BCA

Second

Semester

Purbanchal University

Bachelor of Computer Application (BCA)

Year: I **Semester: II**

Course Code	Course Title	Credit Hour	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BCA151HS	Mathematics-II	3	3	2		5
BCA152MS	Modern Business Practices	3	3	1		4
BCA153CO	Microprocessor and Assembly Language	3	3	1	2	6
BCA154CO	Object –Oriented Programming	3	3	1	2	6
BCA155HS	Sociology, Ethics and Emotional Intelligence	3	3	1		4
BCA156CO	Computer Project-II	2			3	3
	Total	17	15	6	7	28

Note: Each semester of BCA program spans over a period of 15 weeks of class work and one week of internal examinations, such as internal tests, quizzes and mid-term examination.

Mathematics - II
BCA151HS

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	2	-	20	-	80	-	100

Course Objective: The main objective of this course is to equip students with the knowledge of vectors in space, curves in space, along with matrix algebra and their applications.

Course Details:

Unit 1: Fundamental of Vectors **(10 Hrs)**

Vector, components, sum and difference of vectors, equal vectors, zero vector, unit vector, vectors in a plane, vectors in space, use of i, j, k Direction cosines, Direction ratios, relations among the direction cosines modulus of vectors, distance between two points, the scalar product and vector product of two vectors and their properties, a.b. = 0 ⇨ a⊥b, axb = 0 ⇨ a ∥ b, and other relations, including physical applications. Product of three and more vectors (definitions and simple examples only). Coordinates in space: (i) Cartesian, (ii) Cylindrical, (iii) Spherical and transformations from one system to another, with simple applications.

Unit 2: Differentiation of Vector function **(5 Hrs)**

Definition of derivatives of vectors functions, Exercise involving derivatives of vector functions, d/dt(r,.r2), d/dt (r1 xr2),etc. Differentiation of $\nabla\Phi$, ∇.F, ∇xF and simple relations involving grad, div and curl. Definition of directional derivatives and their evaluation.

Unit 3: Plane Analytic Geometry **(10Hrs)**

Conic section as sections of a cone. Standard equation and general equation of a circle. Condition for second degree equation to represent a circle. Determination of centre and radius of a circle in the form $x^2 + y^2 + 2gx + 2fy + c = 0$

Definition of parabola as the locus of points equidistant from a point and a line. Derivation of equation to a parabola in the form $y^2 = 4ax$, Determination of vertex, focus, axis, directrix of a parabola in the general form. Condition for second degree equation to represent a parabola.

Ellipse as the locus of points the sum of whose distances from two points is a constant. Derivation of equation to a parabola in the standard form, Centre, foci, vertices, directrices, eccentricity of (x – h)2/a2 +(y - k)2/b2=1by changing into $X^2/a^2 + Y^2/b^2 = 1$, with X=x-h, Y= y - k. Condition for second degree equation to represent an ellipse.

Hyperbola as the locus of points the difference of whose distances from two points is a constant. Equation in the form $(x-h)^2/a^2 - (y-k)^2/b^2 = 1$, $X^2/a^2 - Y^2/b^2 = 1$. Centre, foci, vertices, directrices and eccentricity determination. Condition for second degree equation to represent a hyperbola. Asymptotes of a hyperbola in the standard form.

Quadratic curves, Conditions for the general equation of second degree to represent a circle, a parabola, an ellipse and a hyperbola. Use of discriminant to identify the curve. Reduction to the standard form and determination of centre, vertex, foci, directrices and axes.

Unit 4: Differential Equations **(10 Hrs)**

Definition, order, degree, formation by elimination of constants, Solution of differential equation of 1st order-1st degree, Variable separation, homogeneous, exact, linear, reduction to Linear equations.

Second order linear equations with constant coefficients, Second order homogeneous equation.

Unit 5: Matrix Algebra **(5 Hrs)**

Introduction to Matrices, sum and differences of Matrices, Scalar multiplication, Multiplication using Matrices of third order.

Determinants, properties, Transpose, Adjoint and Inverse of Matrices.

Unit 6: Linear Equations **(5 Hrs)**

Consistent and Inconsistent equations (linear), Dependent and independent system, Solution of systems of 2 and 3 linear equations by (i) Crammer's rule, (ii) Gaussian Elimination and (iii) Inverse Matrix.

