BACHELOR OF INFORMATION TECHNOLOGY (BIT)

PURBANCHAL UNIVERSITY
(FACULTY OF SCIENCE AND TECHNOLOGY)
BIRATNAGAR, NEPAL

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REGULATIONS GOVERNING BIT PROGRAM

1. TITLE OF PROGRAM:

The program shall be called BACHELOR OF INFORMATION TECHNOLOGY (BIT).

2. ELIGIBILITY FOR ADMISSION:

Students seeking admission in BIT program:

2.1 Should have successfully completed twelve years of schooling in any stream with at least a mathematics subject of 100 marks in 10+2 level examination.

2.2 Must have a minimum C grade in each subject of grade 11 and 12 with CGPA 2.0 or more. In case a student has taken the optional mathematics subject in grade 12, the student must have passed in the optional mathematics paper with at least D+ grade.

or

Must have secured a minimum score of second division (45%) marks in 10+2, PCL or equivalent in any discipline.

Students who have passed grade 11 and are waiting for supplementary exam (PURAK PARIKSHA) of grade 12 can also apply. However, they have to submit all the required documents at the time of admission.

Students who appeared in the final exam and are waiting for the result and certificates can also apply for the entrance examination. However, they have to submit all the required documents at the time of admission.

2.3 In case of foreign certificate, student should submit equivalence and each subject grading with CGPA or total percentage document from concerned authority.

2.4 Should pass entrance examination as conducted by Purbanchal University.

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3. **DURATION OF THE PROGRAM:**
The program of study shall extend over a period of eight semesters (FOUR ACADEMIC YEARS).

4. **MEDIUM:**
ENGLISH shall be the medium of instruction and examination in all the subjects of BIT Program.

5. **ATTENDANCE REQUIREMENT:**
A student must achieve, at least 80% attendance of lectures, tests, and tutorial classes in order to qualify for sitting for the final examination of any subject.

There are no unauthorized cuts from classes; persistent poor attendance may result in exclusion from classes.

In the case of unavoidable absence such as for illness of the student or serious illness or death of a member of the family or similar compelling reasons for absence, all works missed must be satisfactorily made up and the responsibility for making up this work rests with the concerned students.

Teachers should also help them in making up this work.

6. **EVALUATION PROCEDURES:**
(a) CONTINUOUS ASSESSMENT
All courses undertaken by students are evaluated during semester using an internal system of continuous assessment.

The student is evaluated on class and/or tutorial participation, assignment work, laboratory work, class tests and quizzes that contribute to the final grade awarded for the subject.

Students will be notified at the commencement of each course about the evaluation methods to be used for the course and the weightage given to the different assignments and evaluation activities.

(b) COMBINED THEORYAND LABORATORY/PRACTICAL COURSES:
Some of the courses have combined theory and laboratory/practical portions. For these courses marks will be awarded as follows: 20% Internal Marks, 20% Practical Marks, 60% Final Examination Marks.

The type of each course is indicated in the following course descriptions.

(c) THEORY:
The pure theory course marks will be awarded as follows:
20% Internal Marks and 80% Final Examination Marks.

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(d) LABORATORY:
The pure laboratory or practical course marks will be awarded as follows:
60% from continuous internal evaluation, 40% from final viva to be evaluated by the University.

(e) END-SEMESTER EXAMINATION:
The examination at the end of the semester is set and evaluated by examiners.

7. OBJECTIVE OF SEMESTER COMPUTER PROJECTS:

The concepts of project work will begin in the first semester and it will continue in the last Seven semesters. Students will be expected to apply the theory and principles they have learned from other courses in a practical way in order to complete a project each semester. They will develop skills in goal setting, planning, research, team work, implementation, assessment, report writing and presentation is they work on their chosen project.

Student will work in a group of upto three students under the guidance of group adviser. The group will decide on a project and set out their aims and objectives.

8. EVALUATIONS AND GRADING SYSTEM:

The performance of students is evaluated through a system of continuous testing spread over the entire period of study. At the end of each semester, students are awarded letter grades based on grades and marks obtained in various segments of the course evaluation.

In students rating eight grades A+,A,B+, B, C, D ,F and I are used.
Letter grades are used to show the academic standing of a student, with the following values, equivalent marks % and remarks:

EQUIVALENT MARKS %	LETTER GRADE	GRADE VALUE	REMARKS
90 and Above	A+	4.00	
80 and Below 90	A	3.75	
70 and Below 80	B+	3.50	
60 and Below 70	B	3.00	
50 and Below 60	C	2.50	
40 and Below 50	D	1.75	
Below 40	F	0.00	Fail
Not Qualified(NQ)/Absent	I	-	Incomplete

If a student fails to submit term paper, report, home assignment and laboratory assignment, which are requirements of a course, the teacher concerned may allow him the benefit of an "Incomplete." A student who is awarded as "Incomplete" in any course can get it removed within six weeks from the end of the semester. If the requirements are not met within this time limit, the student's grade in that course is converted into "Fail." On completion of the course, however, the student does not receive any further grade but is allowed the benefit of the numerical grade point weight of an "Incomplete."

