Work:**

- Develop a business Strategy for a small IT company which focuses on building software product and services and develop a IT strategy for a company
- Develop a risk management Plan
- Preparation of e- business model for an ISP company
- Develop a E strategy for a company for E commerce site
- Case study for knowledge management

**Text books :**

1. Kulkarni Parag, Chande k.pradip, IT strategy for Business ,Oxford-2008
2. Word Jeffrey, Magal R.Simha, Essential of Business Processes and Information System



## **CMP 483 ICT Project Management (3-1-0)**

### **Evaluation:**

	Theory	Practical	Total
Sessional	50	-	50
Final	50	-	50
Total	50	-	100

### **Objectives:**

The general objectives of the course are as follows:

- To acquaint the students with the fundamentals of Project Management in ICT sector.
- To apprise the students with the different knowledge required for managing ICT Projects.
- To make the students aware about the different project group processes and specific knowledge areas of ICT Project Management from entrepreneurial perspective.

### **Course Contents:**

<b>Unit</b>	<b>Content</b>	<b>Hours</b>
<b>1.</b>	<b>Introduction</b>	<b>3 hrs</b>
1.1.	Project, Program, Portfolio and System	
1.2.	Project Objectives and Goals <ul style="list-style-type: none"><li>• SMART Goals</li></ul>	
1.3.	Classification of Projects	
1.4.	Project Constraints	
1.5.	Project Management and Its Advantages	
1.6.	Project Management Body of Knowledge	
1.7.	Project Environment <ul style="list-style-type: none"><li>• Internal, Task and External Environment</li></ul>	
1.8.	Skill Requirements of Project Manager	
1.9.	Roles and Responsibilities of Project Manager	
1.10.	Project Management Institute's Framework and International Certification	
<b>2.</b>	<b>Project Organization and Project Life Cycle</b>	<b>2 hrs</b>
2.1.	Organizational Structure	
2.2.	Matrix Organization and Its Types	
2.3.	Organizational Structure Influences on Project	
2.4.	Project Team	
2.5.	Project Life Cycle and Phases	
<b>3.</b>	<b>Project Management Process Groups</b>	<b>2 hrs</b>
3.1.	Project Management Processes	
3.2.	Roles of Major Knowledge Areas on Processes	
3.3.	Understanding Organizational Process Assets	



- 3.4. Understanding Enterprise Environment Factor
- 4. Project Integration Management** 6 hrs
- 4.1. Project Integration Management Process
- 4.2. Developing Project Charter
- 4.3. Developing Project Management Plan
- 4.4. Direct and Manage Project Execution
- 4.5. Monitoring and Controlling Project Work
- 4.6. Perform Integrated Change Control
- 4.7. Closing Project or Phase
- 5. Project Scope Management** 3 hrs
- 5.1. Project and Product Scope
- 5.2. Project Scope Management Process
- 5.3. Planning Project Scope Management
- 5.4. Collect Requirements
- 5.5. Define Scope
- 5.6. Creating Work Breakdown Structure
- 5.7. Scope Validation
- 5.8. Scope Control
- 6. Project Time Management** 6 hrs
- 6.1. Project Time Management Process
- 6.2. Planning Project Time Management
- 6.3. Defining Event, Activity and Activity Attributes
- 6.4. Activity Sequencing
- 6.5. Network Analysis and Network Diagram
- 6.6. Activity Resource and Activity Duration Estimating
- 6.7. Schedule Development
- 6.8. Milestones and Gantt Charts
- 6.9. Forward and Backward Pass
- 6.10. CPM
- 6.11. PERT
- 6.12. Schedule Control
- 7. Project Cost Management** 5 hrs
- 7.1. Fundamentals of Project Cost
- 7.2. Project Cost Estimation Process
- 7.3. Review of Cost Estimation and Its Types
- 7.4. Planning Cost Management
- 7.5. Estimating Cost
- 7.6. Determining Budget
- 7.7. Cost Control and Its Measures



