



BACHELOR OF COMPUTER SYSTEM AND INFORMATION TECHNOLOGY (BCSIT)

CURRICULUM

**Faculty of Management Studies
Pokhara University**

2023

Table of Contents

BCSIT Program Objectives	1
Curricular Structure.....	1
Program Features.....	2
The Semester System.....	2
Entry Requirements and Admission Procedures.....	2
Eligibility	2
Documents Required	2
Admission Procedures	3
Academic Schedule and Course Registration	3
Addition and Withdrawal from the Course.....	3
Attendance Requirements	3
Normal and Maximum Duration of Study	3
Evaluation System.....	3
Grading System.....	4
Repeating a Course.....	5
Credit Transfer and Withdrawal.....	5
Project Work	5
Internship	6
Provision for Re-totaling and Rechecking.....	6
Dismissal from the Program	6
Degree Requirements	6
Distinction and Dean's List	6
BCSIT Curriculum Structure	7
Semester-wise Curriculum Structure.....	9
Course Details: BCSIT Program, Semester I.....	12
Course Details: BCSIT Program, Semester II	37
Course Details: BCSIT Program, Semester III	68
Course Details: BCSIT Program, Semester IV	91

POKHARA UNIVERSITY
BACHELOR OF COMPUTER SYSTEM AND INFORMATION TECHNOLOGY (BCSIT)

BCSIT Program Objectives

The Bachelor of Computer System and Information Technology (BCSIT) which was previously named as Bachelor of Computer Information System (BCIS) program of Pokhara University provides students with foundational knowledge and practical skills needed in various areas of information systems, computer technology, and management. The program aims to develop students' intellectual ability, technical skills, and managerial applications through an appropriate blending of computer, information technology, and business courses.

The objectives of the Bachelor of Computer Systems and Information Technology (BCSIT) program are as follows:

- To develop a strong foundation in computer systems, hardware, software, and information technology, ensuring that students grasp fundamental principles and technologies.
- To foster problem-solving abilities, enabling students to analyze complex technical issues, identify solutions, and effectively implement strategies to address them.
- To provide students with the knowledge and skills to design, develop, and maintain software applications using relevant programming languages and methodologies.
- To teach students how to manage information systems, including database management, network administration, and cybersecurity, ensuring data security and availability.
- To equip students with the ability to collect, process, and analyze data, enabling meaningful insights and data-driven decision-making.
- To develop strong written and verbal communication skills, allowing students to convey technical information to diverse audiences and foster collaboration.
- To offer a foundation in business and management principles, helping students understand how IT aligns with organizational goals within a business context.
- To align the curriculum with industry-recognized certifications to enhance employability and industry competitiveness.

Curricular Structure

The coursework gives students a broad and holistic view of the complexity of issues in today's information management and business environment. This program provides the basis for career growth, and also prepares for higher studies. The curriculum comprises the following five distinct components:

- **Foundation Courses:** These courses develop students' communication skills and provide them with a strong foundation in economics, statistics, mathematics, and the legal environment of business and technology.
- **Management Core Courses:** These courses will help students understand the basic principles and practices in the functional areas of management.
- **CIS Core Courses:** These courses will help students to understand principles and practices in the functional areas of computer information management specifically.

- **Concentration Courses:** The elective courses will help students to develop specialized and focused skills in the areas of their choice.
- **Project Work and Internship:** Students are required to undertake an independent capstone project that involves fieldwork and empirical analysis of the information collected from the field. After that, they will prepare a project report in a prescribed format. The internship provides students with an opportunity to gain real-life experience by working in an organization for six to eight weeks.

Program Features

The BCSIT is a four-year program structured in eight semesters. A student needs to complete 127 credit hours of coursework, project work and internship for graduation.

Besides lectures, the classes are facilitated by case studies, group discussions, project assignments, field visits, class presentations and other teaching methods. In order to develop communication and interpersonal skills, students are emphasized to participate in class activities, group discussions and individual presentations.

The medium of instruction and examination for this program will be English, and a student is expected to have good English language proficiency with acceptable communication skill.

The Semester System

The prominent feature of the semester system is the continuous evaluation of a student's performance, and flexibility given to the students to progress at a pace suited to his/her individual ability as per the credit requirements.

The credit hour assigned to each course of this program varies depending on its lecture, tutorial and practical work hours in a week. One lecture/contact hour per week per semester is assigned one credit. That is, a three credit hours course has 48 class hours. A faculty member is assigned to teach each of the courses. If the course is taught by more than one faculty member, then one of the members are designated as the coordinator of that course.

Entry Requirements and Admission Procedures

Eligibility

The entry requirement for a new student in BCSIT will be Intermediate or Higher Secondary level (10+2) or Proficiency Certificate Level (PCL) with second division or equivalent as recognized by Pokhara University. In addition, the student must pass the entrance test conducted by the concerned colleges.

Documents Required

The applicant is required to submit the following documents with the application form made available by the concerned college/school by paying a predetermined fee:

- I. Completed and signed BCSIT application form.
- II. Official transcripts from the academic institutions previously attended.

Certificates of all degrees should be photocopied and submitted with proper attestation. Enrolment is conditional upon completion of all admission formalities including payment of all fees as determined by the college. Incomplete applications shall not be processed.

Admission Procedures

A notice inviting applications for admission is publicly announced. Application forms and information brochures are provided, on request, after the payment of the prescribed fee. The concerned college scrutinizes the application. The eligible candidates are informed to take the entrance test. The date and time for the entrance test are informed to the applicants by the concerned colleges. The college may also interview the candidates for the final selection for admission.

The candidates who are given provisional admission under special conditions are required to submit all necessary documents within a month after their regular classes begin. A student who fails to do so will have his/ her admission canceled.

Academic Schedule and Course Registration

An academic session consists of two semesters. The Fall Semester starts in September and Spring Semester starts in March. Students are normally admitted to the program in the Fall semester.

Students are required to register the courses by themselves from the concerned college at beginning of each semester. Registration in absence may be allowed only in rare cases at the discretion of the principal. In normal cases, a student's nominee will not be allowed for course registration of the concerned student, but he/she may complete other formalities.

Addition and Withdrawal from the Course

A student will have the option to add or drop from the course. This can, however, be done only during the first three weeks of the semester. A student wishing to withdraw from a course should apply on the prescribed form within one month of the start of the semester.

Attendance Requirements

A student must attend every lecture, tutorial, seminar, and practical class. However, to accommodate for late registration, sickness and other contingencies, the attendance requirements will be a minimum of 80% of the classes actually held. If a student is absent in the class for more than four weeks without the permission of the concerned authority, his/her name will be removed from the college roll.

Normal and Maximum Duration of Study

The duration for the completion of the program is as follows:

- Normal duration: 4 Years (8 Semesters)
- Maximum Duration: 8 Years

A full-time student has to take a minimum of 12 credits.

Evaluation System

External evaluation 50 Marks plus internal evaluation 50 Marks

Internal evaluation is again divided into two - Theory 30 Marks + Practical 20 Marks

- The internal evaluation comprises quizzes, tutorials, lab work, home assignments, class tests, class participation, term papers, formal internal examination etc. and will be evaluated by concerned faculty. Practical marks 20 will be evaluated through lab tests, project work and viva examinations.
- The external evaluation will be conducted by the Office of the Controller of Examinations through semester-end examinations.

A fifty percent weightage is given to both internal and external evaluation (semester-end examination). A student is required to pass both internal and external evaluations

independently. The final grade will be awarded on the basis of his/her consolidated performance in all three internal, lab test/ project work/viva and external evaluation.

A student will get NOT QUALIFIED (NQ) status in the internal evaluation if his/her performance falls below the minimum requirement. Such students will not be allowed to appear in the semester-end examination of that particular course.

Internal Evaluation Theory		
Evaluation	Full Marks	Weightage
Assessment	15	50%
Assignment	10	25%
Attendance	5	25%

Internal Evaluation Practical/Viva/Project		
	Full Marks	Weightage
Lab attendance	5	25%
Report	5	25%
Viva	5	25%
Problem Solving	5	25%

Assessment Evaluation	Full Marks	Weightage
Internal Evaluation Theory	30	30%
Internal Evaluation Practical/viva/project	20	20%
External/University Exam	50	50%

Evaluation of Concentration Courses

The concerned school/college will conduct internal and semester-end examinations of the elective courses following the rules and directives of the OCE. The school/college must properly preserve answer copies and other necessary documents of these examinations and submit these to the Office of the Dean as and when instructed. The school/college must forward final grades of students to the OCE within 3 weeks after completion of semester-end examinations and the results should not be disclosed to students till formal notification is received from the OCE. The answer sheets must be preserved in sealed bags at the respective school/college for a period of six months.

Grading System

Pokhara University follows a four-point letter grade system. The letter grades awarded to students will be as follows:

Grade	Grade Point	Description
A	4.0	Excellent
A-	3.7	
B+	3.3	
B	3	Good
B-	2.7	

C+	2.3	
C	2.0	Satisfactory
C-	1.7	
D+	1.3	
D	1	Minimum Requirement
F	0	Fail

In some rare and unusual circumstances, if a student is unable to complete all the required work for the course, he/she may be temporarily marked with an incomplete grade "I". If all the required works are not completed within the following semester, the letter "I" will be automatically converted into "F".

The performance of a student is evaluated in terms of the following two indices:

- The semester grade point average (SGPA) which is the grade point average for the semester and is given by:

$$\text{SGPA} = \frac{\text{Total honor points earned in a semester}}{\text{total number of credit hours taken in a semester}}$$
- The cumulative grade point average (CGPA) which is the grade point average for all completed semesters and is given by:

$$\text{CGPA} = \frac{\text{Cumulative total honor points earned}}{\text{cumulative total number of credit hours taken}}$$

Repeating a Course

A course may be taken only once for grade: Since passing all courses individually is a degree requirement, the student must retake the failing course when offered and must successfully complete the course. A student will be allowed to retake a maximum of two courses to achieve a minimum CGPA of 2.0. The grade earned on the retake examination will substitute the earlier grade earned by the student in that course. A student can retake a course only when it is offered by the college/University.

Credit Transfer and Withdrawal

Up to 25% of the total credit hours of the courses completed in an equivalent program of a recognized institution may be transferred/ waived for credit on the recommendation of the principal of the college. For the credit transfer, a student must receive a "B" or above grade in the respective course. Courses taken earlier than five years from the time of transfer may not be accepted for the credit transfer. However, a student transferring from one program to another program of Pokhara University may receive a credit transfer of all the compatible courses completed with at least a "C" grade.

A student may apply for withdrawal from the entire semester only on medical grounds. The principal will examine the application for semester withdrawal, and depending on the gravity of the case, he/she will make the decision. No partial withdrawal from the courses registered in a semester will be considered.

Project Work

Students are required to undertake two mini-projects and one independent and comprehensive capstone project that involves fieldwork and empirical analysis. At the end, the students must prepare a report of this work in the prescribed format and submit it to the authorized

person/body. The objective of these project works is to develop students' skills in research, particularly in areas of data collection, processing, analysis, and report writing. These reports will be evaluated by the concerned authority.

Internship

Students need to do an internship as approved by the college. The purpose of the internship is to provide students with real-life on-the-job exposure and an opportunity to apply theoretical concepts in real-life situations. Students' interests and intended areas of concentration are taken into account while making the internship placement decisions.

Unfair Means

Students are strictly forbidden from adopting unfair means in class assignments, tests, report writing, and final examinations.

The following would be considered as the adoption of unfair means during examination:

- Communication with fellow students for help
- Copying from another student's script/report/paper.
- Copying from disk, palm of hand, mobile phone, or other incriminating documents.
- Processing from any incriminating documents, whether used or not.
- Any direct or indirect approach to influence teachers for the grade.
- Unruly behavior that disrupts academic programs.

If the instructor detects a student using unfair means, the student may be given an 'F' at the discretion of the Examination Board. Adoption of unfair means may further result in the expulsion of the student from the program, college and the University as well.

Provision for Re-totaling and Rechecking

Students may apply for re-totaling or rechecking of their grades as per university rules.

Dismissal from the Program

A student must obtain 2.0 CGPA at the undergraduate level. If his/her performance in the past semesters does not show the possibility of maintaining this CGPA, he/she may be dismissed from the program.

Degree Requirements

For graduation, a student should:

- Earn at least a 'D' grade in each course as specified in the grading system section,
- Complete the internship with a 'Pass' grade,
- Complete all the courses, project work, and internship as specified in the curricular structure,
- Section within the maximum time period mentioned in the duration of the study section,
- Maintain at least 2 CGPA.

Distinction and Dean's List

A student who obtains a 3.6 CGPA or above will receive the BCSIT degree with distinction. The Dean's list recognizes outstanding academic performances in the FMS. To qualify, a student must have 3.7 CGPA or above.

BCSIT Curriculum Structure

Foundation Courses			(18 Credits)
Course Code	Course Title		Credit Hours
ENG 111	English		3
MTH 113	Mathematics I		3
ENG 112	Business Communication		3
MTH 114	Mathematics II		3
STT 220	Linear Algebra and Probability		3
ECO 322	Applied Economics		3
Management Courses			(27 Credits)
Course Code	Course Title		Credit Hours
MGT 222	Principles of Management		3
FIN 222	Fundamentals of Financial Management		3
MKT 351	Digital Marketing		3
MGT 322	Organizational Behavior		3
RCH 322	Research Methods		3
MGT 422	Strategic Management		3
MGT 423	Management of Human Resources		3
LAW 422	Legal Aspects of Business and Technology		3
MGT 424	Innovation and Entrepreneurship		3
Information Technology and Computing Courses			(57 Credits)
Course Code	Course Title		Credit Hours
CMP 173	Internet Technology I		3
CMP 171	Fundamentals of Computer Systems		3
CMP 172	Programming Language		3
CMP 174	Digital Systems		3
CMP 175	Object-Oriented Language (Java)		3
CMP 176	Data Structure and Algorithm		3
CMP 271	Database Management System		3
CMP 272	Object-Oriented Analysis and Design		3
CMP 273	Internet Technology II (Programming)		3
CMP 275	Computer Architecture and Microprocessor		3
CMP 274	Numerical Methods		3
CMP 276	Software Engineering and Project Management		3
CMP 277	Data Communication and Networks		3
CMP 381	Operating Systems		3
CMP 471	Artificial Intelligence		3
CMP 384	Computer Graphics		3

CMP 382	Cloud Computing	3
CMP 383	Digital Economy	3
CMP 472	Information System Security	3
Concentration Courses		(12 Credits)
Course Code	Course Title	Credit Hours
	Concentration I	3
	Concentration II	3
	Concentration III	3
	Concentration IV	3
Project and Internship		(13 Credits)
Course Code	Course Title	Credit Hours
PRJ 181	Project I	2
PRJ 281	Project II	2
PRJ 481	Major Project	4
INT 494	Internship	5

Summary Course structure

SN	Course	No. of Courses	Credit Hours	Percentage (%)
1.	Foundation Courses	6	18	14.17
2.	Management Courses	9	27	21.25
3.	Information Technology and Computing Courses	19	57	44.88
4.	Concentration Courses	4	12	9.44
5.	Project Work	3	8	6.29
6.	Internship	1	5	3.93
Summary of Total Courses		42	127	100

Semester-wise Curriculum Structure

POKHARA UNIVERSITY Bachelor of Computer System and Information Technology (BCSIT)

Semester I			Semester II		
Code	Course Title	Credits	Code	Course Title	Credits
ENG 111	English	3	ENG 112	Business Communication	3
MTH 113	Mathematics I	3	MTH 114	Mathematics II	3
CMP 173	Internet Technology I	3	CMP 174	Digital Systems	3
	Fundamentals of			Object-Oriented	
CMP 171	Computer Systems	3	CMP 175	Language (Java)	3
	Programming			Data Structure and	
CMP 172	Language	3	CMP 176	Algorithm	3
			PRJ 181	Project I	2
Total Credits		15	Total Credits		17
Semester III			Semester IV		
Code	Course Title	Credits	Code	Course Title	Credits
STT 220	Linear Algebra and Probability	3	CMP 275	Computer Architecture and Microprocessor	3
CMP 271	Database Management System	3	CMP 274	Numerical Methods	3
				Software Engineering and Project	
CMP 272	Object-Oriented Analysis and Design	3	CMP 276	Management	3
	Internet Technology			Data Communication	
CMP 273	II (Programming)	3	CMP 277	and Networks	3
	Principles of			Fundamentals of	
MGT 222	Management	3	FIN 222	Financial Management	3
			PRJ 281	Project II	2
Total Credits		15	Total Credits		17
Semester V			Semester VI		
Code	Course Title	Credits	Code	Course Title	Credits
MKT 351	Digital Marketing	3	CMP 384	Computer Graphics	3
CMP 381	Operating Systems	3	RCH 322	Research Methods	3
	Organizational				
MGT 322	Behavior	3	CMP 382	Cloud Computing	3
CMP 471	Artificial Intelligence	3	ECO 322	Applied Economics	3
	Concentration I	3		. Concentration II	3
Total Credits		15	Total Credits		15

Semester VII			Semester VIII		
Code	Course Title	Credits	Code	Course Title	Credits
MGT 422	Strategic Management	3	LAW 422	Legal Aspects of Business and Technology	3
MGT 423	Management of Human Resources	3	MGT 424	Innovation and Entrepreneurship	3
CMP 383	Digital Economy	3	INT 494	Internship	5
CMP 472	Information System	3		Concentration IV	3
PRJ 481	Security	3			
	Major Project	4			
	Concentration III	3			
Total Credits		19	Total Credits		14

Concentration Computing			Concentration Data Science		
Code	Course Title	Credits	Code	Course Title	Credits
	Python Programming	3		Advance Database	3
	Advance Java	3		Data Analysis and Modeling	3
	Compiler Design and Construction	3		Data Warehousing and Data Mining	3
	Mobile Computing	3		Database Administration	3
	Dot Net	3		Artificial Intelligence and Machine Learning	3
	Software Project Management	3		Distributed Database Management	3
	Open-source Technology	3		Object Oriented Database Management	3
	more..			more..	

Concentration Networking and Cyber Security			Concentration Management Science and Systems		
Code	Course Title	Credits	Code	Course Title	Credits
	Advance Networking with IPV6	3		MIS and e-business	3
	Wireless Communication	3		E-governance	3
	Network Security	3		Social Entrepreneurship	3
	Embedded System	3		Financial Accounting	3
	Routing and switching	3		International Business Knowledge	3
	System Admin	3		Management	3
	Distributed System	3		Managerial Accounting	3
	Ethical Hacking	3		more..	