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9. **CUMULATIVE GRADE POINT AVERAGE (CGPA)**

A Cumulative Grade Point Average (CGPA) , Which is the grade point average of all the semesters, is computed at the end of the course for all students. Final later grades in each course are converted into grade points on the following basis:

A+---------- 4.00	grade points
A----------3.75	grade points
B+----------3.50	grade points
B----------3.00	grade points
C----------2.50	grade points
D----------1.75	grade points
F----------0.00	grade points

As the student complete different course, these points are accumulated and an average point score for each student called the CGPA in maintained.

The CGPA shall be calculated using the for formula:

$$CGPA = \frac{\Sigma(\text{Credit hours} \times \text{Grade points})}{\Sigma(\text{Credit hours})}$$

A student must maintain a CGPA of 2.0 or above throughout the study period. The student failing to maintain the CGPA of 2.0 may be required to withdraw from the program.

10. SCOPE FOR FURTHER STUDIES:

After accomplishing this course, the student can enroll for graduate degree such as:

Maser of Information Technology
Master of Computer Application
Master of Science in Computer Science
Master of Science in Computer Information Systems
Master of Business Administration

Registrar

11. THE DISTRIBUTION OF COURSE SHALL BE AS FOLLOWS:

Year:I **Semester:I**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT101CO	Fundamentals of Information Technology	3	3	1	2	6
BIT102HS	Mathematics-I	3	3	2	-	5
BIT103HS	Technical Communication	3	3	1	-	4
BIT104HS	Society and Ethics in IT	3	3	1		4
BIT105CO	Computer programming in C	3	3	1	2	6
BIT106CO	Project-I	2			3	3
	Total	17	15	6	7	28

Year:I **Semester:II**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT151HS	Mathematics-II	3	3	2	-	5
BIT152CO	Digital Logic	3	3	1	2	6
BIT153HS	Discrete Structure	3	3	1		4
BIT154CO	Object –Oriented Programming in C++	3	3	1	2	6
BIT155MS	Financial Management and Accounting	3	3	1	1	5
BIT156CO	Project-II	2	-	-	3	3
	Total	17	15	6	11	29

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Year:II **Semester:I**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT201HS	Numerical Methods	3	3	1	2	6
BIT202CO	Microcontroller	3	3	1	2	6
BIT203CO	Data Structure and Algorithm	3	3	1	2	6
BIT204CO	Computer Network and Data Communication	3	3	1	2	6
BIT205CO	System Analysis and Design	3	3	1	-	4
BIT206CO	Project-III	2	-	-	3	3
	Total	17	15	5	11	31

Year:II **Semester:II**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT251HS	Probability and Statistics	3	3	1		4
BIT252CO	Computer Organization and Architecture	3	3	1		4
BIT253CO	Operating System	3	3	1	2	6
BIT254CO	Database Management System	3	3	1	2	6
BIT255CO	Programming in JAVA	3	3	1	2	6
BIT256CO	Project-IV	2	-	-	3	3
	Total	17	15	5	7	29

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Year:III **Semester:I**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT301HS	Research Methodology	3	3	1		4
BIT302CO	Computer Graphics	3	3	1	2	6
BIT303CO	Cryptography and Network Security	3	3	1	2	6
BIT304CO	Web Technology	3	3	1	2	6
BIT305CO	Internet of Things	3	3	1	2	6
BIT306CO	Project-V	2	-	-	3	3
	Total	17	15	5	7	31

Year:III **Semester:II**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT351CO	Artificial Intelligence	3	3	1	2	6
BIT352CO	Management Information System	3	3	1		4
BIT353CO	Data warehousing and Data Mining	3	3	1	2	6
BIT354CO	Simulation and Modeling	3	3	1	2	6
BIT355CO	Software Engineering	3	3	1		4
BIT356CO	Project-VI	2	-	-	3	3
	Total	17	15	5	9	29

Registrar

Year:IV **Semester:I**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT401CO	Network Programming	3	3	1	2	6
BIT402CO	Digital Governance	3	3	1		4
BIT4**	Specialization 1	3				
BIT4**	Specialization 2	3				
BIT403CO	Internship	3				
	Total	15				

Year:IV **Semester:II**

Course Code	Course Description	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT451MS	Principles of Management and Entrepreneurship in IT	3	3	1		4
BIT452CO	Distributed and Cloud Computing	3	3	1	2	6
BIT4**	Specialization-3	3				
BIT4**	Specialization-4	3				
BIT453CO	Apprentice Project	3				6
	Total	15				

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**<u>Specialization Area</u>:

Specialization area courses have been designed in three major areas for in-depth knowledge in the area. Students develop specialized expertise in their specialization area. Students are required to take four specialization courses, two courses each in seventh and eight semester, from a selected area of specialization. Currently, three specialization areas (Intelligent Systems and Business Analytics, E-Commerce and Web Application Development, and Climate Change Management) are offered to the students.