References:

1. Calculus with Analytical Geometry - Thomas & Fenny
2. A Text Book of Vector Calculus - M. B. Singh & B.C. Bajracharya
3. Basic Mathematices, Vol. I & II - D. R. Bajracharya et al

Modern Business Practices
BCA152MS

Year : I **Semester : II**

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

Course Objective: The main objective of this course is to impart basic knowledge of business organization and management.

Course Contents:

Unit1: Business Organization **(5 Hrs)**

Nature of Business (Concept & feature); Forms of Business organization: (a) Sole Proprietorship (Definition, features, merit & demerits), (b) Partnership (Definition, features, merit & demerits), (c) Joint Stock Company (Definition, features, merit & demerits).

Unit 2: Management **(14 Hrs)**

Concept and definition of Management; Functions of management (overview):

Planning: Concept of planning; Types of plan; Steps in planning; Implementation of plans (Major factors effecting implementation of plan).

Organizing: Concept of organizing; Structural concept of organizing; Process concept of organizing; Organization Structure (Bureaucratic, structures, matrix structure and virtual organization structure).

Directing: Concept and nature of directing; Principle of directing; Human relations problems in directing.

Controlling: Concept and importance of controlling; Process of controlling.

Unit 3: Human resource Management

Importance and significance of HRM **(12 Hr)**

Procurement Function: Human resource planning; Job analysis; Recruitment; Selection; Socialization.

Maintenance Function: Compensation &Incentive; Discipline; Grievance handling

Development Function: Need assessment; Training methods (on & off the job); Training evaluation; Management development concept.

Motivation Function: Concept motivation; Theories of motivation (hierarchy of needs, motivation-hygiene theory, theory x & theory Y)

Unit 4: Marketing **(14 Hr)**

Meaning of Marketing: Core concept of marketing; Marketing Mix; Marketing Philosophies (Production concept, product concept, selling concept, marketing concept & societal marketing concept); Concept of buyer behavior; Need for understanding buying behavior; Customer value & satisfaction

Implementation of Marketing Program: Product concept and types of product.

Distribution: Meaning of distribution; Importance of distribution.

Promotion: Concept of promotion; Promotion mix (Advertising, Publicity, Sales Promotion); Personal Selling.

References:

1. Ricky W. Griffin, Management, AITBS, Publisher & Distributors, Delhi.
2. Stephen P. Robbins & Mary Coulter, Management, Prentice Hall of India Ltd., India.
3. Dr. G. R. Agrawal, Organization and Management, M.K.Publisher.
4. David A. Decanzo A. & Stephen P. Robbins, Personal/ Human Resources Management, Prentice Hall of India Ltd., India.
5. Dr. G.R. Agrawal, Marketing Management in Nepal, M.K. Publisher.
6. Dr. G.R. Agrawal, Human Resources Management in Nepal, M.k. Publisher.
7. Philip Kotler, Principle of Marketing, Prentice Hal of India Ltd., India.

Microprocessor and Assembly Language
BCA153CO

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	2	20	20	60	-	100

Course Objective: The main objective of this course is to familiarize students with the operation, programming and application of microprocessors.

Course Contents:

Unit 1: Introduction **(4 Hrs)**

Microcomputer, Block diagram of Microcomputer, Microprocessor, Overview of Microprocessor family; Stored program Concept and Von Neumann Machine, Processing Cycling of a stored Program Computer.

Unit 2: Intel 8085 Microprocessor **(12 Hrs)**

Pin Diagram and Pin Functions; Internal Architecture, Addressing Mode, Instruction Set with classification, Instruction format, Timing Diagram.

Unit 3: I/O Interface **[6 hrs]**

Introduction, I/O port addressing, Decoding, Serial and Parallel communication; The 8255 Programmable Peripheral Interface (Block diagram and Modes), the 8251 (Block diagram and Modes), RS-232, Interconnection between DTE-DTE and DTE-BCE.

Unit 4: Interrupts **[2 hrs]**

Introduction, Types of Interrupts in 8085/8086, Basic Interrupt Processing.

Unit 5: Memory Interface and DMA **[3 hrs]**

Introduction, Address Decoding, 8088 Memory Interface, Basic DMA Operation, DMA controller.

Unit 6: 8086 Instruction Description and Assemble Directives **[14 hrs]**

Pin Diagram and Pin Functions, Internal Architecture, Addressing Mode, Instruction Set with classification and Programming.

Unit 7: Evolution of Higher Series of Intel and other Processors [4 hrs]

Lab - Experiments:

All Laboratory work will be based on programming 8085 and 8086 microprocessors. Laboratory work also includes the following exercises.