7.8.	Earned Value Analysis	
	<ul style="list-style-type: none"> <li>• Cost Variance</li> <li>• Schedule Variance</li> <li>• Cost Performance Index</li> <li>• Schedule Performance Index</li> <li>• Earned Value Management</li> </ul>	
<b>8.</b>	<b>Project Quality Management</b>	<b>2 hrs</b>
8.1.	Project Quality Management Process	
8.2.	Planning Project Quality Management	
8.3.	Review of Quality Assurance and Quality Control	
<b>9.</b>	<b>Project Human Resource Management</b>	<b>4 hrs</b>
9.1.	Project Human Resource Management Process	
9.2.	Planning Project Human Resource Management	
9.3.	Acquire Project Team	
9.4.	Develop Project Team	
9.5.	Manage Project Team	
<b>10.</b>	<b>Project Communication Management</b>	<b>3 hrs</b>
10.1.	Basics of Communication	
10.2.	Project Communication Management Processes	
10.3.	Importance of Communication Management	
10.4.	Planning Project Communication Management	
10.5.	Manage Communication	
10.6.	Control Communication	
<b>11.</b>	<b>Project Risk Management</b>	<b>3 hrs</b>
11.1.	Reviewing Risks and Its Types	
11.2.	Risk Management Process	
11.3.	Planning Risk Management	
11.4.	Reviewing Risk Identification	
11.5.	Reviewing Risk Analysis	
11.6.	Quantitative and Qualitative Risk Assessment Processes	
11.7.	Risk Response Planning	
11.8.	Controlling Risk	
<b>12.</b>	<b>Project Procurement Management</b>	<b>3 hrs</b>
12.1.	Project Procurement Management Process	
12.2.	Plan Project Procurement Management	
12.3.	Conduct Procurement	
12.4.	Control Procurement	
12.5.	Close Procurement	
12.6.	Public Procurement Act in Nepal	
<b>13.</b>	<b>Project Stakeholders Management</b>	<b>3 hrs</b>
13.1.	Project Stakeholders Management Process	
13.2.	Identify Stakeholder	
13.3.	Stakeholder Management	



- 13.4. Manage Stakeholder Engagement
- 13.5. Control Stakeholder Management

**Text Book:**

*"A Guide to the Project Management Body of knowledge"*, Fifth Edition,  
Project  
Management Institute Inc., USA, 2013.

**References:**

- Maylor, H. "Project Management", Pearson India, 2003.
- Agrawal, G. R., "Project Management in Nepal", M.K. Publishers, Nepal, 2005.
- Kerzner, H., "Project Management: A Systems Approach to Planning, Scheduling and Controlling", CBS Publishers, New Delhi, 1987.
- Orr, A.D., "Advanced Project Management", First Edition, Kogan Page, 2008.
- Shenhar, A.J., Dvir, D., "Reinventing Project Management", Fifth Edition, Harvard Business School Press, 2007.



## CMP 341 Multimedia Systems (3 – 0 - 3)

### Evaluation:

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

### Course Objectives:

To introduce the technologies, concepts and techniques associated with the development of multimedia systems.

### Course Contents:

#### 1. Multimedia

4 hrs

- 1.1 Introduction: Overview of multimedia, Multimedia building blocks, Digital representation, Interaction techniques and devices.
- 1.2 The Medium aspect
- 1.3 Main Properties of Multimedia System
- 1.4 Definition of Multimedia Systems
- 1.5 Media Combination and Independence
- 1.6 Traditional Data Stream Characteristics
- 1.7 Information Units.

#### 2. Sound and Audio

4 hrs

- 2.1 Basic Sound Concepts: Representation and Formats
- 2.2 Basic Music (MIDI) Concepts: Devices, Messages, Standards and Software
- 2.3 Speech: Generation, Analysis and Transmission.

#### 3. Images and Graphics

4 hrs

- 3.1 Basic Image Concepts: Representation and Format
- 3.2 Image Processing Fundamentals: Synthesis, Analysis and Transmission.
- 3.3 Image Enhancement: Enhancement by point processing, Spatial filtering, Color image processing

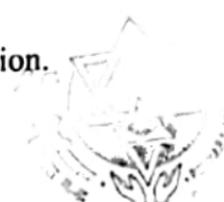
#### 4. Video and Animation

5 hrs

- 4.1 Basic Video Concepts: Representation and Format
- 4.2 Television
- 4.3 Basic Concepts of Animation
- 4.4 Types of animation
- 4.5 Principles of animation
- 4.6 Techniques of animation
- 4.7 Creating animation
- 4.8 Animation Language, Control and Transmission.

#### 5. Data Compression

8 hrs



- 5.1 Data Compression and Coding Fundamentals
  - 5.1.1. Storage Space
  - 5.1.2. Coding Requirements
  - 5.1.3. Source, Entropy and Hybrid Coding
- 5.2 Basic Data Compression Techniques
- 5.3 Data Compression and Coding Standards:
  - 5.3.1. JPEG
  - 5.3.2. H.261 (px64)
  - 5.3.3. MPEG
  - 5.3.4. DVI.