A.Intelligent Systems and Business Analytics

Year :IV and Semester :I (Specialization 1 and Specialization 2)

BIT421CO: Machine Learning
BIT422CO: Business Intelligence and Data Science
BIT423CO: Deep Learning

Year:IV and Semester:II (Specialization 3 and Specialization 4)

BIT471CO:Natural Language Processing
BIT472MS:Supply Chain Analytics

B: Digital Commerce and Mobile application Development

Year :IV and Semester :I (Specialization 1 and Specialization 2)
BIT428CO: Digital Commerce
BIT429CO:Multimedia and Application

Year :IV and Semester :II (Specialization 3 and Specialization 4)
BIT478CO: Big Data
BIT479CO: Mobile App development

C: Climate Change Management

Year :IV and Semester :I (Specialization 1 and Specialization 2)
BIT435CO: **GIS**
BIT437CO:Remote Sensing
BIT437CO: Data Center and Disaster Recovery Center

Year :IV and Semester :II (Specialization 3 and Specialization 4)
BIT485CO: Incident Response and Management System
BIT486CO: Climate Change Risk Management
BIT487CO:Disaster Governance

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Purbanchal University

Bachelor of Information Technology (BIT)

Year:I **Semester:I**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT101CO	Fundamentals of Information Technology	3	3	1	2	6
BIT102HS	Mathematics-I	3	3	2	-	5
BIT103HS	Technical Communication	3	3	1	-	4
BIT104HS	Society and Ethics in IT	3	3	1	-	4
BIT105CO	Computer programming in C	3	3	1	3	7
BIT106CO	Project-I	2	-	-	3	3
	Total	**17**	**15**	**6**	**8**	**29**

Note :- Each semester of BIT 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.

Fundamentals of Information Technology
BIT101CO

Year: I **Semester: I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	2	20	50	80	-	150

Course Objective: The main objective of this course is to provide basic knowledge of IT and its components, and their applications in various fields.

Course Contents:

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

Characteristics and components of computer, History and generation of computers, Classification of computer based on purpose, size and technology; Applications of Computers - Computer in business and Industry, Computers in home, Computer in education and training, Computers in entertainment, science, medicine and engineering.

Unit 2: Basic Computer Organization and Computer Peripherals **(4 Hrs)**

Block diagram of computer system; Input devices: Keyboard, mouse, and other types of input devices; Output devices: Monitor, printer, and other types of output devices.

Unit 3: Computer Storage **(4 Hrs)**

Concepts of memory and requirements of storage devices; Classification and types of storage devices; ROM and RAM with their types; Magnetic devices and Optical devices.

Unit 4: Computer Software **(4 Hrs)**

Introduction and types of software; Definition and functions and types of operating system; Programming languages and their types.

Unit 5: Introduction to Database **(4 Hrs)**

Meaning of data and information; Concepts and characteristics of database and DBMS; Database Models; Data Warehouse & Data Marts, Data Mining; On-Line Analytical Processing (OLAP).

Unit 6: Networks and Internet **(10 Hrs)**

Introduction to communication system and computer network; Uses of computer network; Types and topologies of network; Network media and network software; Introduction, features and applications of Internet; Intranet and extranet; World Wide Web, E-mail, E-commerce, E-Learning, E-Governance, E-Banking; Introduction to Network Protocols (TCP/IP, HTTP, HTTPs, FTP, SMTP, POP3, IMAP).

Unit 7: Information Security **(2 Hrs)**

Introduction to Information Security; Computer crime, viruses and threats; Cyber law and ethical issues.

Unit 8: Computer Hardware **(7 Hrs)**

Motherboard and its parts, slots, daughterboard, and expansion slots; BIOS, SMPS, CMOS, and Microprocessors.

Unit 9: Technological trends in Information Technology **(6 Hrs.)**

Cloud Computing, Artificial Intelligence, BIG Data, IoT, Robotics, Virtual Reality, Augmented Reality, Blockchain Technologies.