Concentration Multimedia Technology		
Code	Course Title	Credits
	Fundamentals of Animations	3
	3D Modeling	3
	Moving Images and VFX	3
	Multimedia Development Tools	3
	Sound and Music Production	3
	Advance Animation Techniques	3
	more..	

Course Details: BCSIT Program, Semester I

Semester I	
Course Title	Credits
English	3
Mathematics I	3
Internet Technology I	3
Fundamentals of Computer Systems	3
Programming Language	3
Total Credits	15

Pokhara University
Faculty of Management Studies

Course Code: ENG 111
 Course Title: **English**
 Nature of the course: Theory
 Year: First, Semester I
 Level: Bachelor

Full marks: 100
 Pass marks: 45
 Credit: 3Hrs
 Total periods: 48 hours
 Program: BCSIT

1. Course Description

This course comprises all aspects of the English language including speaking, pronunciation, listening, reading, and writing. The focus is on improving the students' capacity to communicate clearly and effectively. The syllabus for the lessons on the English language is based on the course books, while the faculty will also use other teaching tools and materials, including suggestions and input received from the students so the content of the class can be more interactive, useful, and interesting. Students are expected to participate as much as possible, which means they will work individually, in pairs, in groups, and with the whole class. The faculty will provide feedback on their spoken and written English and correct errors for the benefit of students at large. This includes basic understanding and use of everyday English phrases, the importance of language skills for information technology professionals, understanding spoken English in various contexts, and improving pronunciation, intonation, and fluency in spoken English and reading strategies like Skimming, Scanning, and Close reading

2. General Objectives

The general objectives of this course are;

- To increase and enhance the English language proficiency
- To develop and enhance communication skills
- To develop a culture and aptitude for literary appreciation
- To learn and improve grammar and syntax, with expansion of vocabulary
- To develop critical thinking skills
- To develop basic research and report-writing skills
- To improve writing skills and proficiency
- To learn and improve oral presentation
- To enhance independent and digital learning
- To promote peer collaboration and reflective writing
- To strengthen listening capabilities to understand discussions and presentations
- To improve writing skills for creating clear and concise reports, emails, and technical documentation.
- Acquire a comprehensive technical vocabulary and grasp industry-specific terminologies
- Participate and apply English communication in professional contexts

3. Method of Instructions

Generation Instructional Technique: Lecture, Discussion, Interactive Activities, Grammar and Vocabulary Exercises, Oral Presentations and Readings.

Specific Instructional Technique: Self-directed learning and Case Study.

4. Content in Detail with specific objective

Specific Objectives	Contents
▪ Provide an overview and highlight the importance of key language skills ▪ To develop and enhance listening, speaking, reading, and writing skills ▪ Understand and use basic everyday English phrases ▪ Acquire a basic repertoire of words and phrases ▪ Highlight the importance of language skills for information technology professionals	Unit 1: Introduction to Language Skills [2 Hrs.] 1.1 Overview of the four language skills - listening, speaking, reading, and writing; 1.2 Importance of language skills for professionals in information technology; 1.3 Introduction to language learning strategies to aid in comprehension
Specific Objectives	Contents
▪ Develop the ability to understand spoken English in various contexts ▪ Develop the capacity to understand and conduct technical discussions and presentations ▪ Improve note-taking skills in meetings and discussions ▪ Capture key points and ideas from spoken English ▪ Understand sentences and frequently used expressions related to immediately relevant areas	Unit 2: Listening Skills [6 Hrs.] 2.1 Understanding English language; Spoken English in various contexts; 2.2 Technical discussions and presentations; Note-taking skills; 2.3 Key points and ideas from spoken English.
Specific Objectives	Contents
▪ Develop the ability to communicate effectively in spoken English ▪ Give presentations and participate in group discussions ▪ Communicate effectively in simple and routine tasks ▪ Describe in simple terms their immediate environment and matters of interest ▪ Improve pronunciation, intonation, and fluency in spoken English	Unit 3: Speaking Skills [6 Hrs.] 3.1 Spoken English; Communications Skills; Presentation of Ideas; 3.2 Participation in Group Discussions; 3.3 Pronunciation, Intonation, and Fluency in English Language.
Specific Objectives	Contents
▪ Differentiate between academic and non-academic language ▪ Understand pronouns, different types of pronouns and their usage in academic writing ▪ Understand the different verb tenses and their usage in academic writing,	Unit 4: English Grammar for Accuracy [8 Hrs.] 4.1 Academic and Non-Academic Language; Pronoun Usage; 4.2 Understanding different types of pronouns and their usage in academic writing; Verb Tenses:

- Understand and make use of subject and verb agreement - Learn to maintain consistency in verb tense throughout a written work - Build an understanding of passive voice and transition words	4.3 Understanding the different verb tenses and their usage in academic writing; 4.4 Subject and Verb Agreement, Maintaining consistency in verb tense throughout 4.5 a written work; 4.6 Passive voice; 4.7 Transition words
Specific Objectives	Contents
- Develop reading strategies like skimming, scanning, and close reading - Develop the ability to read and comprehend technical and literary articles and materials in English. - Demonstrate grammatical control and manage short utterances Improve reading speed and comprehension through inference and interpretation skills	Unit 5: Reading Skills [8 Hrs.] 5.1 Reading Strategies; Skimming, Scanning, and Close Reading; 5.2 Reading and Comprehending Technical and Literary Works; 5.3 Reading Speed and Comprehension; Inference and Interpretation Skills
Specific Objectives	Contents
- Develop note-taking, summarizing, paraphrasing, and referencing skills to achieve language proficiency and precision. - Discourage and prevent plagiarism in academic writing - Develop strategies for promoting ethical integrity in higher education	Unit 6: Basic Research Skills [8 Hrs.] 6.1 Note-taking; Summarizing; 6.2 Paraphrasing; Referencing skills; 6.3 Precision for Proficiency; 6.4 Ethical Integrity in Academic Writing
Specific Objectives	Contents
- Develop the ability to write technical documents, such as business reports, emails and memos in clear, accurate, and concise English - Improve grammar, vocabulary, and sentence structure in written English	Unit 7: Writing Skills [10 Hrs.] 7.1 Grammar and Vocabulary; 7.2 Sentence Structure in Written English, Writing Papers; Writing Technical Documents; 7.3 Business Report Writing; 7.4 Email and Memo Writing

Additional Practical Works:

Below are some practical works and activities that can improve speaking and listening skills of the students of this course.

- **Listening:** Various learning tools can be used to provide students with audio recordings of technical discussions, presentations, or interviews. Students can then listen to the recordings and practice their listening skills by answering questions or summarizing what they heard.
- **Pronunciation:** Various learning tools can be used to provide students with audio recordings of words and phrases in English. Students can then practice their pronunciation skills by listening to and repeating the words and phrases.
- **Role Play:** Various learning tools can be used to simulate real-life scenarios, such as job interviews or customer service interactions. Students can then practice their

speaking skills by role-playing the scenarios and receiving feedback from the instructor or other students.

- **Language Testing:** Various learning tools can be used to administer speaking and listening tests, or language proficiency tests. Students can then take the tests at the same time and receive instant feedback on their performance.

Note: Faculties can create a small portfolio of tasks for students by integrating all of the above skills.

5. Evaluation system and Student's Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End examination	50	Theory		50
		Attendance & Class Participation	10%	
		Assignments	20%	
		Presentations/Quizzes	10%	
		Internal Assessment	60%	
Total External	50	Total Internal		50
Full Marks: 50 + 50 = 100				

7. Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

8. Prescribed Books and References

Prescribed Text Books:

1. Puchta, H., & Stranks, J. (2013). *English in Mind*. Cambridge University Press.
2. Eastwood. (2005). *Oxford Practice Grammar*. Karachi: Oxford University Press.
3. Elbaum, S. N. (2009). *Grammar in context: 1*. Heinle/Cengage Learning.

Reference Books:

1. Kissner, E. (2006). *Summarizing, paraphrasing, and retelling: Skills for Better Reading, Writing, and Test Taking*. Heinemann Educational Books.
2. Godfrey, J. (2018). *How to use your reading in your essays*. Bloomsbury Publishing.
3. Steele, W. R. (2009). *Presentation Skills 201: How to Take it to the Next Level as a Confident, Engaging Presenter*. Outskirts Press.

Pokhara University
Faculty of Management Studies

Course Code: MTH113
Course title: **Mathematics I**
Nature of the course: Theory
Year: First, Semester I
hours
Level: Bachelor

Full marks: 100
Pass marks: 45
Credit: 3 Hrs.
Total periods: 48
Program: BCSIT

1. Course Description

This course covers basic logic, set theory, the real number system, functions and graphs, limit and continuity, derivatives and their applications, integration, matrices and determinants, and permutations and combinations.

2. Course Objective:

The course is designed with the following objectives:

- To acquaint the students with fundamental mathematical concepts with a focus on how they apply to business, economics, and information technology.
- To develop skills among the students that they need to effectively apply mathematical techniques to real-world problems.

3. Method of Instructions

General Instructional Technique: Lecture, Discussion, Readings and Question Answer

Specific Instructional Technique: Self-Directed Learning and Case Study

4. Course Detail with Specific Objectives

Specific Objectives	Content
• Comprehend the idea of logic and able to use it to support mathematical claims as well as practical issues. • Use various set operations to solve the specific problem and determine the number of items in a given set.	Unit 1: Basic Concept [9 Hrs.] 1.1. Elementary Logic 1.2. Connectives, Quantifiers, 1.3. Basic laws of logic, 1.4. Quantifiers 1.5. Techniques of proof. 1.6. Sets, Types of sets, Venn diagram, 1.7. Set operations, Laws of the algebra of sets (without proof), 1.8 Real number system, Representation of real numbers on the Real line, 1.9 Properties of real numbers (without proof), ordered sets, Inequalities, 1.10 Intervals, Absolute value, Cartesian product, Relation.

Specific Objectives	Contents
- Identify the dependent and independent variables to find the domain and range of the function. - Explain the concept of limit and continuity and use it in real-life problems.	Unit 2: Functions, Limit, and Continuity [8 hrs.] 2.1. Constants and variables, Concept of functions, 2.2 Domain, and range of a function, Types of functions (algebraic, logarithmic, Trigonometric, and exponential functions), 2.3. Graphic representation 2.4 Application of functions to business and economics. 2.5 Limit of a function, properties of Limit, Indeterminate Forms, 2.6 Limits of Polynomial and Rational Functions, Limits at infinity, 2.7 Continuity, Continuity at a Point, 2.8 Business Application of Limit.
Specific Objectives	Contents
- Identify the rate change of a function at a particular point. - Find the derivative of algebraic, exponential, logarithmic, and trigonometric functions.	Unit 3: Derivative [6 Hrs.] 3.1 Derivative 3.2. Average rate of change 3.3. Derivative as a slope of the tangent to curves 3.4. Methods of differentiation (power rule sum rule, product rule, quotient rule and chain rule) 3.5 Differentiation of implicit and parametric functions 3.6 Derivative as a rate of change. Higher order derivatives.
Specific Objectives	Contents
- Establish the relationship between the derivative and concavity of the function. - Identify the increasing and decreasing function. - Find the maxima minima of a function, using the first and second-order derivative.	Unit 4: Application of Derivatives [6 Hrs.] 4.1. Increasing and decreasing functions 4.2. Critical point, Point of inflection 4.3. Maximum and minimum value of the function 4.4. Marginal analysis in Business and Economics 4.5. Concavity of the function, Marginal Profit Analysis 4.6. The mean value theorem, Optimization problem
Specific Objectives	Contents

• Use different Rules and techniques of integration to solve the related problems. • Identify the value of the function from the corresponding marginal value.	Unit 5: Integrals [6 Hrs.] 5.1 Indefinite Integral (algebraic, exponential, logarithmic, and trigonometric functions) 5.2 Techniques of Integration (Integration by simplification, Substitution method, Integration by parts) 5.3 Definite integral, 5.4 Properties of the definite integral
Specific Objectives	Contents
• Perform matrix operations and solve related problems • Evaluate the value of the determinant and use the concept of determinant for solving linear equations.	Unit 6: Matrices and Determinants [7 Hrs.] 6.1. Introduction 6.2. Types of matrices 6.3. Matrix operations 6.4. Transpose of a matrix, Determinant of a matrix, Minors, and cofactors of the matrix 6.5. Properties of determinants (Singular and non-singular matrix) 6.6. Solution of a system of linear equations having a unique solution of up to three variables (Cramer's rule).
Specific Objectives	Contents
• Identify the difference between permutation and combination. • Use the concept of permutations and combinations in real-life problems.	Unit VII: Permutations and Combinations [6 hrs] 7.1 Basic principles of counting, factorial notation, 7.2. permutation, Permutation of objects alike, 7.3. Permutation with restrictions, Circular permutation, 7.4 Combination, and Combination with restrictions.

5. Evaluation System and Student's Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End examination	50	Theory		50
		Attendance & Class Participation	10%	
		Assignments	20%	
		Presentations/Quizzes	10%	
		Internal Assessment	60%	
Total External	50	Total Internal		50
Full Marks: 50 + 50 = 100				

6.Student's Requirement

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear for the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc., and complete all the assignments within the specified time period. ***Students are required to complete all the requirements defined for the completion of the course.***

7.Prescribed Books and References

Prescribed Books

1. Budnick, F. (2017). *Applied Mathematics for Business, Economics and the Social Sciences* (4 ed.). McGraw-Hill Higher Education.
2. Pahari, N. P., & Shrestha, R. M. (2013). *Fundamentals Of Mathematical Analysis* (1 ed.). Sukunda Pustak Bhawan.

References

1. Thomas, G. B., & Finney, R. L. (1995). *Calculus and Analytic Geometry* (9 ed.). Addison Wesley.

Pokhara University
Faculty of Management Studies

Course Code: CMP 171
 Course title: **Fundamentals of Computer Systems**
 Nature of the course: Theory + Practical
 Year: First, Semester I
 Level: Bachelor

Full marks: 100
 Pass marks: 45
 Credit Hrs: 3
 Total periods: 48 hours
 Program: BCSIT

1. Course Description

The course aims to provide a comprehensive understanding of computer systems, covering hardware-software interactions, operating systems, data communication, internet services, database management, multimedia, security, privacy, and current computing trends. The course includes study of computer components, CPU, memory, grasp data processing, interactions, software types, and system vs. application, enhance functionality, user experience OS functions, protection, installation multimedia, graphics, sound, image and demonstrate practical knowledge.

General Objectives

- To explore the historical evolution and significance of computers in modern society.
- To gain insight into computer hardware components, including CPUs, memory, storage, and I/O devices.
- To understand different types of software, such as operating systems and applications software.
- To examine the role of operating systems in managing hardware and user interactions.
- To learn about network protocols, transmission media, and architectures enabling seamless digital connectivity.
- To explore the structure, services, and transformative impact of the Internet on global communication and commerce.
- To acquire skills in designing, manipulating, and securing data using database management systems.
- To explore the world of multimedia, learn critical aspects of computer security and privacy, and gain insights into emerging technologies and their transformative impact on various industries.

3. Method of Instructions

General Instructional Technique: Lecture, Discussion, Readings, Question Answer

Specific Instructional Technique: Practical works, Project Based Learning, Self-Directed Learning, Industry Insights, Field Visit and Case Study

4. Content in Detail with Specific Objectives

Specific Objectives	Contents
▪ Explore computer's characteristics, history, and generational progression, highlighting their roles in modern society. ▪ Explain data representation and various computer applications across fields like business, communication, and research.	Unit 1: Introduction to Computer [6 Hrs.] 1.1 Introduction 1.2 Characteristics of Computer 1.3 History of Computing Devices 1.4 Generations of Computer 1.5 Classification of Computer 1.6 Data and Program Representation in Computer

	1.7 Applications of Computers
Specific Objectives	Contents
- Define digital computer components - ALU, CU, Memory, I/O. Illustrate functional block diagram, demonstrating their coordinated operation. - Explore into the significance of each component, their roles in data processing, and their collective contribution to overall computing.	Unit 2: Computer Hardware [4 Hrs.] 2.1 Introduction 2.2 Functional Block Diagram of Digital Computer System 2.2.1 ALU, CU, Memory Unit, Input and Output Units
Specific Objectives	Contents
- Differentiate between system (development, management) and application software (package, tailored), illustrating their vital roles. - Highlight software's diverse applications, from system control to tailored solutions addressing specific business needs.	Unit 3: Computer Software [2 Hrs.] 3.1 Introduction 3.2 Types of Software, (System Software (System Development, System Management), Application Software (Package, Tailored))
Specific Objectives	Contents
- Clarify OS objectives and types, including interactive, batch, real-time. Discuss their critical role in managing resources. - Detail OS functions - process, memory, file, device management, security, and user interface - driving efficient computing.	Unit 4: Operating System [6 Hrs.] 4.4 Introduction 4.5 Objective of Operating System 4.6 Types of OS 4.7 Functions of OS 4.8 Process Management 4.9 Memory Management 4.10 File Management 4.11 Device Management 4.12 Protection and Security) 4.13 User Interface
Specific Objectives	Contents
- Elaborate on communication media, modes (simplex, half-duplex, full-duplex), illustrating how networks facilitate information exchange. - Discuss various network types (LAN, WAN), topologies (star, mesh), and protocols (IP, TCP), crucial for modern interconnected systems.	Unit 5: Data Communication and Computer Network [5 Hrs.] 5.1 Introduction 5.2 Communication Media 5.3 Communication Mode 5.4 Computer Network 5.5 Advantage and disadvantage of Computer Network 5.6 Types of Networks 5.7 Network Topology 5.8 Communication Protocols (IP, TCP) 5.9 Networking Hardware
Specific Objectives	Contents

- Trace Internet's evolution, mechanics of data exchange via TCP/IP, and explain IP addressing and DNS systems. - Examine the structure of client-server architecture, key protocols (HTTP, SMTP, POP), and e-commerce, fostering global connectivity.	Unit 6: Internet and Internet Services [4 Hrs.] 6.1. Introduction 6.2. History of Internet 6.3. Working Mechanism of Internet 6.4. IP Address and Domain Name System (DNS) 6.5. Client-Server Architecture 6.6. Internet Protocols (HTTP, SMTP, POP, FTP, TELNET) 6.7. Static and Dynamic Web Pages 6.8. Search Engines 6.9. E-Commerce and M-Commerce 6.10. E-Governance
Specific Objectives	Contents
- Introduce databases and their attributes, highlight relational database management systems (RDBMS), and discuss data models. - Contrast databases with file systems, and reveal DBMS applications, underlining their pivotal role in efficient data management.	Unit 7: Database Management System [5 Hrs.] 7.1. Introduction to Database 7.2. Data Concepts and Characteristics 7.3. Database Vs. File System 7.4. Data Models 7.5. Database Management System 7.6. RDBMS 7.7. Database Applications
Specific Objectives	Contents
- Get insights into multimedia elements - graphics, sound, image formats, and how they compose immersive experiences. - Explore multimedia's applications, from web-based presentations to the emerging realms of augmented and virtual reality.	Unit 8: Multimedia [4 Hrs.] 8.1. Introduction 8.2. Elements of a multimedia system (Graphics, Sound, Image File Format) 8.3. Web Based Multimedia 8.4. Applications of Multimedia 8.5. Concept of Augmented and Virtual Reality.
Specific Objectives	Contents
- Address computer security concerns, access control mechanisms, unauthorized access prevention, and ethical considerations. - Explain countermeasures against software piracy, malware, and viruses, and delve into network security, encryption, and cyber law.	Unit 9: Computer Security and Privacy [6 Hrs.] 9.1. Computer Security 9.2. Access Control 9.3. Protecting Against Unauthorized Access 9.4. Software Piracy 9.5. Computer Viruses (Spyware, Malware, Ransom ware) 9.6. Anti-Virus 9.7. Ethical Issues 9.8. Cyber Law 9.9. Network Security 9.10. Hardware and Software Firewall 9.11. Data and Message Security 9.12. Encryption and Decryption

Specific Objectives	Contents
- Unpack contemporary trends: big data's impact, AI's applications, machine learning's growth, and the potential of cloud computing. - Introduce blockchain's decentralized paradigm, IoT's connected devices, and how GIS and BI empower data-driven decisions.	Unit 10: Current Trends in Computing [6 Hrs.] 10.1 Data Warehousing and Data Mining 10.2 Big Data 10.3 Data Science 10.4 Artificial Intelligence 10.5 Machine Learning 10.6 Cloud Computing 10.7 Block Chain Technology 10.8 Digital Marketing 10.9 Internet of Things 10.10 Geographical Information System 10.11 Business Intelligence

5. Laboratory Work

This unit encompasses hands-on tasks, from computer assembly to researching technology trends. Skills gained include word processing, spreadsheet manipulation, dynamic presentations, email management, operating system handling, file organization, and troubleshooting. Students develop practical proficiency and strategic insights for computer technology applications and future career planning.