- 6. Optical Storage Media** **5 hrs**
  - 6.1 Basic Technology
  - 6.2 Video Disk Fundamentals
  - 6.3 CD Audio
  - 6.4 CD-ROM and Extended Architecture
  - 6.5 Principles of CD-Write Once and CD-Magneto Optical
  - 6.6 Other Storage Media: DVD, Flash Drive, HD Cards, USB
- 7. Computer Technology and Multimedia Operating Systems (MOS)** **5 hrs**
  - 7.1 Communication Architecture: Hybrid and Digital Systems
  - 7.2 Multimedia Workstation
  - 7.3 Introduction to MOS
  - 7.4 Function of MOS
  - 7.5 Multimedia Real Time System
- 8. Documentation, Hypertext and MHEG** **5 hrs**
  - 8.1 Document Architecture and Multimedia Integration
  - 8.2 Hypertext, Hypermedia and Multimedia
  - 8.3 Hypermedia System: Architecture, Nodes and Pointers
  - 8.4 Document Architecture: SGML and ODA
  - 8.5 MHEG.
- 9. Multimedia Communication Systems** **5 hrs**
  - 9.1 Definition of Multimedia Communication
  - 9.2 Application Subsystem
  - 9.3 Transport Subsystem: Requirements, Transport Layer, Network Layer
  - 9.4 Quality of Service and Resource Management

**Laboratory Exercises:**

Laboratory Exercise includes integration of multimedia (Audio: Speech and Music, Video: Static and Movie, Animation Programming, etc), with application programs through high-level language programming, such as C++ or Java.

**Text Book:**



Steinmetz, R., Nahrstedt, K., *Multimedia: Computing, Communications and Applications*, Pearson Education Asia, 2001, ISBN: 81-7808-319-1

**References:**

- 1 Andleigh, P., Thakrar, *Multimedia Systems Design*, Prentice Hall, NJ, 1996
- 2 Gibbs S.J., Tsichritzis, D.C., *Multimedia Programming: Objects, Environments and Frameworks*, Addison-Wesley, 1995
- 3 Koegel-Buford, J.F., *Multimedia Systems*, Addison-Wesley, 1994
- 4 K.R. Rao, Zoran S. Bojkovic, Dragorad A. Milovanovic, *Multimedia Communication Systems: Techniques, Standards, and Networks*, Pearson, 2002
- 5 Ranjan Parekh, *Principle of Multimedia*, Tata McGraw-Hill Education, 2006



## CMP 436 Network Programming (3 – 0 – 2)

### Evaluation:

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

### Objectives:

Computer network programming involves writing computer programs that enable process to communicate with each other across a computer network or within same system. **Network programming is client-Server programming** so to make

Two processes to communicate with each other one process must take the initiative while the other is waiting for it. Therefore, network programming ineluctably assumes a client-server model. The process initiating the communication is a client, and the process waiting for the communication to be initiated is a server.

The core objectives of the course is to design and implement the client-server based system, which must able to communicate across the different network platform without depending on operating system architecture.

At the end of the course, the students would able to design and implement computer network based client server application which can talk across the network or within the same system.

### Course Contents:

#### 1. Network Programming Fundamentals

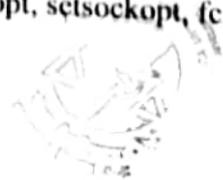
(6 hrs)

- Introduction to Networking and network programming
- Client/Server mode
- Communication Protocol (TCP, IP, UDP, SCTP)
- TCP state transition Diagram
- Protocol comparison

#### 2. UNIX Programming

(22 hrs)

- Sockets Introduction
- Socket Address Structures
- Values Result arguments
- Byte ordering and Manipulation functions
- Fork and exec functions
- Concurrent Servers
- UNIX /INTERNET domain socket
- Socket System Calls
- Passing file descriptor
- I/O models (blocking, non-blocking, multiplexing, signal driven, asynchronous)
- Socket option, getsockopt, setsockopt, fcntl



- Daemon Process, Syslogd Daemon, syslog function, ioctl operation, ioctl function
- Socket operations
- UNIX and Internet domain socket implementation.

### 3. Winsock Programming

(15 hrs)

- Introduction to Winsock architecture
- Winsock DLL
- Windows sockets and Blocking I/O
- Windows Socket Extension; Setup and Cleanup Function
- Function for Handling Blocked I/O
- Asynchronous Database function
- Asynchronous I/O functions
- Error Handling Functions; Asynchronous Operation
- Using Non-Blocking socket, Non-Blocking with connect
- Select in conjunction with accept, select with recv/recvfrom and send/sendto
- Sending and Receiving Data over connection.

### 4. Network Utilities and Application

(2 hrs)

- Telnet
- Netsat
- ifconfig/ipconfig
- ping
- TFTP
- Remote Login

#### Laboratory Exercises:

1. Implementing ECHO server using C and LINUX.
2. Implementing Date and Time Routines in C and LINUX.
3. Implementing Concurrent Server using FORK and EXEC call in LINUX.
4. UNIX and Internet Domain SOCKET in LINUX using C.
5. Implementing Winsock using C.
6. Implementing Message Exchanger between LINUX and Windows.