Laboratory Works:

1. Basics of Windows and User Interface

- Using mouse and moving icons on the screen
- The My Computer icon, the Recycle Bin icon, Status Bar, Start button, Menu Bar
- Opening, closing and running an application
- Using Windows Explorer to view files, folders and directories
- Creating and renaming files and folders
- Windows settings: control panel, wallpapers, screen savers, date and time, sound
- Advanced features: using right mouse button, shortcuts, notepad, accessories

2. Basic DOS Commands

- Comparison of DOS and Windows, switching between DOS and Windows
- Creating, renaming, copying, moving, and deleting files and directories

3. Word Processing:

- Basics: opening and closing documents, saving documents, page setup, printing, scrolling around a document
- Text manipulation and formatting: text selection, cut, copy and paste, font, Bold, Italic and Underline, text alignment, line and paragraph setting, changing font, size and color, bullets and numbering, changing case
- Table manipulation: drawing and inserting table, changing cell width and height, alignment of text in cell, inserting and deleting rows and columns, table borders

4. Spreadsheets:

- Basics: opening and closing of spreadsheet, multiple sheets, Menu Bar, cell inputting, cell addressing
- Manipulation of cells: entering texts, creating tables, setting cell width and height, copying of cells
- Formulas: sum, average, percentage, and other basic functions
- Preparing invoices/budgets, totaling of transactions, maintaining daily and monthly reports

5. Presentations:

- Basics: opening a PowerPoint presentation, using Wizard to create a presentation
- Slide presentation: title, text, picture, table, font color and font size, bullets and indenting, slide design, background, slide numbering, slide show, slide animation, slide sorting, printing slides

6. Computer Communication and Internet:

- Basics of computer network, WWW, and websites
- Web browsing, net surfing, chatting, using e-mails

7. Computer Hardware

- Assembling and disassembling of computer system
- Installation of operating system, utilities and application software
- Installation of printer
- Routine checks and troubleshooting
- Virus protection
- Network cabling and Internet connectivity

References:

1. Peter Norton, "Peter Norton's Introduction to Computer", Tata McGraw-Hill Publishing Company Limited
2. Robert Cowart, "Mastering Windows-Premium Edition", BPB Publication
3. Ron Mansfield, "Mastering Word", BPB Publication
4. Thomas Chester, "Richard A. Alden, Mastering Excel", BPB Publication
5. Katherine Murray, "Mastering Power Point", BPB Publication
6. Shankar N. Adhikary, Ajay K. Shah, "Business Application of Computers", Buddha Publication
7. Winn L. Rosch, "The Hardware Bible", 3rd Edition, PHI
8. Mark Minasi, "The Complete PC Upgrade & Maintenance Guide"
9. Scott Mueller, "Upgrading & Repairing PCs"
10. Alexis Leon & Mathews Leon, "Fundamentals of Information Technology", Leon Techworld
11. P. K. Sinha, "Computer Fundamentals", BPB Publication
12. V. Rajaraman, "Fundamentals of Computer"

Mathematics I
BIT102HS

Year : I **Semester : I**

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 enable students to apply mathematical tools such as linear algebra, differential calculus and analytical geometry in information technology.

Course Contents:

Unit 1: Matrix Algebra **(7 hrs)**

Definition, Equality of matrices, Addition& Scalar Multiplication of a matrix; Product of matrices; Some special types of matrices; Matrices & Determinants (simple cases only); Adjoint & Inverse of a matrix; Cramer's rule; Use of matrices in solving a system of linear equations (Homogenous & Non- homogeneous system).

Unit 2: Coordinate Systems **(5 hrs)**

Rectangular coordinates in a plane; Polar coordinates; Rectangular coordinates inspace; Cylindrical polar coordinates; Spherical polar coordinates; Transformation of one coordinate system into another system.

Unit 3: Elementary Coordinate Geometry **(5 hrs)**

The conic sections; Translation of Axes; Equation of a conic in polar coordinates.

Unit 4: Vectors and Solid Geometry **(10 hrs)**

The concept of a vector; Addition & Subtraction of vectors; Resolution of vectors; Scalar Dot product of two vectors; Vector Cross product of two vectors; Equations of Line and Plane; Product of three or more vectors; Sphere, Cylinder and Cone; Quadratic Surfaces

Unit 5: Applications of Differentiation **(8 hrs)**

Geometrical Applications; Related Rates; Roll's and Mean – Value theorems; Indeterminate forms; Maxima and Minima; Taylor's and Maclaurin's series; Curvature; Asymptotes.

Unit 6: Applications of the Definite Integral **(5 hrs)**

Area bounded by a curve; Volume and surface area of solids of revolution; Length of an arc of a curve; Area and volume in polar coordinates.

Unit 7: Functions of Several Variables **(5 hrs)**

Function of several variables; Limits and continuity; Partial derivatives, First and Second Order; Homogenous functions, Euler's Theorem.

