

# BCIS 3<sup>rd</sup> Semester - Syllabus

## STT 101 Business Statistics (BCIS 3<sup>rd</sup> Semester)

### Course Objectives

The aim of the course is to develop competency and ability to use statistical techniques in conducting research and project work. The emphasis of the course is more on interpretation of results and understanding of the strengths and limitations of different statistical measures.

### Course Description

This course has a business focus. The course covers fundamentals of descriptive and inferential statistical techniques. The contents include data summaries and descriptive statistics; introduction to a statistical computer package; Probability: distributions, expectation, variance, covariance, statistical inference of univariate and bivariate data for hypothesis testing.

### Course Outcomes

By the end of this course students would be able to

- understand and use the descriptive and inferential statistical tools used in business decision making ,
- select an appropriate graph to describe a distribution,
- calculate and interpret the shape, center and spread of a distribution,
- understand the problem of inference when working with the results from random samples, and
- analyze the data using excel.

### Course Contents

#### Unit I Introduction

5 hours

Basic concepts of statistics, Terminologies associated with statistics such as populations and samples, Variables (Dependent and independent only) , Types and sources of data , Descriptive and inferential statistics, Data processing (editing and coding), Applications of statistics in business and management.

#### Unit II Describing Data: Graphs and Tables

6 hours

Data array, Stem and leaf Display, Frequency tables, Histograms, Polygon, Cumulative Polygon, Scatter plots, Simple Bar and Pie charts, Cross tabulation

#### Unit III Describing Data: Summary Measures

10 hours

*Central Location:* Mean, Median and Mode

*Non Central Location:* Quartiles, Deciles and Percentiles

*Dispersion:* Range, Interquartile range, Variance, Standard deviation, Coefficient of variation, Index for qualitative variation (IQV)

*Shape:* Crude measure (comparison of mean, median, and mode), five number summary, Box plot

*Inequality Measure:* Gini concentration ratio

#### Unit IV Basics of Probability Theory

5 hours

Basic concepts, Counting rule, Objective and subjective probability, Marginal and joint probability, Addition rule, Conditional probability, Multiplication rules, Bayes' Theorem.

#### Unit V Probability Distributions

10 hours

Discrete probability distribution (Binomial and Poisson distribution and mean and standard deviation of their distributions), Continuous probability distribution: Normal distribution, Normal approximation of Binomial and Poisson distribution

## **Unit VI Estimation and Hypothesis Testing**

**12 hours**

Concept of estimation, Confidence intervals, confidence intervals for means and proportions (one sample case only), Test of significance, p-value approach to hypothesis testing, connection between confidence intervals and hypothesis testing, comparing two means (two sample z and t-test procedures), and comparing two proportions.

### **Basic Books**

Davis, G., & Pecar, B. *Business Statistics using Excel*. New Delhi: Oxford University Press  
Berenson, M. L. & David M. L. *Basic Business Statistics: Concepts and Applications*. Upper Saddle River, New Jersey: Pearson Prentice Hall of USA.

### **References**

Levin, R. I., & David S. R. *Statistics for Management*. New Delhi: Prentice Hall of India  
Allbright, S. C., Winston, W., & Zappe, C. J. *Data Analysis and Decision Making with Microsoft Excel*. Pacific Grove: Duxubury Press.  
Argyrous, G. *Statistics for Research with a Guide to SPSS*. New Delhi: Sage South India Edition  
Whigham, D. *Business Data Analysis using Excel*. New Delhi: Oxford University Press

## SOC 101 Fundamentals of Sociology (BCIS 3<sup>rd</sup> Semester)

### Course Objectives

The course aims to provide students with basic sociological concepts that will help students understand various ideas on society, culture, group, organizations, etc. By knowing all these concepts, students' knowledge on organization, business and management will be enhanced and such that they will be able to apply their enriched knowledge in their future career and endeavor.

### Course Description

This course presents basic ideas and foundations of sociology through an argument of various sociological variables, terms, terminology and subject matter. The course includes, besides an introduction to sociology, basic sociological ideas like society, culture, norms, values group. It comprises of social institution like religion, family, and others, which help students understand more about existing social structure. More importantly, course has tried to explain the basic sociological theories, social change and some emerging social perception, understanding on sexuality, crime and deviance. Moreover, Max Weber's theory of bureaucracy, group and group behavior, sociology theories of organization are not less important to include in the course, since they will entail a nexus between sociology and management and basic sociological tenet.