- Hands-on lab tasks include building and disassembling a computer.
- Word Processing
Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Page Setup and Layout, references (Table of Content, Citation, Captions), Track Change.
- Spread Sheet
Basics of Spreadsheet; Manipulation of cells; Formulas and Functions (Math, Text, Statistical, LookUp), Pivot Table, Descriptive Analysis
- Presentation Tool
Hands-on lab tasks include creating and editing presentations, using templates and styles, and incorporating media and animation.
- Hands-on lab tasks include setting up and configuring email accounts, sending and receiving messages, and managing contacts.
- Hands-on lab tasks include installing and configuring an operating system, managing users and permissions, and troubleshooting common issues.
- Hands-on lab tasks include creating and organizing files and folders, using command line tools to navigate and manage files, and backing up and restoring data.
- Hands-on lab tasks include diagnosing and resolving common computer problems, performing regular maintenance tasks, and creating and restoring backups and remote login.
- Hands-on lab tasks include research and analysis of current and emerging trends in computer technology and the development of a career plan.

Note:

- Motivate students to create small project work integrating all of the above concepts.

2. Each of the above lab sessions should cover more than 4 hours of practical work.

6. Evaluation system and Student's Responsibility

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End examination	50	Theory		30
		Attendance & Class Participation	10%	
		Assignments	20%	
		Presentations/Quizzes	10%	
		Internal Assessment	60%	
		Practical		20
		Attendance & Class Participation	10%	
		Lab Report/Project Report	20%	
		Practical Exam/Project Work	40%	
		Viva	30%	
Total External	50	Total Internal		50
Full Marks: 50 + 50 = 100				

7. Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc., and complete all the assignments within the specified time period. ***Students are required to complete all the requirements defined for the completion of the course.***

8. Prescribed Books and References

Prescribed Text Books:

1. Thareja, R. (2019). *Fundamentals of computers*. Oxford University Press, USA.
2. Goel, A. (2010). *Computer Fundamentals*. Pearson Education India.

Reference Books:

1. Stallings, W., & Brown, L. (2018). *Computer security: Principles and Practice*. Pearson.
2. Norton. (2010). *Introduction To Computers (Sie)*. Tata McGraw-Hill Education.
3. Sinha, P. K., & Sinha, P. (2004). *Computer Fundamentals*. BPB publications.
4. Han, J., & Kamber, M. (2012). *Data mining: Concepts and Techniques*. Morgan Kaufmann.
5. Sosinsky, B. (2011). *Cloud Computing Bible*. John Wiley & Sons.

Pokhara University Faculty of Management Studies

Course Code: CMP 173
 Course title: **Internet Technology**
 Nature of the course: Theory + Practical
 Year: First, Semester I
 Level: Bachelor

Full marks: 100
 Pass marks: 45
 Credit: 3Hrs
 Total periods: 48 hours
 Program: BCSIT

1. Course Description

This course introduces students to web technologies, encompassing HTML, CSS, and JavaScript. Students learn web basics, HTML structure, CSS styling, JavaScript programming, and advanced topics. The course emphasizes responsive design, DOM manipulation, asynchronous programming, and practical implementations. Practical sets reinforce skills in creating web content, styling layouts, and enhancing interactivity, culminating in a website project. The course includes understanding the fundamental concepts of web technology, including the Internet, Intranet, and World Wide Web (WWW), and demonstrating proficiency in designing and structuring web content using HTML, creating both static and dynamic web pages. The course explores advanced JavaScript topics, including scope, closures, error handling, DOM manipulation, and asynchronous programming, and develops hands-on experience by creating interactive web interfaces and responsive layouts through practical exercises.

2. General Objectives

- To understand the core concepts of web technology, including the Internet, Intranet, and World Wide Web (WWW).
- To acquire proficiency in designing and structuring web content using HTML, encompassing static and dynamic pages.
- To develop expertise in applying CSS for styling and layout, including typography, colors, backgrounds, and responsive design.
- To master the principles of client-side scripting with JavaScript, covering variables, control flow, functions, arrays, and objects.
- To explore advanced JavaScript topics, including scope, closures, error handling, DOM manipulation, and asynchronous programming.
- To gain hands-on experience with practical exercises to create interactive web interfaces and responsive layouts.
- To apply best practices in coding, optimization, and organization to enhance web development efficiency and performance.
- To cultivate a foundation in modern web technologies, enabling the creation of dynamic and engaging web applications.

3. Method of Instructions

General Instructional Technique: Lecture, Discussion, Readings, Question Answer

Specific Instructional Technique: Practical works, Project Based Learning, Self-Directed Learning, Industry Insights and Case Study

4. Content in Detail with Specific Objectives

Specific Objectives	Contents
● Explore internet essentials, differentiating between Internet, Intranet, and World Wide Web (WWW). ● Distinguish between static and dynamic web pages, and comprehend the roles of web clients and servers. ● Grasp the fundamentals of client-server architecture, including single-tier, two-tier, and multi-tier models. ● Gain insight into HTTP, understanding request and response processes, and interpreting URLs. ● Differentiate client-side scripting from server-side scripting, and recognize their significance in web development. ● Trace the evolution of the web from Web 1.0 to Web 3.0, and understand the evolving nature of internet technologies.	Unit I: Introduction to web technology [3 Hrs.] 1.1 Web Basics: 1.1.1 Internet, Intranet, WWW 1.1.2 Static and Dynamic Web Page 1.1.3 Web Clients 1.1.4 Web Servers 1.2 Client Server Architecture: 1.2.1 Single Tier 1.2.2 Two-Tier 1.2.3 Multi-Tier; 1.3 HTTP: HTTP Request and Response 1.4 URL 1.5 Client Side Scripting 1.6 Server Side Scripting 1.7 Web 1.0, Web 2.0 and web 3.0
Specific Objectives	Contents
● Understand HTML's role in web development and its key components. ● Comprehend the basic structure of HTML documents, including head and body sections. ● Identify and use tags, elements, and attributes within HTML. ● Apply proper HTML doctype declaration for consistent rendering. ● Utilize meta tags to specify character encoding, viewport, and other metadata. ● Format content using heading, paragraph, strong, em, underline, and strikethrough tags. ● Implement line breaks, and horizontal rules, and create hyperlinks with anchor tags. ● Establish navigation menus, and lists, and organize content effectively. ● Insert images and multimedia elements, setting attributes like src, alt, width, and height. ● Construct tables, including headers, data cells, merging cells, and adding captions. ● Create interactive forms with input elements, validate user input, and handle form submission.	Unit 2: Hyper Text Markup Language [8 Hrs.] 2.1 Introduction to HTML 2.2 Document Structure 2.3 Text Formatting 2.4 Links and Navigation 2.5 Hyperlink 2.6 Images and Multimedia 2.7 Lists, Tables, Forms and Input 2.8 Semantic HTML

Specific Objectives	Contents
● Create graphics using the HTML5 canvas element. ● Explore new form input types, including email, URL, date, time, and range. ● Master form validation using built-in attributes and placeholder text. ● Adhere to proper code indentation, formatting, and consistent naming conventions.	Unit 3: HTML5 [7 Hrs.] 3.1 HTML5 APIs 3.2 HTML5 Forms 3.3 Responsive Web Design 3.4 HTML5 3.5 Semantic Markup 3.6 Best Practices and Optimization
Specific Objectives	Contents
● Understand CSS's role in web development and its syntax. ● Apply CSS rules inline, internally, and externally. ● Master various CSS selectors, including elements, classes, IDs, and pseudo-classes. ● Grasp the concept of the box model, dimensions, and box-sizing property. ● Style typography with fonts, sizes, colors, alignment, and decorations. ● Apply diverse color formats and configure backgrounds with images and properties. ● Control element positioning using static, relative, absolute, and fixed positioning. ● Implement floating elements and handle clearing and clearfix techniques. ● Utilize display property for versatile element presentation. ● Acquire skills in creating layouts and enhancing webpage aesthetics with CSS. ● Understand viewport Meta tags for responsive design. ● Implement media queries for diverse screen sizes and responsiveness. ● Design responsive layouts using CSS for optimal viewing on various	Unit 4: Cascading Style Sheets [8 Hrs.] 4.1 Introduction to CSS 4.2 CSS syntax 4.3 Using CSS with HTML 4.4 CSS Selectors 4.5 CSS Comments 4.6 CSS Properties 4.6.1 Backgrounds 4.6.2 Border, Margin 4.6.3 Padding 4.6.4 Height 4.6.5 width 4.6.6 color(color wheel) 4.7 Text 4.8 Font 4.9 Alignment 4.10 Line Height 4.11 Box Model 4.12 working with images 4.13 Layout and Positioning 4.14 Media query 4.15 CSS website Layout
Specific Objectives	Contents
● Develop advanced proficiency in CSS, covering flexbox, grid layouts, transitions, animations, responsiveness, specificity, units, preprocessors, and optimization. ● Master CSS Flexbox and Grid for versatile layout control. ● Apply transitions and animations using various properties and keyframes. ● Create responsive designs using media queries,	Unit 5: Advance Topics on CSS [7 Hrs.] 5.1 CSS Flexbox 5.2 CSS Grid 5.3 CSS Transitions and Animations 5.4 Responsive Web Design 5.5 CSS Specificity and Inheritance 5.6 CSS Units and Values 5.7 CSS Preprocessors 5.8 CSS Best Practices and

breakpoints, and the mobile-first approach. • Understand CSS specificity and inheritance principles for effective styling. • Utilize different CSS units and values, including relative and absolute units. • Explore CSS preprocessors, employing nesting, variables, mixins, and functions. • Implement CSS best practices, including efficient organization, vendor prefixes, and optimization techniques. • Enhance web development skills with advanced CSS techniques.	Optimization
Specific Objectives	Contents
• Understand JavaScript's role in web development and its syntax. • Declare variables and utilize data types: numbers, strings, Booleans, null, undefined, objects, and arrays. • Apply arithmetic, comparison, and logical operators to manipulate data. • Implement control flow through if statements, switch statements, and ternary operators. • Utilize loops such as while, for, and do-while for iterative processes. • Define, call, and manage functions, including parameters, arguments, and return values. • Create and manipulate arrays, using methods like push, pop, shift, unshift, splice, slice, and iteration techniques. • Work with objects, access properties, employ methods, and understand object constructors and prototypes. • Develop practical client-side scripting skills using JavaScript to enhance web interactivity and functionality.	Unit 6: Client Side Scripting with JavaScript [8 Hrs.] 6.1 Introduction to JavaScript 6.2 Using JS in HTML 6.3 JavaScript Output 6.4 JavaScript Comments 6.5 Variables and Data Types 6.6 Operators and Expressions 6.7 Control Flow and Conditionals 6.8 Loops 6.9 Functions 6.10 Arrays 6.11 Objects
Specific Objectives	Contents
• Grasp the intricacies of scope, variable visibility, and the concept of closures. • Manage errors using try-catch blocks, exceptions, and employ debugging techniques. • Manipulate the Document Object Model (DOM) to interact with HTML elements and handle events. • Master asynchronous programming, including callback functions, promises, and async/await. • Work with JSON data and make AJAX requests using fetch API or XMLHttpRequest. • Explore ES6 features like arrow functions, template	Unit 7: Advance Topics on JavaScripts [7 Hrs.] 7.1 Scope and Closures 7.2 Error Handling and Debugging 7.3 DOM Manipulation 7.4 Asynchronous JavaScript 7.5 JSON and AJAX 7.6 ES6 and Modern JavaScript 7.7 JavaScript Libraries

literals, let and const keywords, and destructuring assignments. • Understand modern JavaScript concepts, such as modules and import/export functionality. • Gain optional exposure to popular JavaScript libraries/frameworks like React, Angular, or Vue.js for building web applications. • Elevate your JavaScript skills to enable dynamic and interactive web development.	
--	--

5. Laboratory Work

It builds the foundation for how to write a program using any high-level language. Hence, this course requires a lot of programming practice so that students will be able to develop good logic building and program developing capability which is essential throughout the course.

Some important contents that should be included in lab exercises are as follows:

1. Creating a simple static web site with 4 pages, using HTML5 (include all tags included in HTML and HTML 5)
2. Create a simple image gallery using CSS
3. Create a responsive web page using box model
4. Create a form with all the elements and validate it using client-side scripting
5. Using JavaScript create a simple calculator
6. Create a user registration form using HTML 5 and validate it using JavaScript
7. Creating jQuery Slider and Image Gallery
8. Use jQuery date picker and sort
9. Work with JSON data and make AJAX requests using fetch API or XMLHttpRequest
10. General concept of React, Angular, or Vue.js for building web applications

Note:

1. Motivate students to create small project work integrating all of the above concepts.
2. Each of the above lab session should cover more than 4 hours of practical work.

6. Evaluation system and Student's Responsibility

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End examination	50	Theory		30
		Attendance & Class Participation	10%	
		Assignments	20%	
		Presentations/Quizzes	10%	
		Internal Assessment	60%	
		Practical		20
		Attendance & Class Participation	10%	

		Lab Report/Project Report	20%	
		Practical Exam/Project Work	40%	
		Viva	30%	
Total External	50	Total Internal		50
Full Marks: 50 + 50 = 100				

7. Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc., and complete all the assignments within the specified time period. ***Students are required to complete all the requirements defined for the completion of the course.***

8. Prescribed Books and References

Prescribed Text Books:

1. Robbins, J. N. (2018). *Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics*. O'Reilly Media.

Reference Books:

1. Holzner, S. (2000). *HTML Black Book*. John Wiley & Sons.
2. Inc, K. L. S. (2009). *Web Technologies: Html, Javascript, Php, Java, Jsp, Asp.Net, Xml And Ajax, Black Book (With Cd)*. Wiley India
3. Knuckles. (2006). *Web Applications: Concepts & Real World Design*. John Wiley & Sons.
4. Deitel, P. J., Deitel, H. M., & Deitel, A. (2012). *Internet and world wide web: How to Program*. Prentice Hall.

Pokhara University
Faculty of Management Studies

Course Code: CMP 172

Course title: **Programming Language**

Nature of the course: Theory + Practical

Year: First, Semester I

Level: Bachelor

Full marks: 100

Pass marks: 45

Credit: 3Hrs

Total periods: 48 hours

Program: BCSIT

1. Course Description

This course is designed to provide students with a comprehensive understanding of computer programming using the C language. Students will develop essential programming skills, ranging from foundational concepts to advanced techniques, enabling them to create efficient, reliable, and maintainable software applications. Through hands-on exercises, coding projects, and problem-solving activities, students will gain practical experience in writing, debugging, and optimizing C programs. The course includes developing the ability to analyze, design, implement, debug, and comprehensively document code within the C programming language. Likewise attaining mastery over pivotal programming concepts in C, encompassing data manipulation and conditional logic. Proficiently employ statements and logical structures for decision-making and program control. Elevate C programming prowess by effectively manipulating arrays and strings, harnessing library functions, crafting custom functions, managing prototypes, and controlling variable scope. Achieving mastery in essential data management skills within C programming, spanning diverse structures, memory optimization, and adept utilization of pointers to enhance efficiency.

2. General Objectives

- To understand the basic principles and concepts of computer programming.
- To gain proficiency in writing C programs and applying programming constructs.
- To develop problem-solving and logic building skills through programming exercises.
- To acquire knowledge of fundamental data structures and their implementation in C.
- To learn how to design and implement algorithms using C programming.
- To apply programming concepts and C programming skills to solve real-world problems.

3. Method of Instructions

General Instructional Technique: Lecture, Discussion, Readings, Question Answer

Specific Instructional Technique: Practical works, Project Based Learning, Self-Directed Learning, Industry Insights and Case Study.