References:

1. Engineering Mathematics Vol.: S. S. Sastry Prentice Hall of India.

2. Fraleight J. B. Calculus with analytic grometry, Addisen Wesley pub. Community. Inc(1980)
3. Bajpai, A.C Calus I.M. and fairley, J.A.Mathematics for Engineering & Scientist, Vol I john wiley & sons (1973).
4. Goldstain, I.J. Lay D.C. and Schneider, D.I Calculus and its Application,s Prentice Hall Inc. (1977)
5. Spiegel, M.R. Theory and problems of advanced calculus schaum publish.
6. Srivastava, R.S.L. Engineering Mathematics, Vol I, Tata, McGraw hill pub (1980)
7. N. Saran & J.K. Goyal, Introduction to matrices pragatic Prakashan (1990)

Technical Communication
BIT103HS

Year: I **Semester: I**

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

Course objective: The main objective of this course is to develop intensive and extensive skills needed for oral presentation and writing and presenting a seminar paper

Course Contents:

Unit 1: Oral Communication **(10 Hrs)**

Oral Presentation Skills: Introduction; Getting Started on Presentations; Planning; Organizing and Composing; Preparing; Rehearsing; Presenting; Organizing a Group Presentation; Writing and Presenting a Seminar Paper

Unit 2: Reading: Intensive and Extensive **(16Hrs)**

Intensive Reading: How to Tackle Reading Materials; Practice on Contextual Grammar (Prepositions; Active Voice and Passive Voice; Tense based Practice; Direct Speech and Indirect Speech; Subject Verb Concord; Error Analysis; Stress); Reading Techniques (Skimming; Scanning; Note Making; Summary Writing.

Extensive Reading: How to Tackle Extensive Reading Materials; Practicing Extensive Reading.

Unit 3: Writing **(19Hrs)**

Business Communication: Rules of Good Writing; Fax Message and Electronic Mails; Memos; Meetings (Notice Preparation, Agenda Preparation and Minutes Preparation).

Persuasive Communication: Notices, Advertisements and Leaflets.

Letters: Official Letters (Standard Letter Format; Writing Letters for Asking and Giving Instruction, Letters of Request, Apology and Explanation, Complaint and Order); Letter of Application (Standard Format; Preparing CV, Bio-data and Resume; Writing Letters of Application).

Proposals: Introduction; What Is a Proposal?; Getting Started on Proposal; Composing Informal; Proposals; Composing Formal Proposals.

Information Reports: Introduction; Getting Started on Informative Reports; Summary and Abstract; Mechanism and Description; Periodic Reports; Progress Reports; News Releases.

Recommendation Reports: Introduction; What Is a Recommendation Report? Starting a Recommendation Report; Formatting and Organizing Recommendation Reports; Composing Recommendation Reports.

Workshop/seminar(s) should be conducted to enhance the reading, writing, listening and speaking skills.

References:

1. Taylor, Shirely. Communication for Business: A Practical Approach. London: Longman, 2005.

2. Smith-Worthington, Daelene and Sue Jefferson. Technical Writing for Success. 3rd ed.USA: Cengage Writing, 2011.
3. Adhikari, Usha, et al. A Course Book of Communicative English. Kathmandu: Trinity Publications, 2012
4. Mohan, Krishna and Banerji, Meera. (1990). Developing Communication Skills. Macmillan: New Delhi.
5. Gerson, S. J. and Gerson S. M. (2007). Technical Writing. Pearson Education: New Delhi.
6. Leech, G. And Svartvik, J. (1975). A Communicative Grammar of English. ELBS: England.
7. Sinha, R. P. (1991). How to Write Correct English. BharatiBhawan: India.
8. Swan, Michael. (1980). Practical English Usage. OUP: Oxford.
9. Thakur, K. P. (1989). A Practical Guide to English Grammar. BharatiBhawan: India.

Society & Ethics in IT
BIT104HS

Year: I **Semester: I**

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 developmentand 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 Programming in C
BIT105CO

Year: I **Semester: I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	3	20	50	80	-	150

Course Objective: The main objective of this course is to enable students familiarize with writing algorithms and developing programs using C language.

Course Contents:

Unit 1: Problem Solving with Computer **(3 Hrs)**

Problem analysis, Algorithms and Flowchart; History and Importance of C; Structure of C program; Coding, Compilation and Execution; Debugging, Testing and Documentation.

Unit 2: Elements of C **(3 Hrs)**

C Tokens; Escape sequence; Variables; Data types; Constants/Literals; Expressions; Statements and Comments.

Unit 3: Input and Output **(4 Hrs)**

Conversion specification; I/O operation; Unformatted and Formatted I/O.