Laboratory 1

To enter and to trace a simple assembly language program using DOS DEBUG routine.

Laboratory 2

To write a simple assembly language program that will make logical decisions based on program data, DOS DEBUG routine.

Laboratory 3

To enter and trace a program that contains a loop e.g. the loop instruction to use CX register as a default index counter and decrement CX at the end of each pass, compare CX to zero and if it is greater than zero, jump to the beginning of the loop.

Laboratory 4

To modify the program from laboratory 3, so that the looping is accomplished in a different way. Modify the program so that it does not rely on the 'loop' instruction, but rather, performs the loop operations separately. The output of laboratory 3 and laboratory 4 should be same.

Laboratory 5

To complete an assembly language program to carry out given logical process and then assemble, link and run. For example, to complete a given program so that it will read a single character from the keyboard and test the character and based on the range within which it falls, either print it, or change it to lower case and print it, or print it unmodified.

Laboratory 6

To modify the program of laboratory 5, so that it will read a string of characters and select them by the same as in laboratory 5.

References:

1. Ramesh S. Gaonkar, Microprocessor Architecture, Programming,and Applications with 8085, PrenticeHall
2. Barry B. Brey, The INTEL Microprocessors 8086/8088, 80186, 80286, 80386 and 80486 (Architecture, Programming and Interfacing), PHI
3. Yu Chung Liu & G. A. Gibson, Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design, EE Edition
4. Adam Osborne & J. Kane, An Introduction to Microcomputer, Vol. II - Some Real Microprocessors, Galgotia Book Source, New Delhi
5. Douglas V. Hall, Microprocessor & Interfacing, Programming and Hardware, Tata Mc-Graw Hill

Object-Oriented Programming in C++
BCA154CO

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	2	20	20	60	-	100

Course Objective: The main objective of this course is to introduce students with the concepts of object oriented programming using C++.

Course contents:

Unit 1: Introduction to Object Oriented Programming **[2 Hrs]**

Procedural Programming Language vs OOPL, Characteristics of object-oriented languages, Applications of OOP.

Unit 2: C++ programming concept **[3 hrs]**

Introduction to programming in C++, Operators in C++, Type conversion: automatic conversion, Type casting, Arrays and Pointers in C++, New and Delete operators, "this" pointer, Manipulators, Constants, Enumeration.

Unit 3: Functions used in C++ **[3 Hrs]**

Functions overloading, Default arguments, Inline functions

Unit 4: Classes and Objects **[7 Hrs]**

Introduction, Access specifier (public, private and protected), Defining member functions, Accessing class members, Nesting of Member Functions, Array of Objects; Static Data Member, Static Member Functions; Friend Functions, Friend Class; Passing Objects as Function Arguments, Returning Objects from Functions.

Unit 5: Constructor & Destructor **[3 Hrs]**

Types of constructor (Default constructor, Parameterized constructor, Copy constructor); Overloaded constructors, Destructor.

Unit 6: Operator Overloading **[6 Hrs]**

General rules and restrictions for overloading operator; Overloading Unary and Binary operators; Data conversion: Conversion from Basic to Class types, Conversion from Class to Basic Types, Conversion between Objects of different classes.

Unit 7: Inheritance **[6 Hrs]**

Introduction & benefits of inheritance, Types of Inheritance, Types/Modes of Derivation, Multipath Inheritance, Ambiguity in Multipath Inheritance, Virtual Base Class, Abstract Base Class; Contructors and Destructors in Inheritance.

Unit 8: Virtual functions and Polymorphism **[4 Hrs]**

Early vs Late Binding, Overriding, Virtual functions, Pure Virtual Functions.

Unit 9: File handling **[6 Hrs]**

Stream Based Input/Output, Hierarchy Stream Classes; Unformatted and Formatted I/O Operations; File Input Output; Opening and Closing file; Opening file using constructor; Opening file using open() function; Reading and Writing Data Files.

Unit 10: Templates and Namespaces **[3 Hrs]**

Function templates, Class templates, Standard Template Library, Namespaces.

Unit 11: Exception handling **[2 Hrs]**

Introduction to exceptions, Exception handling model: Try, Catch ,Throw.

Laboratory: There shall be lab classes covering above mentioned topics.

