Semester VI

GENERIC ELECTIVES (GE-6)
VI. 4.1. e-Business Organization and Strategy

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
e-Business: Organization and Strategy, GE-6, VI. 4.1.	4	2	0	2	12th Pass	Basic understanding of consumer behaviou	Management Faculty of CIC

Learning Objectives

The core objective of this subject is to provide students with a comprehensive understanding of the managerial as well as technical aspects of e-business, i.e., what is e-business and how it works? The contemporary theories and new business models will be discussed as a theory to form a strong basis for practice. The participants will develop insights for the effective designing and development of e-business strategy as a channel of communication or channel of distribution or both. The analytical ability of students will be enhanced via analytical tool for understanding customer behaviour towards E- business.

Learning Outcomes

After completing this course, student should be able to:

- Understand the dynamic business environment and its elements
- Understand different business models and their application.
- E-commerce architecture and its platforms.
- Understand the dynamics of E-brand trust via ICT.
- Plan e- marketing tools and Web analytics through KPI's.
- Analyse important strategic elements of e- supply chain management, e-customer relations management, e-procurement.

- Perform predictive analysis, customer analysis, pricing, marketing, and over-all retail analytics application in different online retail sectors.
- Envision financial dynamics and cost analysis in website management for a start-up.

SYLLABUS

Unit I: Evolution of e-business and transitions-E-commerce and internet penetration, Web 1.0, Web 2.0, Web 3.0, E-business models & organisation structure- Indian and Global trends, Business responsiveness during crisis, supply chain disruptions and management, Opportunities for Innovations. **[10 hours]**

Unit II: E-business and consumer behaviour- Consumer complex buying behaviour patterns, sentiment analysis, consumer online engagement tools for reviews and managing UGC (User generated content), E-Brand Trust, and Security and role of Information Systems and various approaches in ICT Systems **[10 hours]**

Unit III: Perspectives and requirements for starting online business: Revenue and resources, Processes associated with managing website development, ICT in types of businesses such as B2B and B2C. SEO's, measuring success, On page and off page search engine optimisation, Customer acquisition, customer experience, conversion and retention. **[10 hours]**

Practical Component: (60 Hours)

- Hands on training will be provided by experts from academia and industry regarding different E-business tools for analysing consumer behaviour and building robust advertising strategies
- Predictive analysis using Python, performing (Recency-frequency-monitory) RFM analysis for creating customer clusters.
- Churn Prediction analysis
- Market Basket analysis
- Web analytics- Sentiment analysis via social media such as Google ads, twitter, Facebook and Instagram.
- Case study discussion on real life cases of the companies that exploited the competitive advantage of IT to leverage their growth and expansion.
- Case study discussion on innovative e-business evolved such as online grocery stores, fashion retail which emerged out of market space and other concepts.

Essential/ recommended readings:

- Internet Business Models and Strategies: Text and Cases, A. Afuah and C. L. Tucci, McGraw-Hill., 2003.
- Information Technology and the Corporation of the 1990s: Research Studies, T. J. Allen and M.S. Morton, Oxford University Press, New York 1994.
- Strategies for e-Business: Creating Value through Electronic and Mobile Commerce, T. Jelassi and A. Enders, Prentice Hall, 2005.

- Competitive Advantage: Creating and Sustaining Superior, Performance, Michael E. Porter, The Free Press, New York, 1985.
- E-Learning Tools and Technologies, Horton and Horton, Wiley Publishing, 2003

GENERIC ELECTIVES (GE-6)
VI. 4.2. Control Systems

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
Control Systems GE-6, VI. 4.2	4	2	0	2	12th Pass with Mathematics	Linear Algebra, Differential equations	Physics/ Electronics Faculty of CIC

Learning Objectives

This interactive learning module intends to provide capabilities and basic understanding of functionality and control of a system or a device. It will emphasize on the conceptual know-how of the behavioral aspects and mechanism of different machines, equipment or a system, their manageability, efficiency and performance as per controlled parameters.

Learning outcomes

After completing this course, student should be able to;

- Understand the building blocks of basic and modern control systems.
- Understand the concept of stability analysis of control systems in both time and frequency domain.
- Understand the concept of MATLAB and SIMULINK toolbox to simulate the control systems.
- Perform comparative study of electrical systems using simulation software - Multisim, Eagle, LTSpice and experimental set-up.
- Understand the complex mathematical operations associated with building blocks of various control systems.