Unit 4: Operators and Expression **(3 Hrs)**

Arithmetic operator; Relational operator; Logical and Boolean operator; Assignment operator; Ternary operator; Bit-wise operator; Increment and Decrements operator.

Unit 5: Control Statements **(4 Hrs)**

Branching; Looping; Exit function, Break and Continue statement; Goto statement.

Unit 6: Arrays **(6 Hrs)**

Introduction; Declaration of array; Initialization of array; Sorting; Multidimensional array; String and String handling functions.

Unit 7: Functions **(5 Hrs)**

Local, global, static and Register variables; Library functions and User-defined functions; Pass by value and Pass by reference; Recursion; Use of array in function.

Unit 8: Pointers **(6 Hrs)**

Introduction and importance of Pointers; Reference and dereference operator; Pointer arithmetic; Pointer and array; Pointer with multidimensional array; Pointer and strings; Dynamic memory allocation.

Unit 9: Structure and Union **(5 Hrs)**

Introduction; Array of structure; Passing structure to function; Passing array of structure to function; Pointer to structure; Structure within structure (Nested structure); Union.

Unit 10: Files and File Handling in C **(4 Hrs)**

Introduction and Importance of files; Opening and closing a file; File Opening Modes; Input/output function; Sequential and Random access in file.

Unit 11: Introduction to Graphics **(2 Hrs)**

Modes; Initialization; Graphics Function.

Laboratory: Laboratory exercises are necessary to be done in different chapters. At the end of each chapter, laboratory reports are required to be submitted to teacher for evaluation.

LABORATORY EXERCISE FOR BCA104CO

Lab class will cover all above mentioned topics and shall include at least the following lab exercises.

1. Display messages as output
2. Simple interest calculation
3. Area and circumference of circle
4. Area and perimeter of rectangle
5. Character conversion from lower case
6. Character conversion from upper case to lower case and vice versa
7. Reading and writing a line of text
8. Averaging student exam scores
9. Compound interest calculation
10. Syntactic errors
11. Execution errors (Real root of a quadratic equation)
12. Debugging a program
13. Debugging with an interactive Debugger
14. Calculating total expenses
15. Calculating bonus
16. Calculating division of students
17. Generating consecutive integer quantities
18. Averaging a list of numbers
19. Converting Several lines of character to uppercase
20. Encoding a string of characters
21. Repeated compound interest calculations with error trapping
22. Solution of an algebraic equation
23. Calculating depreciation
24. Searching for palindromes
25. Largest of three integers quantities
26. Calculating factorials
27. Simulation of a game of chance
28. Printing backwards
29. The tower of Hanoi
30. Average length of several lines of text
31. Search for a maximum
32. Generating Fibonacci numbers
33. Deviation about an average
34. Reordering a list of numbers
35. A piglatin generator
36. Factors, prime Factors, LCM, HCF
37. Adding two tables of numbers

38. Recording a list of strings
39. Analyzing a line of text
40. Displaying the day of the year
41. Future value of monthly deposit (compound interest calculations)
42. Updating customer records
43. Locating customer records
44. Raising a number to a power
45. Creating a data file (lower case to upper case text conversion)
46. Reading a data file
47. Creating a file containing customer records
48. Updating a file containing customer records
49. Creating an unformatted data file containing customer records
50. Graphic programming- Displaying different shapes

References:

1. E. Balagurusamy "Programming in ANSI C", Tata Mc Graw-Hill Publishing.
2. Deitel: C: How to program, 2/e(with CD), Pearson Education.
3. Al Kelley, Ira Pogl, "A Book on C", Pearson Education.
4. Brian W. Kernighan & Dennis M. Ritchie, "The C Programming Language", PH.
5. Byron S. Gottfried, "Programming with C, Tata Mc Graw-Hill Publishing.
6. Stephen G. Kochan, "Programming in C", CBS publishers & distributors.
7. Yashvant Kanetker "Let Us C", BPB Publication.

Project-I
BIT106CO

Year: I **Semester: I**

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 high-level language (C-Programming).

Course Contents:
A Project group will be developing a software project by using high-level language (C-Programming / BIT105CO). Every student 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. Information Gathering
2. System requirements specifications
3. Algorithms and Flowchart
4. Coding Techniques
5. Result
6. Documentation

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

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

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

Purbanchal University

BACHELOR OF INFORMATION TECHNOLOGY (BIT)

Year: I **Semester: II**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT151HS	Mathematics-II	3	3	2	-	5
BIT152CO	Digital Logic	3	3	1	2	6
BIT153HS	Discrete Structure	3	3	1	-	4
BIT154CO	Object –Oriented Programming in C++	3	3	1	2	6
BIT155MS	Financial Management and Accounting	3	3	1	1	5
BIT156CO	Project-II	2	-	-	3	3
	Total	**17**	**15**	**6**	8	**29**

Note :- Each semester of BIT 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
BIT152SH

Year: I **Semester: II**

Teaching Schedule Hour/ 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 enable students to apply mathematical tools such as advanced calculus, functions of a complex variables and series in information technology.