#### Reference Books:

1. Steven, R., UNIX network Programming VOL-1
2. Alok k.Sinha.,Network Programming in WINDOWS NT,Addison Wesley,1996
3. Douglas E.Comers,David L.Stevens Internetworking with TCP/IP Volume III,Second Edition



## CMP 411 Telecommunication (3-1-0)

Evaluation:

	Theory	Practical	Total
Sessional	50		50
Final	50		50
Total	100		100

**Objective:**

To provide students with broad knowledge of principles of transmission, switching, signaling and networking aspects of modern telecommunication systems.

### 1. Introduction (4 hr)

- 1.1 Public-switched telephone network (PSTN)
- 1.2 Network topology
- 1.3 Central office switch
- 1.4 Subscriber telephone
- 1.5 Subscriber loop
- 1.6 Telephone conversation, hierarchical networks
- 1.7 Comparison between analog and digital transmission
- 1.8 Transmission impairments (distortion, noise, interference, crosstalk, echo, ringing, jitter)

### 2. Multiplexing and Multiple Access Techniques (2 hrs)

- 2.1 Multiplexing and concentration
- 2.2 Space-Division Multiplexing (SDM)
- 2.3 Wavelength-Division Multiplexing (WDM)
- 2.4 Time-Division Multiple Access (TDMA)
- 2.5 Code-Division Multiple Access (CDMA)
- 2.6 Space-Division Multiple Access (SDMA)
- 2.7 ALOHA, slotted-ALOHA, CSMA/CD

### 3. Pulse Code Modulation (PCM) (4 hrs)

- 3.1 PCM transmission format (T1, and E1 lines)
- 3.2 Frame and multiframe
- 3.3 Frame and multiframe alignment strategy
- 3.4 Higher order PCM
- 3.5 Plesiochronous Digital Hierarchy (PDH), Synchronous Digital Hierarchy (SDH) and SONET

### 4. Switching Techniques and System (6 hrs)

- 4.1 Manual switching, circuit switching, packet switching & Message switching
- 4.2 Electro-mechanical switching (Strowger, step-by-step, crossbar)
- 4.3 Electronic switching, stored control program (Centralized SPC and Distributed SPC)
- 4.4 Space-division switching, time-division switching, space-time division switching



4.5 Multiple stage switching (Two-Stage Networks, Three-Stage Networks, n- Stage Networks)

4.6 Digital cross connect, private branch exchange

**6. Signaling in Telephone Networks (4 hrs)**

6.1 Signaling system, types of signaling (in-channel signaling and common channel signaling)

6.2 CCITT Signaling System No. 7 (Block diagram, signaling units, comparison with OSI model)

6.3 Dual Tone Multi Frequency (DTMF) and pulse dialing

6.4 Numbering Plan and Charging Plan

**7. Synchronization and Network Management (4 hrs)**

7.1 Synchronization principle and mode of operation

7.2 Synchronizer circuits

7.3 Sampling time recovery & frame time recovery

7.4 Timing inaccuracies and elastic stores

7.5 Routing control and flow control in network management

7.6 Network management using SNMP

**8. Diversity Techniques (2 hrs)**

8.1 Multipath propagation (line-of-sight LOS and non-LOS models)

8.2 Fading models (flat and frequency selective fading)

8.3 Diversity system (space, time, frequency, polarization, angle)

**9. Traffic Theory (5 hrs)**

9.1 Poisson process

9.2 Little's theorem

9.3 Characterization of queues

9.4 Measurement of telephone traffic, Blockage, Lost calls and Grade of Service

9.5 Smooth, Rough and Random Traffic

9.6 Loss systems, Lost call Cleared Models, Congestion, Erlang's B-calculation and Dimensioning

9.7 Queuing Theory

**10. Protocols in Telecommunications (8 hrs)**

10.1 OSI model

10.2 X.25 packet switched networks

10.3 Frame relay

10.4 Integrated Services Digital Network, ISDN features, service and application, architecture and data rate, protocols like link access procedure for D channel, B channel data link protocol and ISDN layer three protocol, broadband-ISDN

10.5 ATM services and application, ATM network access, ATM header and payload, ATM signaling



**11. Next Generation Network (NGN )**

**(6 hrs)**

- 11.1 Convergence of media
- 11.2 NGN definition, advantages, challenges and its scope
- 11.3 Transmission of real time traffic using packets, packet length, buffering, delay, jitter, Quality of Service (QoS)
- 11.4 Integrated Service Architecture, Differentiated Service Architecture
- 11.5 Multi-Protocol Label Switching(MPLS)
- 11.6 Resource Reservation Protocol
- 11.7 Real time transport protocol
- 11.8 Session Initiation Protocol
- 11.9 Megaco signaling protocol

**Field Visit:**

Visiting industries and preparation of report on various topics.

**References:**

1. J. Bellamy, Digital Telephony
2. B. Carson, Communication Systems.
3. W. Stallings, Data Communication and Computer Networks
4. J. E. Flood, Telecommunication switching, networks and traffic
5. T. Vishwanathan, Telecom technology

