Course Title: **MIS and E-Business**
Course Code: **CACS301**
Year/Semester: **III/V**
Class Load: **5Hrs. /Week (Theory: 3Hrs, Practical 2Hrs.)**

Course Description

This course provides the fundamental knowledge of Management Information System and E-Business and its associated infrastructure, security and protection issues, payment system and ultimately live implementation of any web application in Web server.

Objectives: The general objectives of this course is to know fundamental knowledge of MIS/E-Business and implement the web application in Web Server.

Unit 1:

Introduction to E-Commerce: Definitions and Concepts; Defining E-Business; Pure Versus Partial EC; EC Framework, Classification of EC; Benefits of E-Commerce; Electronic Markets; Role of Internet and Web in E-Commerce; The Limitations and Barriers of EC; Social Networks and Social Network Services; **M-Commerce**: Concept, Scope, Attributes, Benefits; Location-based l-commerce, l-Commerce Infrastructure, Location-Based Services and Applications. **7LH**

Unit 2:

The Network Infrastructure for E-Commerce: Introduction to Information Superhighway (I-Way), Components of the I-Way, Internet as a network infrastructure. **Wireless Application Protocol**: Wireless Application Protocol (WAP); Architecture of WAP; Working of WAP; Wireless Technologies: ADSL, WiMAX, WLAN, WMAN Wi-Fi, UMTS (3G), LTE (4G), (5G NR). Security Issues related to Wireless Communications. **8LH**

Unit 3: **Introduction to Management Information System**: Data, information, computer based information system (CBIS), Information System Resources, Management information system, Transaction processing (TPS) system, decision support system (DSS), and executive information system (EIS), ***SCM, CRMS and International Systems:*** Introduction, Supply Chain Management Systems, Customer Relationships Management Systems, enterprise systems and Challenges of Enterprise Systems Implementations- Managing the implementation, International Information Systems-Outsourcing and off-shoring. **8LH**

Unit 4: **E-Commerce Security and Fraud Issues and Protections**: Basic EC Security Terminology, The Threats, Attacks, and Attackers, **EC Security Requirements**: Confidentiality, Integrity, and Availability, Authentication, Authorization and Nonrepudiation; Technical Malware attack: Viruses, Worms, and Trojan Horses, Heartbleed, Distributed Denial of Service, Cryptolocker, Page hijacking, Botnets, Malvertising, ransomware, sniffing; Non-Technical Malware attack: Social Phishing, Pharming, Identity

Theft and Identify Fraud, Spam Attacks; EC defense Strategy: access control(Authorization and Authentication, Biometric Systems), encryption and PKI (Symmetric Key Encryption, Asymmetric Key Encryption, Certificate Authority(CA), Secure Socket Layer (SSL). Securing e-commerce networks: Firewalls, Virtual Private Networks, Intrusion Detection Systems (IDS), intrusion prevention System (IPS). **10LH**

Unit 5: E-payment systems:

Online payment cards (credit cards, charge cards, debit cards, smart cards), processing cards in online, credit card payment procedure, e-micropayments, e-checking and its processing in online. Automated clearing house (ACH) network, mobile payments (Digital wallet), mobile payment participants and issues, international payments, emerging EC payment systems and issues: crypto currency, virtual currency. A case study of emerging trends in online payment system in Nepal. **6 LH**

Unit 6: Launching a Successful EC Website:

Planning Online Businesses (Business Plan, The cost-benefit, risk elements of a business case, funding a New Online Business, EC Model selection), The process of building a website, basic hierarchical website structure, website hosting and obtaining a domain name (cPanel management, upload EC site to the web Server), web content creation and management: (Web content, Categories and Types of Content, Content Management and Maintenance, Catalog Content and its Management), Website design criteria, Site Map and Navigation, Web page layout grid, Colors and Graphics, Website Usability, Performance, Website Promotion, implementation of Payments system, Website Promotion, Search Engine Optimization (SEO).

10LH

<u>Laboratory Works:</u> **32LH**

Laboratory works should be done covering all the topics listed above and a project work should be carried out by individually implementing a fully functioning e-commerce web application along with payment system.

Text Book

Efraim Turban, D. K. (2018). *Electronic Commerce:A Managerial and Social Networks Perspective.* New York: Springer

References Book

Chaffey, D. (2009). *E-Business and E-Commerce Management: Strategy, Implementation and Practice (4th Edition).* Harlow: Prentice Hall.