References:

1. Robert Lafore, "Object-Oriented Programming in C++, Galgotia Publication, India
2. E. Balagurusamy, "Object Oriented Programming with C++, McGraw Hill 4/e
3. Deitel & Deitel, "C++ How to Program", 3/e Prentice Hall
4. Yashavant Kanetkar, "Let Us C++", BPB Publication, New Delhi

Sociology, Ethics and Emotional Intelligence
BCA155HS

Year: I **Semester: II**

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

Course Objective: The main objective of this course is to provide students with technical and emotional aspects of sociology and its components.

Course contents:

Unit 1: Introduction **[4 Hrs]**

Definition and evolution of sociology; Relationship of sociology with economics, political science and computer science; Applications of sociology.

Unit 2: Social and Cultural Change **[6 Hrs]**

Process (Innovation, invention diffusion, and discovery); Theories of social change (evolution, functional, conflict); Factors of social change (economics, technology, education, demography); Role of media and communication in social and cultural change; Resistance of social change; Technological changes and its consequences.

Unit 3: Understanding Development **[5 Hrs]**

Definition and approaches of development; Indicators of development and features of developing countries; Development planning; Role of national and international community and state.

Unit 4: Process of Transformation **[4 Hrs]**

Modernization, globalization and migration; E-governance & E-commerce.

Unit 5: Characteristics of Nepali Society and Culture **[5 Hrs]**

Historical development of Nepal; Demographic composition; Contemporary Issues(gender, caste and ethnicity); National integration and differentiation; Social stratification, problems and control.

Unit 6: Ethical issues in IT **[5 Hrs]**

Definition of profession and professional ethics; Code of conduct; Ethical dilemma and problems; Disciplinary action; Corporate social responsibility.

Unit 7: Introduction to Emotional Intelligence **[9 Hrs]**

Definition and benefits of Emotional Intelligence; Components of Emotional Intelligence; Self Management, Self Awareness, Self Regulation, Self Motivation, Empathy; Domains and competencies of Emotional Intelligence; Emotional leadership development; Skills in Emotional Intelligence: Accurately perceive emotions, Use emotions to facilitate thinking, Understand emotional meanings, Manage emotions; Optimism, Pessimism and the balance between optimism and pessimism.

Unit 8: Social Management and Responsibility **[7 Hrs]**

Social skills to make an impact in the society; Creating a powerful first impression; Assessing a situation in the society and workplace, understand Emotions and manage

them; Role of Emotional Intelligence at Social Environment; Articulate the Emotions Using Language; Disagreeing Constructively.

Reference:

1. Alex Inkles, "What is Sociology? Introduction in the Discipline & Profession", Prentice Hall of India
2. Daniel Goleman ," Emtional Intelligence : Why it can matter more than IQ"
3. Giddens & D. Mitchell, "Introduction to Sociology", 3rd Ed., London, W.W. Norton & Company
4. M. Foster, "Traditional Culture & Impact of Technological Change"
5. N.S. Rao, "Principle of Sociology with an Introduction of Social Thought", S. Chand & Co. Ltd.
6. Pratley Peter, "The Essence of Business Ethics", Prentice Hall of India, New Delhi
7. Rishikeshav Raj Regmi, "Dimension of Nepali Society and Culture".

Computer Project-II
BCA156CO

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
-	-	3	-	60	-	40	100

Course Objective: The main objective of this course is to enable students design and complete the software project by using Object Oriented Programming Language (C++ Programming).

Course Contents:
A Project group will be developing a software project by using object-oriented programming [BCA154CO]. Every students of the group should work at least for 45 lab hours under the supervision of the assigned supervisor. Students must develop the assigned software, submit written report, and give oral presentation.

General Procedure:
1. Topic Selection
2. Information Gathering
3. System Requirements and Specifications
4. Algorithms and Flowcharts
5. Coding
6. Implementation
7. Documentation

The project document shall include the following:
1. Technical description of the project
2. System aspect of the project
3. Project tasks and time-schedule
4. Project team members
5. Project supervisor
6. Implementation of the project

Project Evaluation Criteria for Internal assessment:
The marks allocated for the project should be evaluated based on the following criteria:
- Title identification and Proposal Writing— 10 Marks
- Mid-term Presentation — 20 Marks
- Pre-final Submission and final Presentation — 30 Marks

Project Evaluation Criteria for External assessment:
The marks allocated for the project should be evaluated based on the following criteria:
- Project Documentation— 20 Marks
- Final Presentation — 10 Marks
- VIVA - 10 Marks

Group Size: **2 to 3** students in one group.