### Course Outcomes

By the completion of this course, the students should be able to:

- know the basic ideas on the emergence of sociology, methods of study, subject matter and nature of sociology;
- exhibit the understanding on the relationship of sociology with other social sciences and business-management;
- express the knowledge on foundations of sociology like society, culture, group, norms, values, etc., along with ideas on sexuality, crime, etc;
- analyze various social institutions like family, economic institutions, religion;
- understand and evaluate basic sociological theories and its connotation to management;
- can discuss social stratification to view how societies are divided into different groups on the basis of power, prestige and property and create inequality;
- evaluate the ideas of social change and socialization.

### Course Contents

#### Unit I: Introduction to sociology

**6 hours**

Meaning of sociology; nature of sociology; subject matter of sociology; emergence of sociology and methods of sociology along with brief description on the contribution of founders of sociology; Relationship of sociology with economics, psychology, political science and business-management.

#### Unit II: Theoretical perspective in sociology

**8 hours**

What is perspective?

#### *Functionalism:*

Meaning, context, basic tenets or key assumptions:

Functionalism of Emile

Durkheim and Talcott Parsons (Basic ideas with criticism).

*Interactionism:* Meaning, context, basic tenets or key assumptions : Interactionism of George Herbert Mead and Herbert Blumer (Basic ideas and criticism).

*Conflict theory:* Meaning, context, basic tenets or key assumptions: Conflict theory of Karl Marx and Max Weber (basic ideas and criticism).

*Post modernism:* meaning, context, basic tenets or key assumptions: Post Modernism of Fredric Jameson and Jean Baudrillard (basic ideas and criticism).

**Unit III: The foundations of society****14 hours**

**Society:** Meaning, Definition, nature and types (Industrial and pre-industrial).

**Culture:** Meaning, definition, features and functions; types (material and non-material); sub- culture (youth, ethnic and age sub culture vis-a-vis society and organization, e.g. Consumer behavior, organizational culture)

**Norms, values, status and role:** meaning, definition and types; linkage to business and management

**Socialization:** Meaning, definition and function of socialization; agents of socialization; types of socialization (primary and secondary socialization); theories of primary socialization; personality and socialization

**Group and organization:** Group- meaning, definition and features; types (various types with focusing on primary and secondary groups). Organization- meaning, definition (view from founding fathers of sociology); formal and informal organization; Max Weber's Bureaucracy; sociology of organization; work and leisure; group dynamics; dynamics of social capital **Sexuality:** understanding sexuality; sexual issues (pornography, teen pregnancy, prostitution and sexual violence, sexual abuse)

**Crime and deviance:** Meaning, definition and difference between them

**Conformity and sanction:** meaning and definition

**Unit IV: Social stratification****7 hours**

Meaning, definition and features; Functional and conflict approach to social stratification; Stratification and inequality; Class, caste, ethnicity and gender as various aspects of social stratification- Meaning, definition, features and Nepalese context.

**Unit V: Social Institution****7 hours**

Meaning, definition, features, function and types (as required by subject matter): family, marriage, polity, economic institution, religion (along with dysfunction), educational institution; Conflict and functional approach to religion and education; Nepalese context.

**Unit VI: Social change****6 hours**

Meaning, definition and features; Factors of social change; Conflict approach to social change; Application and experiences in Nepalese society.

**Basic Texts**

1. Horton, P. B., & Haunt, C. L. *Sociology*. New Delhi: Tata McGraw Hill.

**References**

1. Abraham, M. F. *Contemporary Sociology: an introduction to concepts and theories*. New Delhi: Oxford University Press.
2. Abraham, M. F. *Modern Sociological Theory: An Introduction*. New Delhi: Oxford University Press.
3. Bhandari, U. et al. *Sociology for Management*. Kathmandu: Buddha Academic Enterprises.
4. Etzioni, A. *Modern Organization*. New Delhi: Prentice Hall of India. Pvt. Ltd.
5. Haralombos, M., & Heald, R. M. *Society: Themes and Perspective*. New Delhi: Oxford University Press.
6. Inkeles, A. *What is Sociology? An Introduction to Discipline and Profession*. New Delhi: Prentice Hall of India Pvt. Ltd.
7. Macionis, J. J. *Sociology*. New Delhi: Dorling Kindersley (India) Pvt. Ltd.
8. Ritzer, G. *Modern Sociological Theory*. USA: McGraw-Hill Companies, Inc.
9. Solomon, M. R. *Consumer Behaviour: Buying, Having and Being (8<sup>th</sup> ed.)*. New Delhi: PHI Learning Pvt. Ltd.
10. Turner, J. H. *The Structure of Sociological Theory*. Jaipur: Rawat publication.