Kalakota, A. B. (1996). *Frontiers of Electronic Commerce.* Pearson.

Kenneth C. Laudon, C. G. (2014). *E-commerce:business.technology.society.* New York: Pearson Education Limited.

Kenneth C. Laudon, J. P. (2014). *Management Information System: MANAGING THE DIGITAL FIRM.* New York: Pearson Education Limited.

Course Title: **DotNet Technology (3 Cr.)**
Course Code: **CACS302**
Year/Semester: **III/V**
Class Load: **6 Hrs. / Week (Theory: 3 Hrs., Practical: 3 Hrs.)**

Course Description:
This course covers different concepts of .NET framework. It also covers basic to advanced features of C# language including language basics, creating types and inheritance, delegates, events, lambda expressions, LINQ, working with databases, and developing web applications using ASP.NET.

Course Objectives:
The primary objective of this course is to provide concepts of .NET framework and different concepts of C# programming language and make students familiar with their uses and applications.

Course Contents:

Unit 1: Introducing C# and the .NET Framework (7 Hrs.)
Object Orientation; Type Safety; Memory Management; Platform Support; C# and CLR; CLR and .NET Framework; Other Frameworks; Framework Overview; .NET Standard 2.0; Applied Technologies

Unit 2: The C# Language Basics (12 Hrs.)
Writing Console and GUI Applications; Identifiers and Keywords; Writing Comments; Data Types; Expressions and Operators; Strings and Characters; Arrays; Variables and Parameters; Statements (Declaration, Expression, Selection, Iteration, and Jump Statements); Namespaces

Unit 3: Creating Types in C# (12 Hrs.)
Classes; Constructors and Deconstructors; this Reference; Properties; Indexers; Static Consturctors and Classes; Finalizers; Dynamic Binding; Operator Overloading; Inheritance; Abstract Classes and Methods; base Keyword; Overloading; Object Type; Structs; Access Modifiers; Interfaces; Enums; Generics

Unit 4: Advanced C# (14 Hrs.)
Delegates; Events; Lambda Expressions; Exception Handling; Introduction of LINQ; Working with Databases; Writing Web Applications using ASP.NET

Laboratory Work: The laboratory work includes writing console and/or GUI programs in C#

- To implement basic language features
- To create classes and objects and to implement different object-oriented features
- To implement inheritance
- To implement advanced features like delegates, event handling, lambda expressions, exception handling
- To implement LINQ and database applications

Text Books:

1. C# 7.0 in a Nutshell (7th Edition), the Definitive Reference, Joseph Albahari & Ben Albhari, O'Reilly.

2. Microsoft Visual C# Step by Step (9th Edition), John Sharp, Pearson Education.

Reference Books:

1. C# 7.0 All-in-One For Dummies (1st Editiion), John Paul Mueller, Bill Sempf, Chuck Sphar, John Wiley & Sons, Inc.
2. Professional C# 7 and .NET Core 2.0 (7th Edition), Christian Nagel, John Wiley & Sons, Inc.

Teaching Methods:

The teaching faculties are expected to create environment where students can update and upgrade themselves with the current scenario of computing and information technology with the help of topics listed in the syllabus. The general teaching pedagogy that can be followed by teaching faculties for this course includes class lectures, laboratory activity, group discussions, case studies, guest lectures, research work, project work, assignments (Theoretical and Practical), and written and verbal examinations.

Evaluation:

Internal Assessment Format [FM = 20] – Subject Teacher

Term Examination		Assignment	Attendance	Total
Mid-Term	Pre-Final			
5	5	5	5	20

Practical Assessment Format [FM = 20] – External Examiner will be assigned by Dean Office, FOHSS.

Practical	Viva	Lab Reports	Total
10	5	5	20

Note: Assignment may be subject specific case study, seminar paper preparation, report writing, project work, research work, presentation, problem solving etc.

Final Examination Questions Format [FM = 60, Time = 3 Hrs.]

SN	Question Type	Number of Questions	Marks per Question	Total Marks
1	Group – 'A' Objective Type Questions (Multiple Choice Questions) Attempt all the questions.	10	1	10 x 1 = 10
2	Group – 'B' Short Questions (Attempt any **SIX** questions.)	7	5	6 x 5 = 30
3	Group – 'C' Long Questions (Attempt any **TWO** questions.)	3	10	2 x 10 = 20

Course Title: Computer Networking (3 Cr.)
Course Code: CACS303
Year/Semester: III/V
Class Load: 5 Hrs. / Week (Theory: 3Hrs. Practical: 2 Hrs.)