4. Content in Detail with Specific Objectives

Specific Objectives	Content
▪ To offer students a comprehensive understanding of the C programming language, including its historical context, problem-solving skills, coding techniques, debugging strategies, and best practices for testing and documenting code.	Unit 1: Problem Solving with Computer [6 Hrs.] 1.1 Problem analysis 1.2 Algorithms and Flowchart 1.3 History of C 1.4 Structure of C program 1.4.1 Debugging 1.4.2 Compiling a C program

These objectives collectively contribute to building a solid foundation in C programming.	1.4.3 Executing a C program 1.5 Testing and Documentation 1.6 Preprocessor and Macros
Specific Objectives	Content
- To provide student with a strong foundation in the essential elements of the C programming language. - To student will gain proficiency in constructing C code, manipulating data, and understanding the fundamental building blocks of C programs.	Unit 2: Elements of C [2 Hrs.] 2.1 C Character Set 2.2 Tokens 2.3 Escape sequence 2.4 Variables Declaration and Initialization 2.5 Data types 2.5.1 Basic, Derived, and User Defined 2.6 Constants/ Literals 2.7 Expressions 2.8 Statements 2.9 Comments
Specific Objectives	Content
- To equip learners with the skills necessary to effectively read and write data in C programs. - To learners will be able to interact with users, handle input data, and present output results in a controlled and organized manner.	Unit 3: Input and Output [2 Hrs.] 3.1 Unformatted and Formatted I/O 3.2 Conversion specifier 3.3 Character Input and Output 3.5 I/O operations
Specific Objectives	Content
- To learners with a deep understanding of various operators and their usage in C programming. - To learners will be able to manipulate data, create complex conditions, and optimize code for efficient execution.	Unit 4: Operators and Expression [4 Hrs.] 4.1 Operator, Operand and Expression 4.2 Types of Operators 4.2.1 Arithmetic operator 4.2.2 Relational operator 4.2.3 Logical or Boolean operator 4.2.4 Assignment Operator 4.2.5 Bitwise operator 4.2.6 Prefix and Postfix Increment and Decrement operator 4.2.7 Ternary operator 4.2.8 Special Operators (size of and comma) 4.3 Evaluation of Expression 4.4 Operator Precedence and Associativity
Specific Objectives	Content
- To provide learners with the skills to control program execution flow based on conditions, implement looping mechanisms for repetitive tasks, and manage loops with break and continue statements. - To learners will be able to write more	Unit 5: Control Statement [8 Hrs.] 5.1 Introduction to Control Structure 5.2 Sequential Control Statement 5.3 Decision Making Statement 5.3.1 if, if else, if else if, nested if and switch case 5.4 Iteration (Loop) Statement

dynamic and efficient programs that can adapt to different scenarios and perform iterative actions	5.4.1 for, while, do while, nested loops 5.5 Break and Continue statement
Specific Objectives	Content
- To provide learners with a solid understanding of arrays and strings in C programming - To learners will be able to store and process data using arrays, effectively handle textual information through strings, and utilize string library functions for various string operations	Unit 6: Arrays and string [6 Hrs.] 6.1 Introduction to Array 6.2 Declaration 6.3 Memory Representation of Array 6.4 Initialization of Array 6.5 Types of Arrays 6.5.1 Single Dimensional and Multidimensional 6.7 Character Array and Strings 6.8 Reading and Writing Strings 6.9 Null Character 6.10 Library Functions for String handling
Specific Objectives	Content
To equip learners with the skills to create modular, organized, and efficient programs using functions, while also understanding how variable scope and lifetime influence data management and program structure.	Unit 7: Functions [6 Hrs.] 7.1 Introduction to Functions 7.2 Types of Functions 7.2.1 Library Functions 7.2.2 User defined functions) 7.3 Components of Functions 7.3.1 Function prototype 7.3.2 Function call 7.3.3 Function Definition 7.4 Function Arguments and Return Types 7.5 Passing Arrays to Function 7.6 Passing Strings to Function 7.7 Storage Class (auto, register, static, extern) 7.8 Scope of Variables (Local and Global) 7.9 Recursive Function
Specific Objectives	Content
To declare, manipulate, and utilize pointers effectively, understand pointer arithmetic, work with arrays and character strings, use pointers as function arguments, and implement dynamic memory allocation.	Unit 8: Pointers[4hrs] 8.1 Introduction 8.2 The & and * operator, 8.3 Declaration of pointer 8.4 Chain of Pointers 8.5 Pointer Arithmetic 8.6 Pointers and Arrays 8.7 Pointers and Character Strings 8.8 Array of Pointers 8.9 Pointers as Function Arguments 8.10 Dynamic Memory Allocation 8.10.1 malloc() 8.10.2 calloc()

	8.10.3 realloc() 8.10.4 free() 8.11 Pass by value, Pass by reference
Specific Objectives	Content
- To provide learners with a deeper understanding of advanced data structures and their usage in C programming - To organize and manage complex data, efficiently pass and manipulate structured data within functions, and use pointers to navigate and modify structure instances	Unit 9: Structure and Union [4 Hrs.] 9.1 Introduction 9.2 Declaration and Initialization of Structure and 9.3 Structure Variable 9.4 Array of structure 9.5 Passing structure to function 9.6 Passing array of structure to function 9.7 Nested Structure 9.8 Pointer to structure 9.10 Union vs Structure
Specific Objectives	Content
- To read data from external files or write data to files as a means of input/output operations. - To store and retrieve information persistently, allowing data to be preserved even after the program terminates.	Unit 10: File Handling[6hrs] 10.1 Concept of File 10.2 File Operation Modes 10.3 Opening and Closing of File 10.4 Input Output Operations in File 10.5 Random access in File

5. Laboratory Work

It builds the foundation on how to write a program using any high-level language. Hence, this course requires a lot of programming practice so that students will be able to develop good logic building and program developing capability which is essential throughout the course.

Some important contents that should be included in lab exercises are as follows:

1. Introduction to C Programming – basic structure of C program.
2. To illustrate the use of Input, Output, Variable and Constants.
3. To illustrate the different operators-Arithmetic, Relational and Logical Operators in C.
4. To illustration of Control Structures (decision making) and processor directives.
5. To illustration of Control Structures (looping).
6. To illustrate the function programming- simple and recursive functions.
7. To illustrate the concept of Pointer and String.
8. To illustrate the function programming- Call by value vs. call by reference.
9. To illustrate the concept of Structure.
10. To illustrate the different file operations.

Note:

1. Motivate students to create small project work integrating all of the above concepts.
2. Each of the above lab session should cover more than 4 hours of practical work.

6. Evaluation system and Student's Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End examination	50	Theory		30
		Attendance & Class Participation	10%	
		Assignments	20%	
		Presentations/Quizzes	10%	
		Internal Assessment	60%	
		Practical		20
		Attendance & Class Participation	10%	
		Lab Report/Project Report	20%	
		Practical Exam/Project Work	40%	
		Viva	30%	
Total External	50	Total Internal		50
Full Marks: 50 + 50 = 100				

7. Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc., and complete all the assignments within the specified time period.

Students are required to complete all the requirements defined for the completion of the courses.

8. Prescribed Books and References

Prescribed Text Books:

1. Srivastava. (2009). *C - In Depth - 2Nd Revised Edition*. BPB Publications.
2. Kanetkar, Y. P. (2006). *Let us c*. BPB Publications.

Reference Books:

1. Balagurusamy, E. (2019). *Programming In Ansi C, 8Th Edition*. MC Graw Hill India.
2. Gottfried, B. S. (1996). *Programming with C Ind Adap ed*. Tata McGraw-Hill Education.
3. Deitel, P. J., & Deitel, H. M. (2016). *C: How to Program*. Prentice Hall.
4. Kelley, A., & Pohl, I. (1998). *A book on c: Programming in C*. Addison-Wesley Professional.
5. Mittal, A. (2010). *Programming In C: A Practical Approach*. Pearson Education India.

Course Details: BCSIT Program, Semester II

Semester II		
Course code	Subjects	Credits
ENG 112	Business Communication	3
MTH 114	Mathematics II	3
CMP 174	Digital Systems	3
CMP 175	Object-Oriented Language (Java)	3
CMP 176	Data Structure and Algorithm	3
PRJ 181	Project I	2
Total Credits		17

Pokhara University
Faculty of Management Studies

Course Code: CMP 174

Credits: 3[Hrs]

Course Title: Digital Systems

Total Lectures: 48 hours

Nature of the Course: Theory & Practical

Program: BCSIT

Level: Bachelor

Year: I

Semester: II

1. Course Description

This course offers a comprehensive introduction to digital systems and logic design, covering key topics such as number systems, Boolean algebra, logic gates, and the simplification of Boolean functions. It includes practical design and implementation of both combinational and sequential circuits, focusing on essential components like adders, subtractors, decoders, encoders, multiplexers, demultiplexers, and code converters. Students gain in-depth knowledge of flip-flops, shift registers, and counters, crucial for sequential logic. The course culminates in the design of core digital components, including the Arithmetic Logic Unit (ALU), accumulator, status register, and processor unit. This course provides a balanced mix of theoretical knowledge and hands-on experience, equipping students with the skills necessary to understand, design, and analyze complex digital systems.

2. General Objectives

The general objectives of this course are:

- To equip the students with the fundamental concept of logic system.
- To provide students with basic tools for the design of digital circuits.
- To provide students a strong grasp of computer hardware basics and software for problem-solving, utilize accessible learning, hands-on activities, and examples.

3. Specific Objectives and Contents

Specific Objectives	Contents
- Define of number systems - Conversion between decimal, binary, octal, and hexadecimal systems for both integer and floating-point values. - Determine of 1's and 2's complements of binary numbers. - Execute the arithmetic operations on binary numbers	Unit I: Binary Foundation and Digital Representation (8 hrs) 1.1 Introduction to Digital System 1.2 Binary Number System Hexadecimal and Octal Number Systems 1.3 Number system conversion 1.4 Binary Codes: weighted and non-weighted codes 1.5 Alphanumeric codes (ASCII, EBCDIC) 1.6 Representation of Negative Numbers 1.7 Subtraction using complements
- Recognize the laws and theorems of Boolean algebra - Comprehension of logic gates, truth tables. and their practical implementation - Proficiency in implementing universal gates in digital circuitry	Unit II: Boolean Building Blocks (6 hrs) 2.1 Basic Laws of Boolean Algebra 2.2 De Morgan's Theorems 2.3 Logic Gates and Their Symbols 2.4 Logic Gate Truth Tables 2.5 Universal Gates
Understand the concepts of the	Unit III: Simplification of Boolean Functions (6

minterms and maxterms in Boolean algebra. • Develop the proficiency in simplifying Boolean functions using sum of products and product of sums methods. • Gain proficiency in determining the dual form and complement of Boolean functions. • Improve the proficiency in employing Karnaugh maps and handling don't-care conditions to streamline Boolean function simplification.	hrs.) 3.1 Minterms and Maxterms 3.2 Sum of products and Product of sums 3.3 Dual and complement of Boolean function 3.4 K-map & don't care conditions 3.5 Two-Level and Multilevel gate Implementations
• Develop design methodologies for combinational logic circuits • Become skilled in creating adders and subtractors • Master in decoder and encoder circuits, along with their practical uses • Become Capable in designing and employing multiplexers and demultiplexers • Become Proficient in various code conversion methods like 8421, BCD, Gray, Excess-3, and 2421 • Learn the principles and applications of Programmable Logic Devices	Unit IV: Combinational Logic (9 hrs.) 4.1 Introduction to combinational Logic circuit 4.2 Adders and Subtractors 4.3 Decoder and Encoder 4.4 Multiplexer and Demultiplexer 4.5 Code Conversion (8421, BCD, Gray, Excess-3, 2421) 4.6 Programmable Logic Device (PROM)
• Understand the functionalities and uses of diverse types of sequential logic circuits • Master the activation processes of flip-flops • Learn to handling different flip-flop variants like RS, JK, T, D, and master-slave. • Develop in creating state diagrams and tables to represent sequential logic systems.	Unit V: Sequential Logic (6 hrs.) 5.1 Types of sequential logic circuit 5.2 Triggering of flip flops 5.3 Flip-flops (RS, JK, T, D, master-slave) 5.4 State Diagrams and State Tables
• Learn how shift registers work and their different modes (SISO, SIPO, PISO, PISO) • Develop proficiency in designing and implementing asynchronous counters	Unit VI: Registers and Counters (6 hrs) 6.1 Shift Register 6.2 Modes of shift register (SISO, SIPO, PISO, PISO) 6.3 Asynchronous counter (Binary ripple, CD

such as Binary ripple and BCD counters • Improve the skill in designing and operating synchronous counters, capable of both up and down counting	counter) 6.4 Synchronous Counter (up/down counter)
• Become Proficient in designing a 4-bit Arithmetic Logic Unit (ALU) • Improve the skill of accumulator design and operation. • Understand the functionality of status registers and flags • Escalate the competence in designing a processor unit for digital systems.	Unit VII: Digital Systems Design (7 hrs.) 7.1 Arithmetic Logic Unit (Design of 4-bit ALU) 7.2 Accumulator 7.3 Status register and flags 7.4 Processor Unit

Note: The figures in the parentheses indicate the approximate periods for the respective units.

4. Laboratory Works

1. Implement AND, OR, and NOT gates using basic electronic components.
2. Verify truth tables for each gate through practical experimentation.
3. Implement the simplified Boolean expressions using logic gates.
4. Verify De-Morgan's theorem
5. Design of half adder & full adder
6. Encoder and decoder
7. Multiplexer and Demultiplexer
8. Design of flip flops
9. Design of shift register and counters

Experiential activities can be showcased through hands-on implementation on a digital logic trainer kit or simulated using dedicated software.

5. Methods of Instruction

- Lecture
- Group discussion
- Question-answers
- Demonstration and discussion
- Presentations
- Guest lectures
- Group work/project work
- Problem solving
- Simulation
- Tutorials

6. Evaluation system and Students' Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

Internal Evaluation	Weight	Marks	External Evaluation	Marks
Theory		30	Semester-End examination	50
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		20		
Attendance & Class Participation	10%			
Lab Report/Project Report	20%			
Practical Exam/Project Work	40%			
Viva	30%			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Student's Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

7. Prescribed Books and References

Text Books

1. Morris Mano (2017). Digital logic and computer design. Pearson India

References

1. Fletcher, J. R. (2017). Digital Logic and Computer Design. Wiley
2. Mano, M. M., & Ciletti, M. D. (2021). Digital Design: With an Introduction to the Verilog HDL. Pearson
3. Malvino, A. P., & Leach, D. P. (2010). Digital Principles and Applications. McGraw-Hill Education

Pokhara University
Faculty of Management Studies

Course Code: CMP 175

Credits:3[Hrs]

Course Title: Object Oriented Programming (Java)

Total Lectures: 48 hours

Nature of the Course: Theory & Practical

Program: BCSIT

Level: Bachelor

Year: I

Semester: II

1. Course Description:

This course offers a comprehensive introduction to Java programming, starting with an overview of object-oriented programming (OOP) concepts and the transition from procedure-oriented programming. Students learn the fundamentals of Java, including variables, data types, operators, control statements, and arrays. Moving on to OOP principles, the course covers classes, objects, encapsulation, constructors, static members, and inheritance. It also explores polymorphism, abstract classes, packages, and interfaces. Exception handling and stream manipulation are addressed, along with graphical user interface (GUI) programming using Swing components. Additionally, students delve into the benefits and implementation of generics for enhanced code reusability and type safety. Through hands-on exercises and projects, students develop practical Java programming skills essential for software development.

2. General Objectives:

- To understanding of fundamental programming concepts such as variables, data types, and control statements in Java.
- Develop proficiency in object-oriented programming principles including classes, objects, inheritance, and polymorphism.
- Learn to effectively handle exceptions and manipulate files in Java programs.
- Acquire practical skills in GUI programming using Swing components and understand the benefits of using generics for code reusability and type safety.

3. Specific Objectives and Contents

Specific Objective	Contents
• Recognize limitations of procedure-oriented programming versus object-oriented programming. • Highlight advantages and disadvantages of object-oriented programming, focusing on its key features.	Unit I: Introduction to Object-Oriented Programming (3 hrs.) 1.1 Problems in Procedure-Oriented Programming 1.2 Introduction to Object Oriented Programming, advantages and disadvantages 1.3 Features and concepts of Object-Oriented Programming 1.4 Basic Concept of OOP
• Understand Java's features like platform independence and robustness. • Explain JVM components and Java program structure with naming conventions.	Unit II: Basic Java [9 hrs.] 2.1. Introduction to Java: Features of Java, 2.2 The Java Virtual Machine (JVM), Parts of Java program, Naming Conventions in Java

• Apply Java fundamentals like variables, data types, operators, arrays, and I/O operations in programming.	2.3 Variables and constants 2.4 Data Types in Java 2.5 Operators in Java, 2.6 Reading and Displaying Output 2.7 Command Line Arguments. 2.8 Control Statements in Java 2.9 Array
• Create classes and objects in Java with proper instance variable initialization. • Understand and apply access specifiers and encapsulation to control class member access. • Implement constructors and grasp garbage collection concepts, including "this" pointer and static members in Java classes.	Unit III: Object-Oriented Programming (6 hrs.) 3.1 Classes and Objects: Object Creation, Initializing the Instance Variables 3.2 Access Specifiers and Encapsulation 3.3 Constructors and Garbage collection 3.4 "this" pointer 3.5 static members
• Explain inheritance and its role in code reuse, covering inheritance types and implementation in Java. • Understand polymorphism principles, including method overriding, overloading, dynamic method invocation, and runtime polymorphism. • Describe abstract classes, methods, packages, interfaces, and lambda functions, demonstrating their usage in Java programming.	Unit IV: Inheritance and Polymorphism (6 hrs.) 4.1 Inheritance and Reuse 4.2 Types of Inheritance and its Implementation 4.3 Polymorphism: Method Overriding, Method overloading, Dynamic method invocation and Run-time polymorphism 4.4 Abstract Classes: Abstract Method and Abstract Class 4.5 Packages and Interfaces 4.6 Lambda function
• Understand Java exceptions, including types and significance, and proficiently implement exception handling mechanisms for both built-in and user-defined exceptions in Java programs	Unit V: Exception Handling (6 hrs.) 5.1 Introduction to Exception 5.2 Errors in Java Program 5.2 Types of Exceptions 5.3 Exception handling mechanism 5.4 Built-in Exceptions in Java 5.5 User defined exception in JAVA
• Understand Java streams, differentiating between byte and character streams. • Learn file management using I/O classes like File Input Stream, File Output Stream, Data Input Stream, Data Output Stream, Object Input Stream, and Object Output Stream.	Unit VI: Stream in JAVA (6 hrs.) 6.1 Introduction to stream, byte stream and character stream 6.2 I/O class hierarchy 6.3 Manipulating file: ▪ File Input Stream, ▪ File Output Stream, ▪ Data Input Stream, ▪ Data Output Stream, ▪ Object Input Stream, ▪ Object Output Stream

• Design GUI creation with Swing components, including buttons, labels, text fields, and text areas, and gain expertise in event-driven programming for mouse and key events	Unit VII: GUI Programming with Swing [8 hrs.] 7.1 Introduction to graphical user interface (GUI) programming in java 7.2 Using Swing components (buttons, labels, text fields, text area, etc.) 7.3 Event-driven programming and event handling: Mouse event and key event 7.4 Building Simple Interactive Applications
• Develop the skill of using generics in Java and demonstrate proficiency in implementing generic classes, methods, and constructors • Apply polymorphism concepts within generic classes and methods	Unit VIII: Generics (4 hrs.) 8.1 Advantages of using Generics 8.2 Generic classes 8.3 Generic methods 8.4 Generic constructors 8.5 Polymorphism in generic