## CMP 261 System Analysis and Design (BCIS 3rd Semester)

### Course Objectives

This course is designed to impart the students with the theory and practice of designing information systems to meet user needs, including problem investigation and the analysis, design and implementation of system. It will also familiarize students with system analysis and design tools. The objective of the course is to make students familiar with the basic principles of a systems development lifecycle, system modeling techniques, system requirement discovery and project management.

### Course Description

This course introduces students to the fundamental concepts, philosophies and trends that provide the context of system analysis and design at the starting. After understanding these basics, students will be better able to apply, with confidence, the practical tools and techniques that will be learned on later sections. Additionally, students are required to do lab works using the various tools like Project and Visio.

### Course Outcomes

By the end of this course, students should be able to:

- Learn about relationships between the stakeholders in system development.
- Understand an architectural look at information systems and methodology for developing the information system.
- Learn basics of project management.
- Learn specific system analysis skills and techniques for use-case modeling, data modelling, process modelling and object-oriented modelling.
- Learn various fact-finding techniques.
- Learn the process of system design and design strategies.

### Course Contents

- 1. The Context of Systems Analysis and Design** **4 hours**
  - 1.1. System development Process: System Initiation, System Analysis, System Design, system Implementation, System Support and Continuous Improvement
  - 1.2. The Players- System Stakeholders
  - 1.3. Skills required for a Systems Analyst
  - 1.4. Business and Technology Drivers for Information System: E-Commerce and Business, TQM, BPR, Mobile and Wireless Technologies, Enterprise Applications
  - 1.5. **Information System Development** **4 hours**
  - 1.6. Information Systems Building Blocks: Knowledge Building Blocks, Process Building Blocks, Communication Building Blocks
  - 1.7. Principles for Systems Development
  - 1.8. The PIECES framework for Problem Identification
  - 1.9. FAST methodology, Cross life-cycle Activities, Sequential vs Iterative development Automated Tools and Technology
- 2. Project Management** **5 hours**
  - 2.1. Introduction to Project Management
  - 2.2. The Project Management tools and techniques: PERT and Gantt Charts
  - 2.3. The Project Management Life Cycle
  - 2.4. Risk Management: Introduction to Risk, Risk Management Process (Risk Identification, Risk Analysis, Risk Planning, Risk Monitoring)
- 3. Systems Analysis** **6 hours**
  - 3.1. System Analysis, Systems Analysis Approaches
  - 3.2. The Scope Definition phase
  - 3.3. The Problem Analysis Phase
  - 3.4. The Requirements Analysis Phase
  - 3.5. The Logical Design Phase
  - 3.6. The Decision Analysis Phase

4. **Fact- Finding Techniques For Requirements Discovery** **6 hours**
  - 4.1. An Introduction to System Requirements and its types
  - 4.2. The Process of Requirements Discovery
  - 4.3. Fact-Finding Techniques: Sampling, Questionnaires, Interviews, Discovery Prototyping, Joint Requirements Planning (JRP)
  - 4.4. Use-Case Modelling: Introduction to Use-cases, Actors, and Relationships
  - 4.5. Process of Use- Case Modelling for Requirements
5. **Data Modeling** **5 hours**
  - 5.1. An Introduction to Data Modeling: Entities, Attributes, Relationships;
  - 5.2. The Process of Logical Data Modeling
  - 5.3. How to Construct Data Models: Entity Discovery, The Context Data Model, The Key-Based Data Model, Generalized Hierarchies, The Fully Attributed Data Model;
  - 5.4. Mapping Data Requirements to Locations (CRUD Matrix)
6. **Process Modeling** **6 hours**
  - 6.1. Introduction to Process Modeling
  - 6.2. System Concepts for Process Modeling
  - 6.3. The Process of Logical Process Modeling
  - 6.4. How to Construct Process Models
  - 6.5. Synchronizing of System models
7. **Object-Oriented Analysis and Modeling** **5 hours**
  - 7.1. An Introduction to Object Oriented Analysis
  - 7.2. System Concepts for Object Modeling
  - 7.3. Modeling the Functional Description of the System
    - 7.3.1. Constructing the Analysis Use-Case Model
    - 7.3.2. Modeling the Use-Case Activities (Activity Diagram)
    - 7.3.3. Drawing System Sequence Diagrams
8. **Feasibility Analysis** **3 hours**
  - 8.1. Feasibility Analysis
  - 8.2. Types of feasibility: Operational Feasibility, Technical Feasibility, Schedule Feasibility, Economic Feasibility, Cultural/Political Feasibility, Legal Feasibility;
  - 8.3. Feasibility Analysis of Candidate Systems
9. **Systems Design Methods** **4 hours**
  - 9.1. Systems Design Approaches
  - 9.2. System Design for In-house Development-The "Build" Solution
  - 9.3. System Design for Integrating Commercial Software- The "Buy" Solution