Course Description

This course offers detailed concept and structure of networking standards and principles. It includes introduction, functioning and significance of Physical Layer, Data Link Layer, Network Layer, Transport Layer, Application layer and some security mechanisms. It does not entirely focus on theoretical concept but also strongly focuses on practical skill based learning.

Course objectives

The general objectives of this course are to provide theoretical as well as practical knowledge of computer networking to make students capable of implementing, managing and troubleshooting the issues of computer network in their personal as well professional life.

Course Contents

Unit 1: Introduction **6 Hrs.**

- 1.1 Network as an infrastructure for data communication
- 1.2 Applications of Computer network
- 1.3 Network Architecture
- 1.4 Types of computer Networks
- 1.5 Protocols and Standards
- 1.6 The OSI Reference Model
- 1.7 The TCP/IP Protocol Suite
- 1.8 Comparison between OSI and TCP/IP Reference model
- 1.9 Critiques of OSI and TCP/IP Reference model

Unit 2: The Physical Layer **6 Hrs.**

- 2.1 Functions of Physical Layer
- 2.2 Data and Signals: Analog and Digital signals, Transmission Impairment, Data Rate Limits, Performance
- 2.3 Data Transmission Media: Guided Media, Unguided Media and Satellites
- 2.4 Bandwidth Utilization: Multiplexing and Spreading
- 2.5 Switching: Circuit switching, Message switching & Packet switching
- 2.6 Telephone, Mobile and Cable network for data Communication

Unit 3: The Data Link Layer **8 Hrs.**

- 3.1 Functions of Data Link Layer
- 3.2 Data Link Control: Framing, Flow and Error Control
- 3.3 Error Detection and Correction
- 3.4 High-Level Data Link Control(HDLC) & Point – to – Point protocol(PPP)
- 3.5 Channel Allocation Problem

3.6 Multiple Access: Radom Access(ALOHA, CSMA, CSMA/CD, CSMA/CA), Controlled Access(Reservation, Polling, Token Passing), Channelization(FDMA, TDMA, CDMA)
3.7 Wired LAN: Ethernet Standards and FDDI
3.8 Wireless LAN: IEEE 802.11x and Bluetooth Standards
3.9 Token Bus, Token Ring and Virtual LAN

Unit 4: The Network Layer **8 Hrs.**

4.1 Functions of Network Layer
4.2 Virtual circuits and Datagram Subnets
4.3 IPv4 Addresses: Address Space, Notations, Classful addressing, Classless addressing, Subnetting and Network Address Translation(NAT)
4.4 IPv4 Datagram format and fragmentation
4.5 IPv6 Address Structure and advantages over IPv4
4.6 Routing Algorithms: Distance Vector Routing, Link State Routing
4.7 Internet Control Protocols: ARP, RARP, ICMP
4.8 Routing protocols: OSPF, BGP, Unicast, Multicast and Broadcast

Unit 5: The Transport Layer **7 Hrs.**

5.1 Functions of Transport Layer
5.2 Elements of Transport Protocols: Addressing, Establishing and Releasing Connection, Flow Control & Buffering, Error Control, Multiplexing & Demultiplexing, Crash Recovery
5.3 User Datagram Protocol(UDP): User Datagram, UDP Operations, Uses of UDP, RPC
5.4 Principles of Reliable Data Transfer: Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocol, Go-Back-N(GBN), Selective Repeat(SR)
5.5 Transmission Control Protocol(TCP): TCP Services, TCP Features, TCP Segment Header
5.6 Principle of Congestion Control

Unit 6: The Application Layer **5 Hrs.**

6.1 Functions of Application layer
6.2 Application Layer Protocols: DNS, DHCP, WWW, HTTP, HTTPs, TELNET, FTP, SMTP, POP, IMAP
6.3 Concept of traffic analyzer: MRTG, PRTG, SNMP, Packet tracer, Wireshark.

Unit 7: Network Security **5 Hrs.**

7.1 A Model for Network Security
7.2 Principles of cryptography: Symmetric Key and Public Key
7.3 Public Key Algorithm – RSA
7.4 Digital Signature Algorithm
7.5 Communication Security: IPSec, VPN, Firewalls, Wireless Security.