4. List of practical

1. Program to define the structure of a basic JAVA program
2. Program to define the data types, variables, operators, arrays, and control structures
3. Program to define class and constructors. Demonstrate constructors and garbage collection
4. Program to define class, methods, and objects. Demonstrate method overloading
5. Program to define inheritance and show method overriding.
6. Program to demonstrate Packages.
7. Program to demonstrate I/O operations.
8. Program to demonstrate Exception Handling
9. Program to demonstrate Layout managers
10. Implementation of generic concepts

Note: Creating a project based on Java using object-oriented concepts

5. Methods of Instruction

- Lecture
- Group discussion
- Question-answers
- Demonstration and discussion
- Presentations
- Guest lectures
- Group work/project work
- Problem solving
- Simulation
- Tutorials

6. Evaluation System and Students' Responsibilities

Evaluation System

The internal evaluation of a student may consist of assignments, attendance, term exams, lab reports and projects etc. The tabular presentation of the internal evaluation is as follows:

Internal Evaluation	Weight	Marks	External Evaluation	Marks
Theory		30	Semester End	50
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		20		
Attendance & Class Participation	10%			
Lab Report/Project Report	20%			
Practical Exam/Project Work	40%			
Viva	30%			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Students' Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with 80% attendance in the class to appear in the semester-end examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

7. Prescribed Books and References

Text Books

1. Schildt, H. (2006). The Complete Reference JAVA (7th ed.). Tata McGraw
2. Balaguruswamy, E. (2009). Programming with JAVA: A Primer (3rd ed.). TATA McGrawHill Company

References

1. Liang, D. (2014). Introduction to Java Programming (Comprehensive Version) (7th ed.). Pearson
2. Malhotra, S., & Chaudhary, S. (2014). Programming in Java. Oxford University Press
3. Lowe, D., Murach, J., & Steelman, A. (2005). Murach's Beginning Java 2. SPD

Pokhara University
Faculty of Management Studies

Course Code: CMP 176
 Course Title: Data Structure and Algorithm
 Nature of the Course: Theory & Practical
 Level: Bachelor

Credits:3[Hrs]
 Total Lectures: 48 hours
 Program: BCSIT
 Year: I Semester: II

1. Course Description

This course offers a thorough examination of the core principles of data structures and algorithms, crucial for computer science students. It starts with an introduction to data structures and advances through abstract data types, algorithm analysis, and design techniques. Topics covered include recursion, stacks, queues, linked lists, trees, sorting, searching, hashing, and graph algorithms, with in-depth explanations and practical examples. Through hands-on exercises, students gain proficiency in designing, implementing, and analyzing these structures and algorithms, with a focus on understanding their efficiency and real-world applications. Upon completion, students are equipped with the essential knowledge and skills to address intricate problems and develop efficient software solutions.

2. General Objectives

- Provide a comprehensive understanding of fundamental data structures and algorithms.
- Equip students with proficiency in designing, implementing, and analyzing data structures and algorithms.
- Foster a deep comprehension of the efficiency and practical implications of different algorithms.
- Prepare students to tackle complex problems and develop effective software solutions.

3. Specific Objectives and Contents

Specific Objectives	Content
• Explain fundamental concepts and importance of data structures. • Define and classify different types of data structures. • Differentiate between data structures and abstract data types (ADTs). • Analyze and evaluate algorithms in terms of time and space complexity.	Unit I: Introduction to data Structure [3 Hrs.] 1.1 introduction 1.2 Definition, 1.3 Classification of data structure 1.4 Abstract Data Type 1.5 Comparison between Data structure and ADT, 1.6 Algorithm 1.7 Analysis algorithm 1.8 Design algorithm ▪ Incremental approach ▪ Divide and conquer 1.9 Performance analysis and measurement

	▪ Space complexity ▪ Time complexity
• Discuss the principles and characteristics of recursion. • Apply recursion to solve problems and implement algorithms efficiently.	Unit II: Recursion [4 Hrs.] 2.1 Introduction to Recursion 2.2 Principle of Recursion 2.3 Types of Recursions ▪ Direct, ▪ Indirect, ▪ Linear ▪ Tail recursion 2.4 Recursion Examples ▪ TOH, ▪ Fibonacci Series, 2.5 Application of Recursion
• Become proficient in using stacks and understanding their terms. • Proficiency in implementing stack algorithms such as POP and PUSH. • Application of stacks in solving problems like reverse string, postfix expression evaluation, and infix to postfix conversion.	Unit III: Stacks [4 Hrs.] 3.1 Introduction 3.2 Operation stack 3.3 Stack terminology 3.4 Algorithm for POP and PUSH 3.5 Stack Applications ▪ Stack frame ▪ Reverse string ▪ Calculation of postfix expression ▪ A notation conversion 3.6 Algorithm for converting infix expression to postfix from.
• Discuss of queue terminology and operations. • Gain proficiency in implementing queue insertion and deletion algorithms. • Recognize queue variations and their applications, such as circular queues and priority queues.	Unit IV: Queue [4 Hrs.] 4.1 Introduction 4.2 Queue terminology 4.3 Algorithm for insertion queue 4.4 Algorithm for deletions in queue 4.5 Limitation of simple queue 4.6 Variation in a queue ▪ A circular queue ▪ Priority of queue 4.7 Application of queue
• Comprehend the advantages and disadvantages of linked lists. • Define key terms associated with linked lists, such as data field and linked field. • Demonstrate the representation of a linear linked list. • Execute operations on linked lists including creation, insertion, deletion, traversal, searching, concatenation, and display.	Unit V: Linked List [5 Hrs.] 5.1 Introduction 5.2 Linked List ▪ Advantage and disadvantage 5.3 Key term ▪ Data field ▪ Linked field 5.4 Representation liner linked list 5.5 Operation of linked list ▪ Creation

Identify and differentiate between various types of linked lists, including single, double, circular, and circular double linked lists.	- Insertion - Deletion - Traversing - Searching - Concatenation - Display 5.6 Types of linked list - Single linked list - Double linked list - Circular linked list - Circular double linked list 5.7 Create single linked list 5.8 Insertion of single linked list at specific position 5.9 Deletion of single linked list at specific position 5.10 Application: addition of two polynomials
- Define tree terminology and apply it, including concepts like strictly binary trees and complete binary trees. - Understand different representations of binary trees, like array and linked list representations. - Create a binary tree and implement various traversal methods. - Perform operations on binary search trees, including insertion, search, and deletion, and understand their properties. - Learn about AVL balanced trees, their principles, properties, and how they ensure efficient data structure operations by maintaining balance and minimizing search times	Unit VI: Trees [7 Hrs.] 6.1 Introduction 6.2 Tree terminology 6.3 Binary tree - Strictly binary tree - Complete binary tree - Extended binary tree 6.4 Binary tree representation - Array representation of binary tree - Linked list representation of binary tree 6.5 Create binary tree 6.6 A traversal of a binary tree - Preorder traversal - Inorder traversal - Post order traversal 6.7 Binary search tree - Insertion - Search - Deletion 6.8 Tree Height, Level and Depth, 6.9 Balanced Tree: AVL Balanced Trees 6.10 The Huffman Algorithm 6.11 B-Tree
- Understand the distinction between internal and external sorting techniques. - Learn various common sorting algorithms such as Bubble Sort, Insertion Sort, Selection Sort,	Unit VII: Sorting[7 Hrs.] 7.1 Introduction 7.2 Internal & External Sort, 7.3 Common sorting algorithm

Quick Sort, Merge Sort, Shell Sort, and Binary Sort. - Analyze the efficiency of sorting algorithms and their performance using Big O notation. - Implement sorting algorithms and evaluate their effectiveness in sorting large datasets.	- Bubble sort - Insertion - Selection Sort, - Quick Sort, - Merge Sort, - Shell Sort, - Binary Sort, 7.4 Efficiency of Sorting, Big 'O' Notation
- Various searching techniques including Sequential Search, Binary Search, and Tree Search. - Learn about hashing techniques, including hash functions and hash tables, and their applications. - Explore collision resolution techniques such as linear probing, quadratic probing, and double hashing. - Compare the efficiency of different search techniques and hashing methods to determine their suitability for various applications.	Unit VIII: Searching [5 Hrs.] 8.1 Introduction 8.2 Searching Technique - Sequential Search, - Binary Search, - Tree Search, 8.3 Hashing: - Hash functions - Character of a good hash functions - Type of hash function - Hash tables and application 8.4 Collision resolution techniques 8.5 Hashing with open addressing - Linear probing - Quadratic probing - Double hashing 8.6 Hashing with chaining 8.7 Rehashing 8.8 Efficiency comparison of different search technique
- Understand the fundamental concepts and terminology related to graphs. - Learn about different types of graphs, including undirected and directed graphs. - Explore graph representation techniques and graph traversal algorithms such as Breadth-First Search (BFS) and Depth-First Search (DFS). - Study spanning trees, minimum spanning trees, and algorithms such as Kruskal's algorithm and Prim's algorithm for their construction.	Unit 9: Graph [7 Hrs.] 9.1 Introduction 9.2 Graph terminology 9.3 Types of Graphs - Undirected graph - Directed graph 9.4 Graph representation 9.5 Graph Traversal - Breath first search - Depth first search 9.6 Spanning tree and Minimum spanning tree - Kruskal's algorithm - Prime algorithm 9.7 Shortest Path problem - Dijkstrs's Algorithm 9.8 Application graph
Learn the concept of asymptotic notations,	Unit 10: Growth Functions [2 Hrs.]

including Big O, Omega, and Theta notation. • Learn the limitations of Big O notation and its applicability in analyzing algorithmic complexity.	10.1. Introduction to Asymptotic Notations 10.2 Big Oh notation 10.3 Omega notation 10.4 Theata notation 10.5 Limatitation of big Oh notation
---	---

4. Laboratory Work

It builds the foundation on how to write a program using any high-level language. Hence, this course requires a lot of programming practice so that students will be able to develop good logic building and program developing capability which is essential throughout the course.

Some important contents that should be included in lab exercises are as follows:

1. Implementations of different operations related to Stack.
2. Implementation of different operations related to linear and circular queue.
3. Solution of TOH and Fibonacci Series using Recursion.
4. Implementations of different operations related to singly linked list.
5. Implementation of Trees: AVL trees, Balancing AVL.
6. Implementation of merge sort.
7. Implementation of different searching technique: sequential, Tree and Binary.
8. Implementation of Graphs: Graph traversal
9. Implementation of Hashing

Note: Each of the above lab session should cover more than 4 hours of practical work.

5. Methods of Instruction

- Lecture
- Group discussion
- Question-answers
- Demonstration and discussion
- Presentations
- Guest lectures
- Group work/project work
- Problem solving
- Simulation
- Tutorials

6. Evaluation system and Student's Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End examination	50	Theory		30
		Attendance & Class Participation	10%	
		Assignments	20%	
		Presentations/Quizzes	10%	

		Internal Assessment	60%	
		Practical		
		Attendance & Class Participation	10%	20
		Lab Report/Project Report	20%	
		Practical Exam/Project Work	40%	
		Viva	30%	
Total External	50	Total Internal		50
Full Marks: 50 + 50 = 100				

Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. ***Students are required to complete all the requirements defined for the completion of the courses.***

7. Prescribed Books and References

Text Books

Langsam, Y., Augenstein, M. J., & Tanenbaum, A. M. (2019). Data Structures using C and C++. PHI

Reference Books

- 1 Rowe, G. W. (1997). Introduction to Data Structures and Algorithms with C and C++. PHI
- 2 Lafore, R. (2002). Data Structures and Algorithms in Java. Sams Publishing
- 3 Baluja, G. S. (2016). Data Structures through C. Dhanpat Rai & Co

Pokhara University
Faculty of Management Studies

Course Code: MTHS213 174
 Course Title: **Mathematics II**
 Nature of the Course: Theory
 Level: Bachelor

Credits: 3[Hrs]
 Total Lectures: 48 hours
 Program: BCSIT
 Year: I Semester: II

1. Course Description

This course covers essential mathematical concepts starting with complex numbers, including their definition, algebra, properties, and graphical representation. It introduces De Moivre's theorem and applications. The course progresses to infinite sequences and series, focusing on convergence tests and specific tests like P-series and ratio tests. It explores antiderivatives, including definite and improper integrals, quadrature, rectification, and Beta and Gamma functions. Optimization for functions of several variables, partial differentiation, and finding maxima and minima are also covered. Students will study ordinary differential equations, including first-order solutions and second-order equations with constant coefficients, along with initial and boundary value problems. The course addresses number theory, including division, primes, GCD, LCM, and modular arithmetic, with applications in cryptology. Finally, it covers Fourier series and integrals, exploring even and odd functions, periodic functions, and Fourier coefficients, as well as sine and cosine integrals.

2. General objective

- Understand complex numbers, their properties, and algebraic operations.
- Proficiently analyze infinite sequences and series using convergence tests.
- Master antiderivatives, including definite and improper integrals, and apply Beta and Gamma functions in problem-solving.
- Solve ordinary differential equations and optimization problems using techniques like partial differentiation

3. Specific Objectives and Contents

Specific Objectives	Content
- Understand and define complex numbers, including integral powers of i. - Execute addition, subtraction, multiplication, and division of complex numbers. - Investigate properties of complex numbers, including conjugates and moduli. - Represent complex numbers using Argand's diagram, express in polar form, and apply De Moivre's theorem	Unit I: Complex Numbers [8 hrs.] 1.1 Definition of a complex number, integral powers of i. 1.2 Algebra of complex numbers (sum, difference, multiplication, division). 1.3 Properties of complex numbers (without proof), conjugate of a complex number and its properties. 1.4

	odulus of a complex number and its properties (without proof), representation of a complex number by a point in a plane (Argand's diagram). 1.5 Polar representation of a complex number. 1.6 Square roots of a complex number (only Cartesian form) 1.7 De Moivre's theorem (statement only) and its application.
- Learn the concept and conditions of convergence tests for infinite series. - Use direct and limit comparison tests to determine series convergence or divergence. - Apply P-series, De Alembert's ratio, and alternating series tests to analyze series convergence.	Unit II: Infinite Sequence and Series [7 hrs.] 2.1. Introduction 2.2. Convergence test of infinite series (statement only). 2.3. Direct comparison test, Limit comparison test (statement only). 2.4. P-series test, De Alembert's ratio test, and Alternating series test (statement only).
- Learn the concepts, properties, and applications of definite and improper integrals. - Calculate areas (quadrature) and curve lengths (rectification) for functions $y=f(x)$ using antiderivative techniques - Study and apply the properties of Beta and Gamma functions in different mathematical contexts.	Unit III: Application of Antiderivative [7 Hrs.] a. Definite integral b. Properties of the definite integral c. Improper Integral d. Quadrature [$y = f(x)$] e. Rectification [$y = f(x)$] f. Beta and Gamma function.
- Learn the concept and importance of partial derivatives - Use rules of partial differentiation for accurate calculations - Identify maxima and minima for functions of two variables	Unit IV: Optimization: Functions of several variables [6 hrs] 4.1. Introduction 4.2. Partial derivative 4.3. Rules of partial differentiation 4.4. Maxima and minima for the function of two variables.
- Understand the order and degree of differential equations - Solve first-order and first-degree differential equations using various	Unit V: Ordinary Differential Equation [7 Hrs.] 5.1. Introduction. 5.2. Order and degree of differential equation.

methods. Solve second-order linear differential equations with constant coefficients and address initial and boundary value problem.	5.3. Solution of the first order and first-degree differential equation. 5.4. Variable separation, homogeneous, linear differential equation. 5.5. Second-order linear differential equation with constant coefficients. 5.6. Initial and boundary value problems.
- Identify prime numbers and apply them in problem-solving - Master division algorithm, GCD, and LCM for integer problem-solving. - Apply modular arithmetic in cryptography for secure message transmission	Unit VI: Integers and Division [6 Hrs.] 1.1. Introduction 1.2. Division, primes, the fundamental theorem of arithmetic (statement only) 1.3. The infinitude of primes 1.4. The division algorithm, GCD and LCM 1.5. Modular arithmetic 1.6. Application of congruence's Cryptology.
- Classify functions as even or odd and analyze their properties. - Represent periodic functions using Fourier series and determine coefficients. - Apply Fourier integrals to represent non-periodic functions	Unit VII: Fourier Series and Integrals [7 Hrs.] 1.1. Introduction 1.2. Even and odd function 1.3. Periodic function 1.4. Fourier series and Fourier coefficients (without proof) 1.5. Fourier sine and cosine series 1.6. Fourier integral 1.7. Fourier sine and cosine integral

4. Methods of Instruction

- Lecture
- Group discussion
- Question-answers
- Demonstration and discussion
- Presentations
- Guest lectures
- Group work/project work
- Problem solving
- Simulation

- Tutorials

5. Evaluation System and Student's Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End examination	50	Theory		50
		Attendance & Class Participation	10%	
		Assignments	20%	
		Presentations/Quizzes	10%	
		Internal Assessment	60%	
Total External	50	Total Internal		50
Full Marks: 50 + 50 = 100				

Student's Requirement

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class to appear in the semester-end examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear for the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc., and complete all the assignments within the specified period. ***Students are required to complete all the requirements defined for the completion of the course.***

6. Prescribed Books and References

Text Books

1. Kreyszig, E. (2020). *Advanced Engineering Mathematics*. New Delhi: John Wiley & Sons Inc.
2. Thomas, G. B. Jr., & Finney, R. L. (2003). *Calculus and Analytical Geometry*. New Delhi: Narosa Publishing House.
3. Rosen, K. H. (2003). *Discrete Mathematics and its Applications* (5th ed.). McGraw Hill Companies.

Reference

1. Shrestha, K. K., & Thagurathi, R. K. (Year of publication). *Applied Mathematics*. Kathmandu, Nepal: Buddha Publication

Pokhara University
Faculty of Management Studies

Course Code: ENG. 112

Course Title: Business Communication

Nature of the Course: Theory

Level: Bachelor

Credits: 3[Hrs]

Total Lectures: 48 hours

Program: BCSIT

Year: I Semester: II

1. Course Description

This course is designed to equip students with the practical concepts, knowledge and skills essential for an effective business communication. It covers the fundamental components of successful communication, including oral, written, non-verbal, visual, and intercultural aspects within the business environment. The course primarily focuses on developing core competencies for successful communication in modern business settings through task-based classroom activities. It complements the technical knowledge of business frameworks, highlighting the practical aspects of individual involvement as communicators in business. It underscores the practical role of individuals as communicators in business and enhances their ability to communicate effectively, thereby contributing to their employability and career progression.