### Laboratory Work

There shall be 10 lab exercises based on Project Scheduling, Object Modelling, Process Modelling and Data Modelling which will be done on MS-Project and MS-Visio

1. Familiarization with tools in MS-Project
2. Creation a Project Schedule and creation of Work-Breakdown Structure(enter Tasks and Create Summary tasks and subtasks)
3. Creation of a Gantt Chart (Estimate Task Durations, Enter milestones, Enter deadlines, Indicate Task Dependencies, Assign People Resources)
4. Familiarization with tools in MS-Visio
5. Creation of Data flow Diagram (DFD)
6. Creation of Entity-Relationship Diagram (ERD)
7. Creation of Use-Case Diagram
8. Creation of conceptual model (Class) Diagram
9. Creation of Activity Diagram
10. Creation of Sequence Diagram

### Basic Texts

Whitten, Jeffery L., Lonnie, D. & Bentley, Kevin (7th Edition), *Systems Analysis and Design Methods* McGraw Hill Irwin, 2008.

Sommerville, Ian. (7<sup>th</sup> Edition), *Software Engineering* - (For Unit 4.4)

## **CMP 264 Numerical Methods (BCIS 3rd Semester)**

### **Course Objectives**

To be familiar with the theory and algorithms of numerical methods for solving nonlinear and set of algebraic equations, interpolation from given set of data, numerical differentiation and integration, solution of ordinary and partial differential equations.

### **Course Description**

The numerical methods course involves solving engineering problems drawn from all fields of engineering. It includes error analysis, roots of nonlinear algebraic equations, solution of set of equations, curve fitting and interpolation, numerical integration and differentiation, solution of ordinary and partial differential equations. It also deals with the algorithm of solution of various methods that can be implemented in a digital computer.

### **Course Outcomes**

At the end of this course, the students are expected to be able to:

- know the mathematical background for the different numerical methods
- understand the different methods for numerical solution of the nonlinear equations and solution of system of linear and nonlinear equations
- understand the different numerical methods for interpolation and data fitting
- know the numerical differentiation, integration and solution of set of ordinary and partial differential equations
- understand how numerical methods are used to solve various problems which are difficult to solve by analytical method
- know how numerical method can generate solutions in a manner that can be implemented on digital computers

### **Course Contents**

- 1. Introduction** **4 hours**  
Importance of numerical methods, Review of calculus, Taylor's theorem, Errors in numerical computations, Use of computer programming in numerical methods
  
- 3. Solution of Nonlinear Equations** **8 hours**  
Nonlinear equations and their solutions, Trial and error method, Graphical method, Iterative methods: Bisection method, False position method, Secant method, Newton's method and Fixed point iteration method, Rate of convergence of iterative methods, Newton's method for polynomials and Horner's rule
  
- 4. Solution of Set of Algebraic Equations** **9 hours**  
Existence of solutions for linear set of equations, Gaussian elimination method, pivoting, ill-conditioning, Gauss-Jordan method, Matrix inversion, Matrix factorization: Doolittle algorithm, Cholesky's factorization, Iterative solution using Gauss Seidel method, Eigen value and eigen vector using power method
  
- 5. Interpolation and Approximation** **8 hours**  
Lagrange interpolation, Newton's interpolation using divided differences and difference table, Cubic spline interpolation, Least squares method of fitting linear and nonlinear function for given data

**6. Numerical Differentiation and Integration****6 hours**

Numerical differentiation formulas, Maxima and minima of a tabulated function, Newton-Cote's quadrature formulas: Trapezoidal, Simpson's 1/3 and 3/8 rule, Romberg integration, Gaussian integration

**7. Solution of Ordinary Differential Equations****8 hours**

Review of differential equations, Initial value problem, Taylor series method, Euler's method and its accuracy, Henu's method, Runge-Kutta methods, Solution of higher order equations, Solution of boundary value problems using finite difference and Shooting method

**8. Solution of Partial Differential Equations****5 hours**

Review of partial differential equations, Deriving difference equations, Solution of Laplacian equation and Poisson's equation

**Laboratory Work**

The laboratory experiments will consist of program development and testing of nonlinear equations, Linear algebraic equations, Interpolation, Numerical integration and differentiation, ordinary and partial differential equations.