Practical

1. Prepare hardware and software specification for basic computer system.
2. Determine the appropriate placement of networking devices on a network.
3. Identify networking cable standards. Create and test cross – over and straight cables.
4. Configure the IP address of the computer.
5. Create a basic network and share file and folders.
6. Install and configure windows server: Active Directory, User and Group Policy Management.
7. Set the file access permissions and quota in windows server.
8. Configure basic DNS and DHCP services in windows server.
9. Install Linux based OS and practice on basic Linux and networking commands.
10. Configure IP address and subnet in Linux Machine.
11. Install packet tracer and identify the features of packet tracer.
12. Implement the LAN topologies.
13. Demonstrate the use of VLAN.
14. Implement the both static and dynamic router configurations.
15. Install and configure DNS, DHCP, FTP and Web Servers in Linux machine.
16. Capture some packets and analyze the header using Wireshark.
17. Implement the firewall.

Teaching Methods

The teaching faculties are expected to create environment where students can update and upgrade themselves with the current scenario of computing and information technology with the help of topics listed in the syllabus. The general teaching pedagogy that can be followed by teaching faculties for this course includes class lectures, laboratory activity, group discussions, case studies, guest lectures, research work, project work, assignments (Theoretical and Practical), and written and verbal examinations.

Evaluation

Examination Scheme				
Internal Assessment		External Assessment		Total
Theory	Practical	Theory	Practical	
20	20 (3 Hrs.)	60 (3 Hrs.)	-	

Reference Book

1. Andrew S. Tanenbaum, David J. Wetherall, "Computer Networks, 5/e", Prentice Hall, 2011.
2. Behrouz A. Forouzan, "Data Communications and networking" Tata McGraw-Hill.
3. Kurose, Ross, "Computer Networking: A Top-Down Approach", Pearson Education Limited, 2017.
4. Larry L. Peterson and Bruce S. Davie, "Computer Network: A System Approach", Morgan Kaufmann, 5/e, 2012.
5. Matthew Helmke, Andrew Hudson, Paul Hudson "Ubuntu Unleashed 2019 Edition_ Covering 18.04, 18.10, 19.04", 13/e, SAMS _ Pearson Education, 2019.

Course Title: **Introduction to Management (3 cr.)**
Course code: **CAMG 304**
Year/Semester: **III /V**
Class load: **3 Hrs./Week (Theory: 3Hrs)**

Course Objectives

This course aims to impart the basic management knowledge, and skills to the students so as to enhance their managerial capabilities and enable them to apply in the practical field.

Course Description

This course contains Introduction to Management, perspectives in management thought, emerging issues and challenges in management, management functions like planning, leading, controlling, organizational change and development, communication, emerging issues in quality management, technology and management.

Course Contents

Unit 1: Introduction **LH 4**

Management: concepts, meaning and functions. Types of managers. Managerial roles and skills. Organization and management. Changing perspectives of organization.

Unit 2: Perspectives in Management **LH 7**

Classical Perspective: scientific management, administrative management and bureaucracy. Behavioral Perspective: Hawthorne studies, human relations movement, and emergence of organizational behavior. Quantitative Perspective: management science and operations management. Integrating perspectives: systems and contingency perspectives. Emerging management issues and challenges.

Unit 3: Planning and decision making **LH 7**

Concept of planning, Levels of Planning: Strategic, Tactical and operational. Steps in Planning. Tools for planning. Decision Making: meaning, types and process. Decision making conditions – certainty, risk and uncertainty.

Unit 4: Organizing **LH 9**

Concept of organizing, process and principles of organizing. Organization Architecture: vertical differentiation – tall versus flat hierarchies, horizontal differentiation – functional structure, multidivisional structure, geographic structure, and matrix structure. Authority: line authority and staff authority. Delegation of authority. Centralization, Decentralization

and Devolution: meaning, reasons, advantages and disadvantages. Staffing: concept and importance.

Unit 5: Leading and communication **LH 7**

Concept and qualities of leadership. Transformational and transactional leadership, Leadership Styles: autocratic, democratic, and participative. Concept of managerial ethics. Motivation: concept, importance, and techniques. Communication: meaning, process, and networks. Types of communication, Barriers to effective communication.

Unit 6: Controlling and total quality management **LH 5**

Concept, purpose, Process and types of controls. Essentials of effective control systems. Control tools and techniques. Quality: Concept and importance. Total Quality Management: concept, components, principles, tools and techniques. Emerging issues in quality management.