General Objectives

The general objectives of this course are as follows:

- To familiarize the students with fundamentals of business communication
- To enable students to communicate effectively in written and oral business context
- To enable students to produce business documents with appropriate organization and design
- To empower students with nonverbal and visual modes of business communication
- To empower students to develop intercultural communicative competence
- To enhance students' skills in using appropriate graphics and visuals in written documents and oral presentation

3. Specific Objectives and Content of the Course

Learning Objectives	Contents
• Explain the meaning and definition of business communication. • Describe the process of communication. • Describe the principles of effective business communication. • Explain the modes of business communication. • Discuss the barriers to effective communication.	Unit I: Foundation of Business Communication (8 hrs.) 1.1 Meaning and definition of business communication 1.2 Process of communication 1.3 Principles of effective business communication (clarity, conciseness, completeness, correctness, concreteness, consideration and courtesy) 1.4 Modes of communication: intra-personal,

Learning Objectives	Contents
- Describe communication in an organizational structure. - Acquaint students with business communication in the digital age. - Follow the etiquettes of business communication.	inter-personal, visual or presentational mode, electronic or digital mode of communication 1.5 Barriers to effective communication (noise and distractions, filters, competing messages, channel breakdown) 1.6 Communication in an organizational structure (downward, upward, horizontal, diagonal) 1.7 Business communication in the digital age 1.8 Etiquettes of business communication
- Describe the process of business writing. - Explain the qualities of business writing. - Follow the basics of document design. - Compose effective memos and emails. - Prepare brief document messages. - Prepare mid-length professional business proposals, reports and plans. - Consider the ethical issues in business writing.	Unit II: Written Business Communication (12 hrs.) 2.1 Writing process: planning (Analyzing the situation, analyzing the audience, choosing the medium, organizing the information) writing (Being sensitive to the audience and composing the message) and completing (revising, producing, proofreading, distributing). 2.2 Qualities of business writing 2.3 Preparing business documents: basics of document design (organization, order, access, variety) 2.4 Writing brief messages: memos, letters, emails, blogs, notices, press release 2.5 Writing business proposals, reports, plans: informal reports, proposals and plans, and formal components of advanced business documents 2.6 Ethical considerations in business writing: plagiarism, crediting and referencing the sources
- Explain the basics of oral business communication process. - Distinguish between oral and written business communication. - Deliver effective oral presentation and public speech. - Perform effective job interview. - Conduct effective in-person and virtual business meetings and participate in it actively.	Unit III: Oral Business Communication (6 hrs.) 3.1 Basics of oral business communication process: qualities of oral communication and distinction between oral and written 3.2 Major oral communication situations 3.2.1 Mastering oral presentation and public speech 3.2.2 Effective job interview process 3.2.3 Effective business meetings: in-person and digital mode

Learning Objectives	Contents
- Define the concept of non-verbal communication. - Explain the characteristics of non-verbal communication. - Communicate with appropriate physical appearance, tone of voice, facial expression, use of space, touch, and time in communication. - Acquaint with the key considerations in effective business communication. - Explain the meaning of intercultural business communication. - Discuss the barriers to effective intercultural business communication. - Overcome the barriers to effective intercultural communication	Unit IV: Non-verbal and Intercultural Business Communication (6 hrs.) 4.1 Meaning of non-verbal communication 4.2 Characteristics of non-verbal communication 4.3 Types of non-verbal communication 4.3.1 Physical appearance 4.3.2 Vocal characteristics 4.3.3 Gesture and posture 4.3.4 Facial expression 4.3.5 Use of space 4.3.6 Touch 4.3.7 Use of time 4.4 Key considerations in non-verbal communication 4.5 Intercultural communication and diversity sensitivity in business communication 4.5.1 Meaning of intercultural communication 4.5.2 Barriers to effective intercultural communication 4.5.3 Overcoming the barriers to intercultural communication
- Acquaint students with the concept of visual communication and its use. - Use and describe visual messages used in business communication appropriately.	Unit V: Visual Communication (5 hrs.) 5.1 Uses of visual aids in business communication 5.2 Types of visual aids: 5.2.1 Signs, symbols, signals 5.2.2 Tables 5.2.3 Figures 5.2.4 Bar graphs 5.2.5 Gantt chart 5.2.6 Infographics 5.2.7 Pie chart 5.2.8 Organizational chart 5.2.9 Flowchart 5.2.10 Diagrams 5.2.11 Map 5.2.12 Photograph 5.3 Ethical consideration in using visual aids
- Enable students to produce professional email and resume. - Enable students to draft effective business proposals and reports. - Enable students to excel in job interview and business meetings.	VI: Employment Communication and Presentation (Practicum) 10 hrs. 6.1 Cover letter and resume writing workshop- 2 hrs. 6.2 Mock job interview and business meetings- 3 hrs. 6.3 Creating LinkedIn profile 2 hr.

Learning Objectives	Contents
	6.4 Oral presentation practicum hrs. 3

Note: The figures in the parenthesis indicate the approximate teaching hours for respective units

Unit	Activity and Instructional Techniques
I	Lecture, group discussion, individual presentations
II	Demonstration, classroom practice, group work, individual tasks, project work
III	Demonstration, presentation, mock-meetings, mock, interview, pair work and group work
IV	Demonstration, presentation, pair work and group work
V	Demonstration, presentation, pair work and group work
VI	Demonstration, pair work and group work, presentation
VII	Workshop (individual work, group work, presentation)

5. Evaluation System and Students' Responsibilities

4. Methods of Instruction

- Lecture
- Group discussion
- Question-answers
- Demonstration and discussion
- Presentations
- Guest lecture
- Group work/project work
- Problem solving
- Simulation
- Tutorial

Evaluation System

The internal evaluation of a student may consist of assignments, attendance, term-exams, lab reports and projects etc. The tabular presentation of the internal evaluation is as follows:

Internal Evaluation	Weight	Marks	External Evaluation	Marks
---------------------	--------	-------	---------------------	-------

Theory		30	Semester End	50
Attendance and classroom participation	5			
Assignments	10			
Presentations	5			
Internal assessment	10			
Employment Communication and Presentation Practicum		20		
Qualities of cover letter and resume	5			
Mock- meeting/ interview	5			
LinkedIn profile creation	5			
Presentation	5			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Students' Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with 80% attendance in the class to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time. Students are required to complete all the requirements defined for the completion of the course.

External Evaluation (Final Examination) 50%

The Office of the Controller of Examination University will be conducted external examination at the end of the semester.

SN	Question Types	Points
1	Case analysis	15
2	Analytical Questions: 15x1	15
3	Short questions: 10x5 marks	50
	Very short answer questions: 10x2 marks	20
	Total	100

6. Prescribed Books and References

Text Books

1. Adhikari, Dharma and Upadhyaya, Phandindra (2014). *Technical Communication: Concept and Process*. Kathmandu: Buddha Publication (for Unit 1: page no. 2-11, for Unit II: 144-152; for Unit V: page no. 154-168)
2. Courtland L. Bovee and John V. Thill, Business (2021) *Communication Today: Occasional Handouts*. Pearson: London (for Unit 1: page no. 48- 52; 64-67; 100-104, for Unit II: page no.140-141, for Unit IV: page no.98-100; 114-132, for Unit VI: page no. 463-475, 503, 521, 557-621)

3. GC, Saroj (2021). *Business Communication: Theory and Applications*. Kathmandu: Advance Sarswati Publication (for Unit II: page no. 14-32; 141-190; 191-246), for Unit III: page no. 247-295
4. Guffey, M. E., & Loewy, D. (2019). *Essentials of business communication*. Boston: Cengage Learning. (for Unit 1: page 1-7)

Reference Books

1. Bruckmann, C. G., & Hartley, P. (2007). *Business communication*. Routledge.
2. Hartley P. & Chatterton, P. (2015). *Business Communication: Rethinking your professional practice for the post-digital age*. London. Routledge
3. Floyd, K. & Peter W. (2020). *Business and Professional Communication: Putting People First*. New York. Mc Grow Hill Education
4. Guffey, Mary E. & Carolyn M. S. (2011). *Business English*. Ohio: Cengage Learning. Oxford Business English Dictionary for Learners of English. Oxford: OUP.
5. Guffey, M. E., & Loewy, D. (2011). *Business Communication: Process and Product*. (7th ed.). Mason, Ohio: South-Western.
6. Rentz, K., Flatley, M. E., & Lentz, P. (2011). *Business Communication: Connecting in a Digital World*. (12th ed.). New York: Mc-Graw Hill. (for Unit I: page no. 1-7)
7. Hartley, P. (2002). *Business Communication*. London: Routledge

Pokhara University
Faculty of Management Studies

Course Code: PRJ 181
 Course Title: Project I
 Nature of the Course: Theory
 Level: Bachelor

Credits: 2[Hrs]
 Total Lectures: 32 hours
 Program: BCSIT
 Year: I Semester: II

1. Course Description

This course equips students with essential web development skills using HTML, CSS, and JavaScript. Students begin by learning to structure web pages with HTML, followed by enhancing them with CSS for styling and layout control to create visually appealing and responsive designs. JavaScript is introduced to add interactivity and dynamic functionality, enabling the creation of engaging user experiences. Advanced topics such as form validation, DOM manipulation, and AJAX requests are also covered, providing the tools needed for real-world web development challenges. By the end of the course, students will have a solid understanding of web development principles and practical experience in creating interactive, responsive websites, preparing them for more complex projects in future semesters.

2. General Objectives

- Understand the fundamental concepts and structures of HTML, CSS, and JavaScript for web development.
- Develop skills in creating visually appealing and responsive web designs using CSS.
- Gain proficiency in using JavaScript to add interactivity and dynamic functionality to web pages.

3. Laboratory Work

It builds the foundation for how to create simple static web pages. Hence, this course requires a lot of programming practice so that students will be able to develop good logic-building and program-developing capabilities which is essential throughout the course.

Some important contents that should be included in project work are:

1. Creating a simple static website with 4 pages, using HTML5 (include all tags included in HTML and HTML5)
2. Create a simple image gallery using CSS
3. Create a responsive web page using the box model
4. Create a form with all the elements and validate it using client-side scripting
5. Create a user registration form using HTML 5 and validate it using JavaScript
6. Creating jQuery Slider and Image Gallery
7. Use jQuery date picker and sort
8. Work with JSON data and make AJAX requests using fetch API or XMLHttpRequest
9. The general concept of React, Angular, or Vue.js for building web application

- Case discussion
- Group discussion
- Practical works,
- Demonstration and discussion
- Project-based Learning
- Self-Directed learning
- industry insights and case study
- Case readings, Case question and answer
- Simulation
- Tutorial

5. Evaluation system, Project timeline and Student's Responsibility

SN	Evaluation Details	Day for Evaluation (48 hrs.)	Marks
1.	Introduction to Project I	Project Seminar (Introduction)	5 marks for attendance and submission of topic on time
2.	Topic finalization	Day 2-4 (Discussion on project topic, Research)	
3.	Proposal Defense	Day 6-10 (Preparation for proposal defense)	5
4.	Mid- Term Defense	Day 11 (Presentation, printed copy of project proposal- 2 pcs, Demo)	15
5.	End- Term Defense	Day 24 (Presentation, Demo 60% of the work is to be completed)	25
6.	Final Defense	Day 48 (Final Project presentation, Demo and Q&A)	50
Total			100

Project Work Phase:

The entire project work shall be divided into three phases and evaluation shall be done accordingly.

Phase	Description
Phase 1: Conceptual Framework and Proposal	Team formation: Students form teams of 2-4 members based on their interests, skills, and the nature of the project. Conceptual Framework: Teams develop a conceptual framework for their project. This should include: • Problem statement: Clearly define the problem the project aims to address. • Objectives: Outline the goals and expected outcomes. • Scope: Define the boundaries and limitations of the project. • Significance: Explain the relevance and importance of the project. • Methodology: Briefly describe the approach and methods to be used. Documentation Teams document the conceptual framework in the format provided by

	the department for project proposals. Presentations Teams present their proposal in front of the examiner, providing a clear overview of their project
Phase 2: Progress Report	1. Progress Report Teams demonstrate the progress made in the design phase, including. • Overall system design: Present the architecture of the system • Architectural design: Detail the structure and components of the system • Validation scheme: Explain how the system's functionality will be validated 2. Documentation of Progress: Teams document the progress made, highlighting key design decisions and any challenges encountered. 3. Presentation to Internal Evaluator Committee: Teams present their progress report to the internal evaluator committee for feedback and assessment.
Phase 3: Final Presentation and Defense	1. Completion of all Phase: Ensure that all phases of the project, including design, development, and testing, are completed. 2. Product Output: Teams develop the final output of their product using web technology. This could be a web application, platform, or any relevant web-based solution. 3. Oral Defense: • Teams present the final product and its features to the external examiner. • Conduct an oral defence, addressing questions from the examiner regarding design choices, implementation, and overall project execution 4. Use web Technology: Emphasize the incorporation of web technology in the project. This could include technologies like HTML, CSS, JavaScript, and relevant frameworks for web development 5. Submission of Final Documentation: Provide comprehensive documentation covering all aspects of the project, from the initial proposal to the final product.

By following these three phases, students can systematically plan, execute, and present their project work, with a focus on utilizing web technology for effective solutions

Project Evaluation Criteria

The marks of Mid-term, End- term and Final Defense are distributed as:

1. Report 10 %
2. Presentation 5%
3. Demonstration 15%
4. Q&A 15%
5. Teamwork 5%

Note: There can be three members in the final defense and the marks are adjusted on an average basis: (Project supervisor, Program Coordinator and External)

The project document shall include the following items:

- Project Team members (At least 2 and a maximum of 3)
- Project supervisor(s)
- Technical description of the project.
- Project Analysis, Design, Coding, Testing and Implementation details.

Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the Semester-End Examinations. Students are advised to attend all the evaluation criteria and complete all the assignments within the specified period. ***Students are required to complete all the requirements defined for the completion of the course.***

6. Prescribed Books and References

Text Books:

Niederst Robbins, J. (2018). *A beginner's guide to HTML, CSS, JavaScript, and web graphics* (5th ed.). O'Reilly Media.

Reference Books:

1. Holzner, S. (2001). *HTML black book*. Dreamtech Press
2. Dreamtech Press. (2009). *Web technologies black book*
3. Knuckles, R. (2011). *Web applications: Concepts and real world design*. Wiley-India.
4. Deitel, P. J., & Deitel, H. M. (2012). *Internet and world wide web how to program* (5th ed.). Pearson

Report Contents:

1. Prescribed content flow for the project proposal

1. Introduction
2. Problem Statement
3. Objectives of Study
4. Methodology
 - a. Requirement Identification
 - Study of existing system
 - Requirement Collection
 - b. Feasibility Study
 - Technical
 - Operational
 - Economic
 - c. High Level Design of System (system flow chart/ methodology of the proposed system/ working mechanism of proposed system)
5. Gantt Chart (showing the project timeline)
6. Expected Outcome
7. References

2. Prescribed content flow for the project report

1. Cover & Title Page
2. Certificate Page

- Supervisor Recommendation
 - Internal and External Examiners' Approval Letter
3. Abstract Page
 4. Acknowledgements
 5. Table of Contents
 6. Abbreviations
 7. List of Figures
 8. List of Tables
 7. Main Report
 8. Appendices (Screen Shots/ Source Codes/ Supervisor Visit Log Sheets)
 9. References

3. Prescribed Chapters in Main Report

Chapter 1: Introduction

- 1.1. Background of the Study
- 1.2. Statement of the Problem
- 1.3. Objectives of the Study
- 1.4. Scope of the Study
- 1.5. Limitations of the Study

Chapter 2: Review of Literature

- 2.1. Description of fundamental theories, general concepts and terminologies related to the project
- 2.2. Review of the similar Projects and Theories

Chapter 3: System Analysis and Design

- 3.1. System Analysis
 - 3.1.1. Requirement Analysis
 - Functional Requirements
 - Non Functional Requirements
 - 3.1.2. Feasibility Analysis
 - Technical
 - Operational
 - Financial
 - Schedule
 - 3.1.3. Data Modeling
 - 3.1.4. Process Modeling
- 3.2. System Design
 - 3.2.1. Interface Design (UI Interface / Interface Structure Diagrams)

Chapter 4: Implementation and Testing

- 4.1. Implementation
 - 4.1.1. Tools Used (Tools, Programming languages, Database platforms)
 - 4.1.2. Implementation Details of Modules (Description of procedures/functions)
- 4.2. Testing
 - 4.2.1. Test Cases for Unit Testing
 - 4.2.2. Test Cases for System Testing

Chapter 5: Conclusion and Future Recommendations

- 5.1. Lesson Learnt
- 5.2. Conclusion

5.3. Recommendations

Appendices (Screen Shots/ Source Codes/ Supervisor Visit Log Sheets)

Citation and Referencing

The listing of references should be listed in the references section. The references contain the list of articles, books, that are cited in the document. The books, articles, and others that are studied during the study but are not cited in the document can be listed in the bibliography section.

Report Format Standards

1. Page Number

The pages from certificate page to the list of tables/figures should be numbered in roman starting from i. The pages from chapter 1 onwards should be numbered in numeric starting from 1. The page number should be inserted at bottom, aligned center.

2. Page Size and Margin

The paper size must be a page size corresponding to A4. The margins must be set as 6 Top = 1; Bottom = 1; Right = 1; Left 1.5

3. Paragraph Style

All paragraphs must be justified and have spacing of 1.5.

4. Text Font of Document

- The contents in the document should be in Times New Roman font
- The font size in the paragraphs of document should be 12 E. Section Headings
- Font size for the headings should be 16 for chapter title, 14 for section headings, 12 for the sub-section headings. All the headings should be bold faced.

5. Figures and Tables

Position of figures and tables should be aligned center. The figure caption should be centered below the figure and table captions should be centered above the table. All the captions should be of bold face with 12 font size.

Course Details: BCSIT Program, Semester III**Second Year, Third Semester**

Course Code	Subjects	Credits
CMP 172	Object Oriented Analysis and Design	3
CMP 271	Database Management Systems	3
CMP 273	Internet Technology II	3
MGT 222	Principles of Management	3
STT 220	Linear Algebra and Probability	3

Pokhara University
Faculty of Management Studies

Course Code: CMP 172

Course title: **Object Oriented Analysis and Design**

Nature of the course: Theory + Practical

Year: Second

Level: Bachelor

Semester: III

Full marks: 100

Pass marks: 45

Credit Hrs: 3

Total periods: 48 hours

Program: BCSIT

1. Course Description

This course introduces the fundamental concepts of object-oriented (OO) analysis and design (OOD) for software development. Students will gain an understanding of the OO paradigm, learn to identify objects and their relationships, and create models using the Unified Modeling Language (UML).