Some of them are listed below:

- To solve nonlinear equation using bisection method, secant method, Newton Raphson method
- To solve polynomial equation
- Solving set of linear algebraic equations using Gauss elimination method
- Finding largest Eigen value and corresponding eigenvector by Power method.
- Interpolation using Lagrange interpolation and Newton's interpolation
- Curve fitting by Least square method.
- Numerical differentiation, numerical integration using trapezoidal and Simpson's rule
- Solution of differential equation using Euler's method, RK-4 method
- Solution of partial differential equation
- Using Mat Lab for solution of numerical problems

**References**

Gerald, C.F. & P.O. Wheatly, *Applied Numerical Analysis*

Balagurushamy, E. *Numerical Methods*

Chency, W.& D. Kinciad, *Numerical Mathematics and Computing*

Press, W. H.,B.P. Flannery et.al., "*Numerical Recipes in C*"

## **CMP 263 Computer Architecture and Microprocessors (BCIS 3rd Semester)**

### **Course Objectives**

This course will provide the fundamental knowledge to understand the basics, operation, programming and application of microprocessor and brief insight into computer architecture.

### **Course Description**

This is a fundamental course for the microprocessor and computer architecture. 8085 microprocessor is taken as an example processor to deal with the details of the microprocessor. The course introduces about the microprocessors system and gives idea for assembly language programming and machine language programming with 8085 microprocessor. The course also deals with the hardware aspects of microprocessors such as memory interfacing, input/output interfacing, interrupt handling and some typical interfacing chips such as PPI and USART. The course also introduces the students about the parallel systems and different processor architecture.

### **Course Outcomes**

After the completion of the course, students should be able to

- know basics of microprocessor and microprocessor based systems
- know the internal architecture of microprocessor
- write assembly language program
- solve various instructions such as data transfer, arithmetic, logical, branching etc. to solve various problems
- know various microprocessor operations and their timing diagrams
- interface various devices such as keyboard and seven segment displays
- know various interfacing standards
- handle interrupts
- have an idea about parallel systems and different processor architectures

### **Course Contents**

#### **1. Introduction**

**4 hours**

Introduction and History of Microprocessors, Basic Block Diagram of a Computer, Bus Organization with Microprocessor Based System, Stored Program Concept and its Processing Cycle, Micro programmed and Hardwired control unit.

#### **2. Intel 8085 Microprocessor Architecture and Programming**

**12 hours**

Internal Architecture of 8085 microprocessor, Features of 8085 microprocessor, Instruction and Data format, Operation Code and Operands, Addressing Modes of 8085, Instruction Set of 8085, Assembly language programming with 8085 microprocessor.

#### **3. Microprocessor System**

**8 hours**

Pin Configuration of 8085 microprocessor, Microprocessor Operations, Fetch Operation and Timing Diagram, Execute Operation and Timing Diagram, I/O and Memory Read/Write Timing Diagrams, Memory Device and Classification, I/O Address Decoding, Memory Address Decoding

**4. Basic I/O Interfacing****12 hours**

Parallel Interfacing, Serial Interfacing, Modes of parallel transfer, Introduction to 8255A Programmable Peripheral Interface(PPI), 8255 Operating modes and programming, Interfacing with keyboard and seven segment display, Synchronous and Asynchronous Serial Transmission, RS 232 Standard, Connection between DTE and DTE, Introduction to USART 8251, Basic DMA operation, DMA Controlled I/O, The 8237 DMA Controller, Introduction to ISA, PCI, AGP and USB Interface standards.

**5. Interrupt handling****6 hours**

Polling and Interrupt, Interrupt processing sequence, Interrupt service routine, interrupt handling with 8085, Introduction to 8259, Using 8259 with 8255.

**6. Advanced Topics****6 hours**

Parallel and concurrent systems, Different level of parallelism (instruction level, process level and thread level parallelism), Register based and accumulator based architecture, RISC and CISC architecture

**Laboratory Work**

Assembly language programming using 8085 trainer kit. The programming should include: data transfer, arithmetic operation, logic operation, conditional branching, base conversion etc.

**References**

Gaonkar, Ramesh S.: *Microprocessor Architecture, Programming, and Applications with 8085*, Prentice Hall, New Delhi

Hall, Douglas V.: *Microprocessor and Interfacing programming and Hardware*, McGraw Hill, New Delhi

Uffenbeck, John . *Microcomputers and Microprocessors, The 8080, 8085 and Z-80 Programming, Interfacing and Troubleshooting*, 3rd Edition 1999, Prentice Hall, New Delhi