Course Contents:

Unit 1: Multiple Integrals **(6 hrs)**

Definition and Evaluation of Double Integrals; Area by Double integration; Introduction to triple integrals & some simple applications; Change of variables.

Unit 2: Differential Equations of the first order **(8 Hrs)**

Variable separable; Exact Differential equations; Homogeneous equations; Linear Differential Equation; Simultaneous differential equations; Equations of higher degree Some applications.

Unit 3: Linear Differential Equations **(7 Hrs)**

Homogeneous equations of second order; Methods of determining particular integrals and application; Vibrations of a particle (SHM).

Unit 4: Fourier Series and Integrals **(10 Hrs)**

Definitions and derivations; Odd and Even functions; Half range series; Change of scale; The Fourier Integral and Fourier Transforms.

Unit 5: Functions of a Complex Variable **(8 Hrs)**

Basic definitions; Functions of a complex variable; Limits, continuity & differentiation; Cauchy Riemann Equations; Analytic Functions; Harmonic Functions; Complex exponential, trigonometric and hyperbolic function.

Unit 6: Complex Series, Residues and poles **(6 Hrs)**

Taylor's Theorem; Laurent's Series; Zeros, Singularities and poles; Residues.

References:

1. Engineering Mathematics Vol II.:--□ S.S. Sastry, Prentice Hall of India.
2. Fraleigh, J.B. Calculus with Analytic Geometry, Addison Wesley pub. Co. Inc (1980)
3. Bajpai, A.C., Calus, I.M and fairley, J.A., Mathematics for Engineering & Scientists, Vol I, John wiley & sons (1973)
4. Goldstain, I.J. Lay, D.C. and schinder, D.I. Calculus and its Applications, Prentice Hall Inc (91977)
5. Spiegel, M.R. Theory and problems of advanced calculus, Scham publishing co

6. Srivastava, R.S.L. Engineering Mathematics, Vol II, Tata, McGraw hill publishing co, (1980)
7. Potter & Goldberg, Mathematical Methods, Prentice Hall of India.

Digital Logic
BIT 152CO

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	50	80	-	150

Course Objective: The main objective of this course is to familiarize students with the concepts of design and analysis of digital systems and introduce the principles of digital computer organization and design.

Course contents

Unit 1: Number Systems **(5 Hrs)**

Introduction, Comparison between analog and digital system, Number system and conversion (Binary, Octal, and Hexadecimal), signed and unsigned numbers, fraction conversion, Binary Arithmetic, Representation of Binary coded decimal, gray code, alphanumeric code and error detection and correction codes

Unit 2: Boolean Algebra and Logic Gates **(6 Hrs)**

Introduction to Boolean algebra; Basic theory and properties of Boolean algebra; Boolean functions; Logic gates and operations.

Unit 3: Simplification of Boolean Functions **(6 Hrs)**

K-Map; Two and three variable maps; Product of sums, sum of products; Simplification of NAND and NOR implementation.

Unit 4: Combinational Logic **(16 Hrs)**

Design procedure of Adders and Subtractors; Code conversion, Analysis procedure; Multilevel NAND gates; Multilevel NOR gates; Binary parallel adder; Decimal adder; Magnitude comparator; Decoders; Multiplexers; Read only memory Programmable logic array (PLA).

Unit 5: Sequential Logic **(6 Hrs)**

Difference between sequential and combinational circuit; Introduction and Design procedure of RS, JK, T, D and master-slave flip flops; Design with state equation and state reduction table.

Unit 6: Registers and Counters **(6 Hrs)**

Introduction; Left and right shift register; Serial in serial out, Serial in parallel out, Parallel in serial out, Parallel in parallel out; Asynchronous and Synchronous counter; Asynchronous up and down counter; Decade counter, Ring counter; Application of counter.

Laboratory:

1. Familiarization with logic gates
2. De Morgan's law
3. Multiplexer and de-multiplexer
4. Encoder and decoder

5. Half adder and half subtractor
6. Full adder and full subtractor
7. RS, JK, T,D and master slave flip flops
8. Shift registers, Sequential logic
9. Ripple counters and synchronous counters
10. Simulation using suitable software

References:

1. Floyd T. L & Jain R. P, "Digital Fundamentals", 8th edition
2. Morris Mano, "Logic & Computer Design Fundamentals", Pearson education
3. William I, Fletcher, "An Engineering Approach to Digital Design", Prentice Hall of India, New Delhi, 1990
4. A.P. Malvino & Jerald A. Brown, "Digital Computer Electronics", 1995
5. D. D. Hodegs & H.G. Jackson, "Analysis & Design of Digital Integrated Circuits", McGraw Hill, New York, 1983

Discrete Structure
BIT153HS

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 the concept of computational mathematics.