It will include the following information about the course:

- Understand the fundamental concepts of OOP, including objects, classes, attributes, methods, benefits, and challenges.
- Gain an introduction to UML, its building blocks (things, relationships, diagrams), and its role in object-oriented modeling
- Learn the object-oriented analysis process, including use case modeling, building the conceptual model (identifying classes and relationships), and using CRC cards
- Master the transition from analysis to design, designing classes and interfaces, operations (methods), system behavior using state diagrams, and common design patterns.
- Explore design patterns and their benefits, understand how to apply common design patterns, and gain an introduction to object-oriented frameworks.
- Apply OOAD principles to a real-world case study, develop a UML model for the chosen scenario, and present your findings.

2. General Objectives

1. Explain the core principles of object-oriented programming.
2. Apply object-oriented analysis techniques to understand system requirements.
3. Design robust and maintainable object-oriented software systems using UML.
4. Utilize design patterns to solve common software design problems.

3. Method of Instructions

General Instructional Technique: Lecture, Discussion, Readings, Question Answer

Specific Instructional Technique: Practical works, Project Based Learning, Self-Directed Learning, Industry Insights and Case Study

4. Content in Detail with Specific Objectives

Specific Objectives	Content
▪ Understand the concepts of class, objects, attributes, and methods. ▪ Describe and differentiate between association, aggregation, and composition relationships with	Unit 1: Introduction to Object-Oriented [4 Hrs.] 1.1. Class, objects, attributes, methods. 1.2. Relation between objects: Association, aggregation, and composition

examples. Identify the benefits and challenges of Object-Oriented Programming (OOP).	relationships with examples. 1.3. Benefits and challenges of OOP
Specific Objectives	Content
- Understand the fundamentals of requirement gathering. - Identify and apply requirement elicitation techniques. - Perform requirement analysis and specification. - Validate requirements. - Understand the concepts of use cases, scenarios, and actors. - Gain an overview of the Unified Modeling Language (UML) fundamentals and notations.	Unit 2: Requirement Elicitation and Analysis [7 Hrs.] 2.1 Requirement gathering 2.1.1 Requirement fundamentals 2.1.2 Requirement elicitation techniques 2.1.3 Requirement analysis 2.1.4 Requirement specification 2.1.5 Requirement validation 2.4 Use cases, Scenario and Actors 2.5 Overview of the Unified Modeling Language: UML Fundamentals and Notations 2.5.1 Behavior Diagram: Use case Diagram and Activity Diagram 2.5.2 Interaction Diagram: Sequence and communication Diagram 2.5.3 Structure Diagram: Class, Package, and Component diagram
Specific Objectives	Content
- Perform domain modeling and concept modeling, including identifying relationships. - Identify classes, attributes, and methods. - Model behavior using state diagrams and activity diagrams.	Unit 3: Object oriented analysis [6 Hrs.] 3.1 Domain modeling and concept modeling relationships 3.2 Identifying classes, attributes, methods 3.3 Behavior modeling using state diagrams and activity diagrams
Specific Objectives	Content
- Elaborate use cases and create use case diagrams. - Understand system interaction diagrams: Sequence and communication diagrams. - Develop logical architecture and UML package diagrams. - Create class diagrams, including generalization, dependency, constraints, composition over aggregation, singleton class, and template class.	Unit 4: Object-Oriented Modeling Using UML Notation [10 Hrs.] 4.1 Elaborating use cases and Use case diagram 4.1.1 Use cases for reuse 4.1.2 Use cases and components 4.1.3 Separation variant behavior 4.1.4 Generalization 4.1.5 Actor as classes 4.1.2 System interaction diagram: Sequence and communication diagram 4.2 Logical architecture and UML package diagram 4.2.1 Model-View separation principal

	4.3 Class diagram 4.3.1 Generalization 4.3.2 Dependency 4.3.3 Constraints 4.3.4 Composition over Aggregation 4.3.5 Singleton class 4.3.6 Template class
	Content
- Understand General Responsibility Assignment Software Patterns (GRASP) principles. - Design for visibility. - Understand and apply SOLID principles	Unit 5: Object Oriented Design principles [6 Hrs.] 5.1 General Responsibility Assignment Software Patterns (GRASP) 5.1.1 Creator 5.1.2 Information Expert 5.1.3 Controller 5.1.4 Low Coupling 5.1.5 High Cohesion 5.2 Designing for visibility 5.3 SOLID principal 5.3.1 Single Responsibility Principle 5.3.2 Open Closed Principal 5.3.3 Liskov Substitution Principle (LSP) 5.3.4 Interface Segregation Principle (ISP) 5.3.5 Dependency Inversion Principle (DIP)
Specific Objectives	Content
Understand and apply Design patterns	Unit 6: Applying GOF Design Patterns [8 Hrs.] 6.1 Adaptor 6.2 Factory 6.3 Singleton 6.4 Strategy 6.5 Composite 6.6 Façade 6.7 Observer/Publish-Subscribe/Delegation Event Model
Specific Objectives	Content
- Apply Object-Oriented Analysis and Design (OOAD) principles to a real-world case study. - To implement the object oriented analysis and design in real world cases	Unit 7: Case Study and Project [4 Hrs.] 7.1 Apply OOAD principles to a real-world case study 7.2 Develop a UML model for the chosen case study 7.3 Class presentations and discussions
Specific Objectives	Content

5. Laboratory Work

It builds the foundation for analysis of information system and software engineering.

1. Implementing class, objects, attributes, and methods in a simple Java program.
2. Exploring different types of relationships (association, aggregation, composition) between objects through coding examples.
3. Conducting requirement elicitation and analysis for a small software project, using techniques such as interviews and surveys.
4. Creating use case diagrams and specifying requirements for a given scenario using UML notation.
5. Modeling domain concepts and relationships using UML class diagrams.
6. Developing behavior models using state diagrams and activity diagrams for a simple system.
7. Elaborating use cases and system interactions through sequence and communication diagrams.
8. Designing logical architecture and package diagrams for a software system.
9. Implementing SOLID principles in a programming project and analyzing their impact on code quality.
10. Implementing and applying various design patterns (e.g., Factory, Singleton, Observer) in a software project, assessing their effectiveness in addressing design challenges.

Note:

1. *Motivate students to create small project work integrating all of the above concepts.*
2. *Each of the above lab session should cover more than 4 hours of practical work.*

6. Evaluation system and Student's Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows :

External Evaluation	Marks	Internal Evaluation	Marks	
Semester End Examination	40	Theory		40
		Practical		20
		Attendance & Class Participation	5	
		Lab Report/Project Report	5	
		Practical Exam/Project Work	5	
		Viva	5	
Total External	40	Total Internal		60
Full Marks: 40 + 40+ 20 = 100				

Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. ***Students are required to complete all the requirements defined for the completion of the course.***

7. Prescribed Books and References

Prescribed Text Books :

1. Larman, C., Applying UML and Patterns, Pearson Education Asia, 2008.

Reference Books:

2. Stevens, P, Pooley, R., Using UML: Software Engineering with Objects and Components, Addison-Wesley, 2009.
3. Fowler, M., Scott, K., UML Distilled: Applying the Standard Object Modeling Language, Addison-Wesley, 2007.
4. Booch, G., Jacobson, I., Rumbaugh, J., The Unified Software Development Process, Addison-Wesely, 2009.
5. Booch, G., Jacobson, I., Rumbaugh, J., The Unified Modeling Language User Guide, Addison-Wesely, 2008.
6. Jacobson I., Object-Oriented Software Engineering – A Use Case Driven Approach, Addison-Wesely, 2009.

Pokhara University
Faculty of Management Studies

Course Code: CMP 271

Course title: **Database Management Systems**

Nature of the course: Theory + Practical

Year: Second

Level: Bachelor

Semester: III

Full marks: 100

Pass marks: 45

Credit Hrs: 3

Total periods: 48 hours

Program: BCSIT

1. Course Description:

This course covers the core principles and techniques required in the design and implementation of database systems. It consists of relational database systems RDBMS - the predominant system for business, scientific and engineering applications at present, Entity-Relational model, Normalization, Relational model, and data access queries as well as an introduction to SQL. It also covers essential DBMS concepts such as Query Processing, File organization and indexing, security, Transaction Processing, Concurrency Control, Backup and Recovery.

2. General Objectives:

1. Explain the concepts of database and database management system.
2. Provide knowledge of database design using entity relationship diagram.
3. Perform on SQL statements, normalization, transaction processing, and database recovery.

3. Methods of Instructions:

Lecture, Tutorial, Discussion, Readings and Practical works

4. Course Contents

Specific Objective	Contents
- To offer students a comprehensive understanding of the database management system, including its historical context, definition, features and advantages and limitations. - These objectives collectively contribute to building a solid foundation in database management system.	Unit 1. Introduction [5 Hrs.] 1.1. History, database system and its applications 1.2. Characteristics of DBMS 1.3. Application architecture (one tier, two tier, n-tier) 1.4. Data abstraction and Independence 1.5. Schemas and Instances 1.6. Database Manager and users
- To provide student with a strong foundation in data models. - To student will gain proficiency in E-R model and constructing E-R diagram.	Unit 2. Data Models [8 Hrs.] 2.1. Conceptual, Logical and Physical Model 2.2. Introduction to Entity Relationship Model 2.3. Entities type 2.4. Entities set 2.5. Attributes and keys 2.6. Relationship types and sets

	2.7. E-R diagrams
- To equip learners with the skills necessary to effectively database design. - To learners will be able to normalize database in different normal forms.	Unit 3. Normalization [7 Hrs.] 3.1. Importance of Normalization 3.2. Functional Dependencies-- definition, trivial and non-trivial FD, closure of FD set, closure of attributes 3.3. Integrity and Domain constraints 3.4. Normal forms (1NF, 2NF, 3NF, BCNF)
- To learns with a deep understanding of SQL and their type. - To learners will be able to create, manipulate and other different operations in database.	Unit 4. Relational Language [10 Hrs.] 4.1. Introduction to SQL 4.2. concepts of DDL, DML, DCL 4.3. SQL –Data type, operators 4.4. structure – creation, alteration, drop, defining constraints – Primary key, foreign key, unique, not null, check, default etc. 4.4. Manipulation commands (INSERT, UPDATE, DELETE, SELECT queries) 4.5. Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, Use of group by, having, order by, LIKE Pattern, Exist, Any, All, BETWEEN, join and its types, view and its types.
- To provide learners with the skills to query processing. - To learners will be able to query cost estimation and query optimization	Unit 5. Query Processing [3 Hrs.] 5.1. Introduction to Query Processing 5.2. Query Cost estimation 5.3. Query Operations 5.4. Evaluation of Expressions 5.5. Query Optimization
- To provide learners with a solid understanding of file organization and indexing - Define the concept of file organization type, B+ tree index and hash index	Unit 6. File organization and indexing (3 Hrs) 6.1 Disks and storage 6.2 Organization of records into blocks 6.3 File organizations - The sequential and the indexed sequential file organizations 6.4 B+ Tree index 6.5 Hash index
- To equip learners with the skills to need of security, integrity violations, and efficient use of access control. - To provide knowledge about authorization and cryptography.	Unit 7. Security (3 Hrs) 7.1 Needs of security 7.2 Security and integrity violations 7.3 Access control 7.4 Authorization 7.5 Security and Views 7.6 Encryption and decryption
Define transaction and their properties	Unit 8. Transaction and Concurrency Control [4 Hrs.]

Acknowledge the concept of serializability, concurrency control	8.1. Introduction to Transaction 8.2. Concept of Serializability 8.3. Concurrent execution 8.4. Lock based Concurrency Control 8.5. 2PL and Strict 2PL 8.6. Timestamp concept
- To provide learners with a deeper understanding of backup and recovery - Different technique to backup database	Unit 9. Backup and Recovery [3 Hrs.] 9.1. Failure Classifications 9.2. Recovery and Atomicity 9.4. Log based Recovery 9.5. Shadow Paging 9.6. Local Recovery Manager 9.7. Backup system
Define the concept of Object oriented database.	Unit 10. Object oriented Database [2 Hrs.] 10.1. Introduction of OODMS 10.2. Use, benefit, role of OODMS 10.3. Object oriented data model

5. Evaluation System and Students' Responsibilities

Evaluation System

The internal evaluation of a student may consist of assignments, attendance, term-exams, lab reports and projects etc. The tabular presentation of the internal evaluation is as follows:

Internal Evaluation	Weight	Marks	External Evaluation	Marks
Theory		30	Semester End	50
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		20		
Attendance & Class Participation	10%			
Lab Report/Project Report	20%			
Practical Exam/Project Work	40%			
Viva	30%			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Students' Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

6. List of Practicals	
SN	Practicals
1.	Construct E-R Diagram for different database system.
2.	Demonstrate 1NF,2NF, 3NF.
3.	Write SQL query for DDL commands.
4.	Write SQL query for DML commands.
5.	Write SQL query for operators(arithmetic, logical, assignment).
6.	Write SQL query using aggregate function.
7.	Apply SQL for specifying constraints.
8.	Write SQL for join(inner joins, outer joins).
9.	Write SQL for set operations.
10.	Apply SQL for Group by, having, like pattern etc.
11.	Students will take a database project and design complete database structure and present in class.

7. Prescribed Books and Reference Book

Text Books:

1. H. F. Korth and A. Silberschatz, Database System Concepts, McGraw Hill
2. K. Majumdar and P. Bhattacharaya, Database Management Systems, Tata McGraw Hill, India.

References:

1. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Addison Wesley
2. Raghu Ramakrishnan, and Johannes Gehrke, Database Management Systems, McGraw-Hill
3. Jaffrey D. Ullman, Jennifer Widom; A First Course in Database Systems, Pearson Education Limited

Pokhara University
Faculty of Management Studies

Course Code: CMP 273
 Course title: **Internet Technology II**
 Nature of the course: Theory + Practical
 Year: Second
 Level: Bachelor
 Semester: III

Full marks: 100
 Pass marks: 45
 Credit Hrs: 3
 Total periods: 48 hours
 Program: BCSIT

1. Course Description

This course introduces students to web technologies, focusing on server-side scripting using PHP (Hypertext Preprocessor) for dynamic web content generation. It builds upon the foundational knowledge of web development acquired in Internet Technology I. Covering a wide range of topics, including PHP syntax, control structures, loops, arrays, functions, form handling, file management, database integration, and advanced PHP concepts like object-oriented programming and MVC architecture, students gain practical experience in developing robust and scalable web applications. Through hands-on exercises, projects, and practical assignments, students learn to set up development environments, connect to databases, handle user input, manage sessions, and implement authentication and authorization mechanisms. By the end of the course, students are proficient in PHP programming, capable of designing and developing sophisticated web applications.

2. General Objectives

- To understand the fundamentals of server-side scripting and the role of PHP in web development.
- To develop a strong understanding of core concepts of PHP to build dynamic web applications effectively.
- To gain practical experience integrating PHP with HTML, CSS, and JavaScript to create interactive user interfaces.
- To learn essential techniques for handling user input, processing form submissions, and implementing data validation.
- To gain hands-on experience in using PHP to interact with databases, manipulate files, and handle HTTP requests.
- To learn to implement authentication and authorization mechanisms to secure Web applications.
- To explore advanced PHP concepts such as object-oriented programming, database integration, and error handling.
- To familiarize oneself with popular PHP frameworks and libraries to accelerate development and improve code maintainability.

3. Method of Instructions

General Instructional Technique: Lecture, Discussion, Reading, Question Answer.

Specific Instructional Technique: Practical works, Project Based Learning, Self-Directed Learning, Industry Insights and Case Study.

4. Content in Detail with Specific Objectives

Specific Objectives	Contents [4 Hrs.]
- Gain a foundational understanding of server-side scripting and its relevance to web development. - Learn about the significance of PHP programming language in building dynamic web applications. - Develop the ability to set up a PHP development environment. - Familiarize with the basic syntax of PHP, including statements, variables, and comments. - Understand the functionality and usage of operators for performing different operations in PHP.	Unit 1: Introduction 1.1 Understanding server-side scripting and PHP Programming 1.2 Installing and setting up PHP development environment (XAMPP, WAMP, or alternatives) 1.3 Basic syntax and data types 1.4 Variables and Constants 1.5 Operators 1.5.1 Arithmetic Operators 1.5.2 Assignment Operators 1.5.3 Logical Operators
Specific Objectives	Contents [5 Hrs.]
- Understand the concept of conditional statements and their role in controlling the flow of program execution. - Explore different conditional logic statements. - Learn about the ternary operator as a concise alternative for simple conditional expressions. - Develop the ability to use loops for repetitive tasks. - Control the loop execution flow with continue and break statements.	Unit 2: Control Structures and Loop 2.1 Conditional Statements 2.1.1 If, Else, Elseif 2.1.2 Ternary Operator 2.1.3 Switch Statement 2.2 Using Loop for Repetitive Tasks 2.2.1 While, Do...While, For 2.2.2 Continue and Break
Specific Objectives	Contents [7 Hrs.]
- Understand the concept of arrays and their significance in storing and organizing data. - Learn how to iterate through arrays using various iteration techniques. - Understand the concept of functions and their role in promoting code reusability by encapsulating reusable logic. - Dealing with strings, numbers, date & time, and arrays with built in function. - Learn about passing arguments to functions and returning values from functions. - Understand variable scoping and how they affect the visibility and accessibility of variables within functions.	Unit 3: Array and Function 3.1 Working with Array 3.1.1 Indexed Array 3.1.2 Associative Array 3.1.3 Array Iteration 3.1.4 Multi-dimensional Array 3.2 PHP's Built in Function 3.2.1 String Function 3.2.2 Math Function 3.2.3 Date and Time Function 3.2.4 Array Function 3.3 User Defined Function 3.3.1 Passing arguments and Return 3.3.2 Variable Scoping
Specific Objectives	Contents [6 Hrs.]
Gain proficiency in processing HTML forms to collect user input from web pages.	Unit 4: Form Handling and Data Validation