SYLLABUS

Unit I: Introduction to Control Systems - Analysis and design objectives - The design process - Classification and modeling of control systems **(6 Hours)**

Unit II: Modeling in the frequency domain - Modeling in the time domain - Time response - Reduction of multiple subsystems **(6 Hours)**

Unit III: Signal flow graphs - Mason's rule - Routh Hurwitz Criterion - Steady state errors - Root locus techniques - Frequency Response Techniques **(8 Hours)**

Unit IV: Root Locus and its Applications -– Design via state space -– Non-linear analysis – Controller and its applications -– Case Studies **(10 Hours)**

Practicals – (60 Hours)

The following explorations would be carried out on matrix based numerical mathematics software:

- Designing the model of a DC motor
- Design of controllers for speed and position control
- Compensator design
- Realization of logic gates through diodes and resistors
- Verification of Boolean algebraic functions through digital IC gates
- Design of half/full adder and sub tractor circuits
- Design of shift registers using flip-flops
- Circuit simulation
- State space model design
- Design of temperature controller
- Hands on experiments with PID controller
- Innovation Project

Essential/recommended readings

- Control Systems Engineering, 6th Edition, Norman S Nise, Wiley, 2011.
- Linear Control Systems with MATLAB Applications, 11th Edition, B. S. Manke, Khanna Publishers, 2013
- Discrete-Time Control Systems, K. Ogata, Prentice Hall, 1995.
- Control Tutorials for MATLAB and Simulink, W. Messner and D. Tilbury, Addison-Wesley, 1998.

GENERIC ELECTIVES (GE-6)
VI. 4.3. Genomics and Proteomics

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Prerequisite of the course (if any)	Dept. offering the course
		Lecture	Tutorial	Practical/ Practice			
Genomics and Proteomics GE-6, VI.4.3	4	2	0	2	12th Pass	Basic knowledge of biological sciences	Chemistry / Biology Faculty of CIC

Learning Objectives

This module is designed to:

- Introduce students to basic RDT techniques
- Introduce students to basic tools of genomics and proteomics
- Introduce students to building and analyzing networks involving complex biological data.

Learning outcomes

After studying this course, the students will be able to:

- Design primers for PCR
- Well-versed in gene cloning techniques
- Will develop skills in understanding the advancement of the genomic and proteomics branches of Sciences and their importance in manipulating genome and proteome.

SYLLABUS

Unit I: Basics of gene cloning (8 Hours)

Introduction to Recombinant DNA technology, Isolation of DNA, PCR amplification, Types of PCR, Restriction digestion, Cloning and expression vectors, Cloning, Expression, Purification of expressed proteins, DNA libraries and Screening

Unit II: Genome analysis (8 Hours)

Genome sequences and database, Discovery of new genes and function, Early DNA sequencing efforts: Maxam & Gilbert Method, Sanger Di-deoxy method, Fluorescence method, shot-gun approach, NGS: different methods and principles, Genome libraries, expressed sequenced tags (ESTs)

Unit III: Applied Genomics (8 Hours)

Genotyping tools: DNA Chips, Diagnostic assays, Diagnostic services. Functional genomic studies with model systems such as Drosophila, Yeast and C. elegans, Interference RNA, RNA silencing, SiRNA: Applications in Functional genomics, Medicine and Gene Knockdown. Gene Editing - Crispr Cas9

Unit IV: Applied Proteomics (6 Hours)

Large-scale preparation of proteins and peptides, Synthesis of peptides, Use of peptides as probes Two-hybrid interaction screens, Mass-spec based analysis of protein expression. "Protein Chip" - interactions and detection techniques, Two-dimensional PAGE for proteome analysis, Detection of proteins on SDS gels, Protein cleavage, Edman protein micro-sequencing, Automation in proteomics, Applications of proteome analysis to drug development and toxicology, Phage antibodies as tools for proteomics.

Practicals- **(60 Hours)**

- Isolation and analysis of plasmids
- Expression of proteins as inclusion bodies
- Isolation and refolding of the inclusion bodies
- Agarose Gel Electrophoresis
- SDS PAGE analysis
- Primer design
- Polymerase Chain Reaction (PCR)
- Restriction Digestion
- Cloning Strategy (Introductory Gene Cloning)

Essential Readings

- Principles and Techniques of Biochemistry and Molecular Biology, Wilson & Walker, Cambridge University Press, 2010
- Principles of Gene Manipulation and Genomics, Primrose and Twyman, Wiley-Blackwell 2013