Course contents:

Unit 1: Set Theory and Matrices **(3 Hrs)**

Overview of sets and sets operation; Sequence; Matrices; Mathematical structure.

Unit 2: Function and Counting **(7 Hrs)**

Functions; Function for computer science; Permutation; Combination; The Pigeonhole principle; Recurrence relation.

Unit 3: Logic **(6 Hrs)**

Proposition and logical operation; Conditional statement; Proof Techniques; Mathematical induction.

Unit 4: Relation and Digraphs **(8 Hrs)**

Products set and partitions; Relations digraphs; Paths and in-relation and digraphs; Properties of relations; Equivalent relation; Manipulation of relation; Transitive closure and Warshall's algorithms.

Unit 5: Graph and Tree **(8 Hrs)**

Graphs; Euler path and circuit; Hamiltonian path and circuit; Trees; Labeled tree; Binary search tree; Minimal spanning tree.

Unit 6: Order Relation and Structure **(6 Hrs)**

Partially ordered sets; External element of a Posets; Lattices; Finite Boolean algebra.

Unit 7: Automata, Language and Grammar **(7 Hrs)**

Introduction; Finite-state Automata; Strings; Languages; Regular expressions; Grammars.

References:

1. "Discrete Mathematical Structure", Bernard Kolman, Rober C, Busy, Sharman Ross, PHI India
2. "Applied Discrete Structure", K. D. Joshi, New Age International Pvt. Ltd., New Delhi, India
3. "Discrete Mathematics", B. P. Prashar, CBS Publishers & Distribution, New Delhi, India

Object-Oriented Programming in C++
BIT154CO

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

Financial Management and Accounting
BIT155MS

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	1	20	50	80	-	150

Course Objective: The main objective of this course is to familiarize students with the basic knowledge of financial management and accounting in information technology.

Course contents

Unit 1: Nature of Financial Management **[3 Hrs]**

Meaning and importance objectives-profit vs wealth maximization, functions, financial; management in new millennium-globalization of business and information technology

Unit 2: Time Value of Money **[3 Hrs]**

Concept, present values and future values

Unit 3: Capital Budgeting **[4 Hrs]**

Importance, generating ideas for capital projects, projects classifications, capital budgeting; decision rules-payback period, NPV and IRR, comparison of NPV and IRR.

Unit 4: Working Capital **[5 Hrs]**

Concept of working capital, cash management (preparation of Cash Budget), receivables management inventory management, financing working capital.

Unit 5: Capital Structure **[4 Hrs]**

Meaning of capital structure, optimum capital structure, business and financial risks, determining; Optimum structure, factors affecting capital structure policies.

Unit 6: Dividends **[4 hrs]**

Meaning of Dividends and retained earnings, optimum dividend policy, factor affecting dividend policies, types of dividend policy, other forms of dividend stock dividends-stock dividends, stock splits, stock repurchase.

Unit 7: Nature of Accounting **[4 Hrs]**

Meaning, importance, basic accounting concepts, principles and standards: double entry system of accounting, rules of double-entry-equation rule and types of account rule.

Unit 8: Accounting Process **[6 Hrs]**

Journalizing and subdivision of journal, ledger posting, cash book, preparation of trial balance.

Unit 9: Financial statement **[5 Hrs]**

Meaning types- income statement (Trading & P/L account), B/S, preparation of financial statements of sole trading concern & Partnership firm.

Unit 10: Financial Analysis **[4 Hrs]**

Meaning, types, ratio analysis, uses and limitation of ratio analysis

Unit 11: Cash Flow Statement – Direct Method **[3Hrs]**

Laboratory: Lab will be conducted to the accounting topics of the syllabus using accounting package (e.g. Tally, Facts). Students should prepare final accounts of any organization using any of those accounting package.

References:

1. Eugene F. Brigham & Joel F. Houston, "Fundamentals of Financial Management", Harcourt Asia Pte, Singapore, Indian Edition, 2001.
2. T. S. Gerewal, "Introduction to Accounting", S. Chand & Co, New Delhi.
3. Lawrence J Gitman, "Principles of Managerial Finance", Addison Wesley Longman (Singapore) Pvt. Ltd, Indian Reprint, 2001.
4. Surendra Pradhan, "Basics of Financial Management", Educational Enterprises, Kathmandu.

Project-II
BIT 156CO

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 [BIT154CO]. 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.