Unit 7: Organizational Change and Development **LH 5**

Concept and nature, forces, paradigm shifts and areas (structure, technology, business process and behaviors) of organizational change. Resistance to change. Overcoming resistance to change. Concept of Organizational Development

Unit 8: Technology, Organization and Management **LH 4**

Concept of technology, approaches to technology and organization, social networking, use of technology in people management,

References

Charles W.L. Hill and Steven L. McShane, ***Principles of Management,*** Tata Mc-Graw-Hill Company, New Delhi.

Griffin, Ricky W., ***Management.*** AITBS Publishers and Distributors, New Delhi.

Hitt, M.A., J.S. Black and Porter, L.W., ***Management,*** Pearson Education, New Delhi

Laurie J. M. ***Management and organizational Behaviour,*** Pearson, New Delhi

Evaluation:

Internal Assessment: 40 marks

External Assessment: 60 marks

Total: 100 marks

Teaching methods: The major teaching methods include the case analysis, project work, term paper, assignments, and quiz. The instructor decides the learning strategies based on the nature of session/class.

Course Title: Computer Graphics and Animation (3 Cr.)
Course Code: CACS305
Year/Semester: III/V
Class Load: 6 Hrs. / Week (Theory: 3Hrs. Tutorial: 1 Hrs., Practical: 2 Hrs.)

Course Description

This course is designed to extend students' knowledge and practice in Graphics hardware, software, and applications. It also provides the knowledge of data structures for graphics, graphics languages, and models for 2D and 3D objects, clipping, hidden surface elimination, depth buffer, raster graphics, shading, and rendering.

Course objectives

Upon completion of this course, students should be able to 1. Explain basic principle of computer graphics. 2. Develop 2D and 3D computer graphics applications. 3. Specify lighting and object's materials in computer graphics programming.

Course Contents

Unit 1: Introduction 6

1.1 Advantage of Computer Graphics and Areas of Applications
1.2 Hardware and Software for Computer Graphics. (Hard Copy, Display Technologies),
1.3 Random Scan Display System, Video Controller, Random Scan Display Processor
1.4 Raster Graphics
1.5 Scan Conversion Algorithms (Line, Circle, Ellipse)
1.6 Area Filling (Rectangle, Ellipse), Clipping (Lines, Circle, Ellipse), Clipping Polygons

Unit 2: Two dimensional and three dimensional transformations 7

2.1 2-Dimensional transformation
2.2 2-D Translation, Rotation, Scaling,
2.3 Homogeneous Coordinates, Reflection, Shear transform
2.4 3-dimensional transformation,
2.5 3-D Translation, Rotation Scaling, Reflection, Shear.

3 Unit 3: Clipping 7

3.1 Window to view port transformation
3.2 Clipping, line clipping,
3.3 Cohen –Sutherland line clipping
3.4 Polygon clipping
3.5 Sutherland and Gary Hodgman polygon clipping algorithm

Unit 4: Visible Surface Determination and computer graphics algorithm **15**

4.1 Image space and object space techniques
4.2 Hidden Surface removal—Depth comparison
4.3 Z-Buffer Algorithm
4.4 Back-Face Removal
4.5 The Painter's Algorithm
4.6 Scan-Line Algorithm
4.7 Light and Color and different color models (RGB,CMY, YIQ)

Unit 5: Animation and virtual reality **10**

5.1 Basic Principles of Animation and Types of Animation
5.2 Introduction to the flash interface
5.3 Setting stage dimensions, working with panels, panel layouts
5.4 Layers & Views
5.5 Shaping Objects – Overview of shapes, Drawing & Modifying Shapes
5.6 Bitmap Images & Sounds
5.7 Animation -Principles , Frame by frame animation, tweening, masks
5.8 Introduction to virtual reality

Laboratory Work

Laboratory work should be done covering all the topics listed above and a small project work should be carried out using the concept learnt in this course using Open GL.

Reference Books:

1. Foley, J. D., A. V. Dam, S. K. Feiner, J. F. Hughes, Computer Graphics Principle and Practices, Addison Wesley Longman, Singapore Pvt. Ltd.,
2. Hearn Donald, M. P. Baker, Computer Graphics, 2E, Prentice Hall of India Private Limited, New Delhi
3. Robert R & Snow D Flash CS4 Professional Bible, Wiley Publishing