• Understand the HTTP request methods and their usage in form submissions. • Validating and sanitizing user input to prevent security vulnerabilities and ensure data integrity. • Validating file types, sizes, and other attributes to ensure the integrity of uploaded files and prevent potential security risks. • Understand the process of sending emails programmatically.	4.1 Processing HTML forms with PHP 4.2 Working with HTTP Request (GET, POST, SERVER) 4.3 Preserving User Input 4.4 Validating and Sanitizing User's Input 4.5 Dealing with checkbox, radio button and list. 4.6 File Upload 4.7 Send Email
• Specific Objectives	Contents [6 Hrs.]
• Learn about the importance of file handling in web development, including reading file content and storing user-generated content, logging application data etc. • Understand the various file reading and writing modes and their respective use cases. • Know the differences between file inclusion methods (include and require) and their respective use cases. • Gain practical knowledge in managing sessions and cookies for maintaining user state and tracking user interactions. • Acquire skills in implementing session-based authentication and authorization mechanisms to control access to web applications and resources. • Learn to efficiently manage and gracefully handle unexpected errors or exceptional conditions in the application	Unit 5: File Handling, Sessions, and Error Handling 5.1 Reading from and writing to files 5.2 Understanding file permissions and security considerations 5.3 File Inclusion (Include and Require) 5.4 Managing sessions and cookies 5.5 Implementing session-based authentication and authorization 5.6 Error handling in PHP: try-catch blocks, exception handling
• Specific Objectives	Contents [8 Hrs.]
• Understand the importance of using databases in PHP applications for efficient data storage, retrieval, and management. • Connecting PHP applications to a MySQL database using MySQLi extensions. • Acquire skills in executing SQL queries dynamically in PHP to interact with MySQL databases. • Explore transaction management concepts to ensure data consistency and integrity in multi-step database operations.	Unit 6: Working with Database 6.1 Introduction to MySQL database management system 6.2 Connecting PHP with MySQL database 6.3 Performing CRUD operations (Create, Read, Update, Delete) 6.4 Executing SQL queries using PHP 6.5 User Registration and Login 6.6 Error handling and transaction management
• Specific Objectives	Contents [6 Hrs.]
• Understand the importance and benefits of	Unit 7: Advanced PHP Concepts

using object-oriented programming (OOP) in PHP. • Creating and using classes and objects to organize and encapsulate code. • Understand the purpose and usage of static properties and methods, including declaring and accessing static members without the need for class instantiation. • Learn about properties and methods in PHP classes and how they contribute to code organization and reusability. • Explore advanced concepts such as inheritance, encapsulation, and polymorphism. • Learn about PHP magic methods and their role in implementing specific functionality, enhancing code flexibility and extensibility.	7.1 Object-oriented programming (OOP) in PHP 7.2 Creating and using classes and objects 7.3 Properties and Methods 7.4 Inheritance, encapsulation, and polymorphism 7.5 Static Properties and Methods 7.6 Magic Methods 7.7 Practical applications of OOP in PHP development
• Specific Objectives	Contents [6 Hrs.]
• Understand the concepts of models, views, and controllers, and understand how they interact within the MVC architecture to handle user requests and manage application data. • Learn about the benefits of using a framework for web development, such as code reusability, modularity, and rapid development. • Explore one of the PHP frameworks available, such as Laravel, Symfony, CodeIgniter. • Learn about common features provided by PHP frameworks, such as routing, templating, authentication, authorization, and ORM (Object-Relational Mapping).	Unit 8: PHP Framework 8.1 MVC Model 8.2 Benefits of using the PHP Framework 8.3 Getting Started with PHP Framework

5. Laboratory Work

It builds the foundation for how to write a program using any high-level language. Hence, this course requires a lot of programming practice so that students will be able to develop good logic building and program developing capability which is essential throughout the course.

Some important contents that should be included in lab exercises are as follows:

1. Create a basic PHP web page that displays dynamic content and interacts with the user.
2. Create an HTML form with various input elements and server-side validation.
3. Create a form to upload images using PHP.
4. Implement session-based authentication and authorization.
5. Implement CRUD operation in MySQL Database using PHP.
6. General concept of Laravel, Symfony, or CodeIgniter for rapid web development.

Note:

1. Motivate students to create small project work integrating all the above concepts.
2. Each of the above lab sessions should cover more than 4 hours of practical work.

6. Evaluation system and Student's Responsibilities

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Weight	Marks
Semester-End Examination	50	Theory		
		Attendance & Class Participation	10%	30
		Assignments	20%	
		Presentations/Quizzes	10%	
		Internal Assessment	60%	
		Practical		
		Attendance & Class Participation	10%	20
		Lab Report/Project Report	20%	
		Practical Exam/Project Work	40%	
		Viva	30%	50
Total External	50	Total Internal		
Full Marks: 50 + 50 = 100				

7. Students' Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc., and complete all the assignments within the specified time period. ***Students are required to complete all the requirements defined for the completion of the course.***

8. Prescribed Books and References**Prescribed Text books:**

1. Larry Ullman (2018). *PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide (5th Edition)* Peachpit Press

Reference Books:

1. Butler, T., & Yank, K. (2017). *PHP & MySQL: Novice to Ninja (6th Edition)*. SitePoint Pty. Ltd.
2. Josh Lockhart (2015). *Modern PHP: New Features and Good Practices (1st Edition)*. O'Reilly Media
3. Robin Nixon (2015). *Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (5th Edition)*. O'Reilly Media

Pokhara University
Faculty of Management Studies

Course Code: MGT 222
 Course title: **Principles of Management**
 Nature of the course: Theory + Practical
 Year: Second
 Level: Bachelor
 Semester: III

Full marks: 100
 Pass marks: 45
 Credit Hrs: 3
 Total periods: 48 hours
 Program: BCSIT

1. Course Description

This course provides an insight into the principles and practices of management. It explores the fundamental concepts, theories, and techniques essential for effective management across various sectors & industries. Students will gain insight into the evolution of management thoughts, basic functions of management, and emerging concepts in management. This course also includes IT-integrated management concepts to address the evolving requirements of contemporary business and other organizations.

2. General Objectives

The main aim of this course is to equip students with the concepts and techniques required to manage complex businesses and other modern organizations. On completion of the course, students will be able to:

- Describe the basic concepts, functions, and techniques of management.
- Explain the evolution of management thoughts.
- Evaluate and apply management theories in organizational decision making and problem-solving.
- Explain the contemporary views, issues, and challenges in management to cater to the changing needs of modern businesses and other organizations.
- Explain requirement of IT Management in the current world.

3. Methods of Instruction

Teachers can use diverse methods of instruction to deliver this course. They are as follows:

- Lecture
- Group discussion
- Case study analysis
- Quiz
- Roleplay
- Problem-solving exercises
- Videotapes
- Self-assessment exercises
- Flipped classroom
- Home assignment and feedback
- Article review and presentation
- Field visit
- Project work
- Collaborative learning
- Guest lecture

4. Course Contents

Specific Objectives	Contents
• Explain the key aspects and characteristics of management. • Describe the basic management functions and discuss the managerial roles. • Discuss the basic management skills	Unit I: Introduction to Management (5 hrs.) 1.9 Concept and characteristics of management 1.10 Basic management functions

Specific Objectives	Contents
needed for today's managers. Review contemporary challenges for managers.	1.11 Managerial roles 1.12 Fundamental management skills 1.13 Contemporary issues of Management
- Introduce the historical context of management. - Trace out the early management theories and critically appraise them. - Discuss the contemporary management theories.	Unit II: The Evolution of Management Thoughts (6 hrs.) 2.7 The historical context of management 2.8 The classical management theory 2.9 The behavioral management theories 2.10 The quantitative management theory 2.11 Contemporary management theories: Systems theory, contingency theory, and dynamic capabilities theory
- Define decision making and its types. - Explain the decision making process - Discuss the various approaches in decision making. - Outline the decision-making biases and errors. - Review the cutting-edge approaches for improving decision making.	Unit III: Decision Making (7 hrs.) 3.3 Concept of decision making 3.4 Types of decision making 3.5 The decision making process 3.6 Approaches in decision making: Rationality, bounded rationality, intuition, evidence-based management, and crowdsourcing 3.7 Decision making biases and errors 3.8 Cutting-edge approaches for improving decision making
- Define planning and delineate its importance - Describe the planning process. - Discuss the contingency factors and contemporary issues in planning. - Define organizing and identify the basic elements of the organizing function. - Describe traditional organizational designs. - Discuss organizing for flexibility in the twenty-first century.	Unit IV: Planning and Organizing (7 hrs.) 4.6 Definition, importance, and types of planning. 4.7 The planning process 4.8 Contingency factors in planning 4.9 Contemporary issues in planning 4.10 Concept of organizing and its basic elements 4.11 Traditional organizational designs 4.12 Organizing flexibility in the twenty-first century

Specific Objectives	Contents
• Describe the meaning of leadership and differentiate between management and leadership. • Delineate the various sources of power in leadership. • Explain the trait, behavioral, and contingency theories in leadership. • Discuss the contemporary views of leadership. • Describe the concept, components, and importance of emotional intelligence in leadership.	Unit V: Leadership (7 hrs.) 5.1 The meaning of leadership 5.2 Management versus leadership 5.3 Leadership and power 5.4 Early leadership theories: trait theories and behavioral theories 5.5 Contingency theories of leadership: Hersey and Blanchard's situational leadership theory, path-goal theory 5.6 Contemporary views of leadership 5.7 Emotional intelligence in leadership
• Define motivation. • Explain the early theories of motivation. • Describe the contemporary theories in motivation. • Discuss the current issues in motivation.	Unit VI: Motivation (6 hrs.) 6.1 Concept of Motivation 6.2 Early theories of motivation: Maslow's need hierarchy theory, McGregor's theory X and theory Y, Herzberg's two-factor theory 6.3 Contemporary theories in motivation: Goal setting theory, reinforcement theory, equity theory, and expectancy theory 6.4 Contemporary issues of motivation
• Explain the concept and basic element of control. • Explain the purpose of control, types of control, and the steps in the control process. • Identify the forms of operations control. • Describe the budgets and other tools for financial control. • Discuss structural and strategic controls. • Identify features of effective control including why people resist control and how managers can overcome this resistance. • Discuss contemporary issues in control.	Unit VII: Controlling (6hrs.) 7.1 Concept and basic elements of control 7.2 The nature of control: Purpose, types, and steps 7.3 Operations control 7.4 Financial control 7.5 Structural control 7.6 Strategic control 7.7 Managing control in organizations 7.8 Contemporary issues in controlling
• Explain the strategic importance of information. • Describe the characteristics and costs of useful information. • Explain the basics of capturing, processing, and protecting information. • Describe how companies can access and	Unit VIII: IT for Management (4hrs.) 8.1 The strategic importance of information for management. 8.2 Characteristics and costs of useful information 8.3 Capturing, processing, and protecting

Specific Objectives	Contents
share information and knowledge.	information 8.4 Issues managing information system

4. Evaluation Scheme

The evaluation scheme consists of both internal and external. The external evaluation shall be done through the semester-end examination held by the university, and it carries 50% weightage of the total. The internal evaluation shall be done by the teacher who delivers the course. The internal evaluation carries the remaining 50% of the total. The internal evaluation of students includes individual as well as group work and on-the-classroom as well as off-the-classroom activities. The tabular presentation of the internal evaluation is as follows:

S. N.	Internal evaluation components	Marks (weightage)
1	Attendance and class participation	5 (10%)
2	Home assignments including case studies	5 (10%)
3	Quizzes	5 (10%)
4	Presentations	10 (20%)
5	Group Project work/term paper (field-visit or review based)	10 (20%)
6	Internal assessment/exam	15 (30%)

5. Student Responsibilities

Each student must secure at least 45% marks separately in internal evaluation with minimum of 80% attendance in the class to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the Semester-End Examinations. Students are advised to attend all the classes, formal exams, tests, etc., and complete all the assignments within the specified period. Students are required to complete all the requirements defined for the completion of the course.

6. Prescribed Books

Text Books

Griffin, R. W. (2022). *Fundamentals of management* (10th ed.). Boston, USA: Cengage Learning.

Robbins, S. P., & Coulter, M. (2021). *Management* (15th ed.). Harlow, UK: Pearson.

Willams, C., Champion, T., & Hall, I. (2018). *MGMT: Principles of management* (3rd ed.). Toronto, Canada: Nelson Education Ltd.

Reference Books

Jones, G. R., & George, J. M. (2022). *Contemporary management* (12th ed.). New York, USA: McGraw Hill.

Singh, C., & Khatri, A. (2024). *Principles and practices of management and organizational behavior*. London, UK: Routledge.

Pokhara University
Faculty of Management Studies

Course Code: STT 220
 Course title: **Linear Algebra and Probability**
 Nature of the course: Theory + Practical
 Year: Second
 Level: Bachelor
 Semester: III

Full marks: 100
 Pass marks: 45
 Credit Hrs: 3
 Total periods: 48 hours
 Program: BCSIT

1. Course Description:

This course covers the descriptive statistics, inferential statistics and probability distribution that guide IT students in research and project work. This course provides students a deeper understanding about the statistical data its types, collection, interpretation and analysis of data. The Students will able to learn and use the concepts of theory of probability, probability distribution and their application in IT.

2. General Objectives:

The general objectives of this course are

- a) To understand and know different statistical tools, basic concept of Probability and probability distribution.
- b) To equip students with sampling distribution and infer via various tools such as estimation and hypothesis.
- c) To prepare a project work report for the presentation in the classroom

3. Methods of Instructions:

Lecture, Tutorial, Discussion, Readings, Case study, Assignment and project work

4. Course Contents

Specific Objective	Contents
- Explain the meaning and definition of statistics - Describe the importance and application of statistics in management and IT. - To identify the limitation of statistics in daily life	Unit 1: Introduction (2 hours) 1.1 Meaning and Definition of Statistics 1.2 Application of Statistics in IT 1.3 Variable and its types 1.4 Limitation
To measure the central values (mean, median and mode only), measure of location, absolute and relative measure of dispersion	Unit 2: Summarization and Analysis of Data (8 hours) 2.1 Construction of GFD, Relative frequency, cumulative frequency distribution 2.1 Measure of Central Tendency 2.2 Measure of Location 2.2 Measure of dispersion
Describe different terminology and approaches of probability with	Unit 3: Basic Probability (6 hrs) 3.1 Terminology and definition of

- properties of probability - Calculate probability using addition and multiplication law (dependent and independent case) - Application of conditional probability using Bayes theorem	probability 3.2 Addition and multiplication Law 3.3 Conditional probability and Baye's Theorem related to IT
- Explain the meaning and importance of correlation and regression. - Describe the difference between correlation and regression coefficient - To measure the relationship between variables by Karl Pearson's correlation coefficient - To fit a simple regression equation, interpret the coefficients, residuals - Calculate standard error of estimate and coefficient of determination and interpret them	Unit 4: Correlation and Regression Analysis (6 hours) 4.1 Meaning, definition of correlation 4.2 Karl Pearson's correlation coefficient 4.3 Meaning and definition of simple regression 4.4 Standard error of estimate 4.5 Coefficient of Determination
- Describe random variable, types of random variable with examples - Measure expected value and variance of a discrete random variable. - Calculate probability using binomial and poisson probability of a discrete random variable (approximation of binomial to poisson) - Describe normal curve, characteristics of a normal curve and its application	Unit 5: Probability Distribution (8 hours) 5.1 Random variable and its types 5.2 Expectation and variance of a Discrete random variable 5.3 Binomial Probability distribution 5.4 Poisson Probability distribution 5.5 Normal Probability distribution
- Explaining sampling distribution, sampling distribution of sample mean, population, statistics - Application of estimation theory - Drawing inference for a population by estimation theory by using IT problems - Confidence interval estimation of mean and proportion (single only) - Sample size determination for mean and proportion	Unit 6: Theory of Estimation (6 hours) 6.1 Sampling Distribution 6.2 Parameters, Statistic, point estimation and Interval Estimation 6.3 Sample size Determination
- Explaining the meaning of hypothesis and its importance in IT research work - To learn the steps of hypothesis testing and use those steps to test different hypothetical statement - Distinguish the difference of one-way	Unit 7: Hypothesis Testing (12 hours) 7.1 Meaning and Definition 7.2 Types of errors Significance level, degree of freedom, 7.3 Steps in Hypothesis Testing 7.4 Single and double mean test for population Standard Deviation known

ANOVA and t Test to test the mean test	7.5 Single and double proportion test 7.6 Single and double mean test for population Standard Deviation unknown 7.7 pair t test 7.8 One Way ANOVA
--	--

5. Evaluation System and Students' Responsibilities

Evaluation System

The internal evaluation of a student may consist of assignments, attendance, term-exams, lab reports and projects etc. The tabular presentation of the internal evaluation is as follows:

Internal Evaluation	Weight	Marks	External Evaluation	Marks
Theory		30	Semester End	50
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		20		
Attendance & Class Participation	10%			
Project Work	20%			
Practical Exam/Project Work	40%			
Viva	30%			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Students' Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

6. List of Tutorials

SN	Lists of Tutorials
1.	Solving the problems related to measure of central values, location and dispersion
2.	Solving the problems related to correlation and simple regression
3.	Solving the problems related to probability and probability distribution
4.	Solving the problems related to estimation and hypothesis
5.	Solving the problems related to matrix and determinant

7. Laboratory Work

SN	List of Lab Work	Hour
1.	Calculate descriptive tools such as mean, median, mode, quartiles, deciles,	4 hours

	percentiles, SD and CV using EXCEL	
2.	Measure different probability using EXCEL	3 hours
3.	Calculate simple correlation and fit simple regression model using EXCEL	3 hours
4.	Calculate confidence interval, test different hypothesis using EXCEL	5 hours

8. Prescribed Books and Reference Book

Text Books:

1. Agarwal, B.L., “Basic Statistics”. New Delhi, New Age, 2000
2. Douglas A. Lind, William G. Marchal and Samuel A. Wathen, “Statistical Techniques in Business and Economics”, McGraw-Hill, 15th Ed.

References Books

1. Shrestha H. B. (2006) Statistics and Probability: Concepts and Techniques, Second Edition, EKTA Books

Course Details: BCSIT Program, Semester IV**Second Year, Fourth Semester**

Course Code	Subjects	Credits
CMP 274	Numerical Methods	3
CMP 275	Computer Architecture and Microprocessor	3
CMP 276	Software Engineering and Project Management	3
CMP 277	Data Communication and Networks	3
FIN 222	Fundamental of Financial Management	3
CMP 281	Project II	2

Pokhara University
Faculty of Management Studies

Course Code: CMP 275

Course title: **Computer Architecture and Microprocessor**

Nature of the course: Theory + Practical

Year: Second

Level: Bachelor

Semester: IV

Full marks: 100

Pass marks: 45

Credit Hrs: 3

Total periods: 48 hours

Program: BCSIT

1. Course Description:

This course aims at providing fundamental knowledge about computer architecture, instruction cycle, components of microprocessor, Intel 8085 and assembly programming.

2. Course Objectives:

The main objective of this course is to provide basic knowledge of components of microprocessor, block diagram and assembly language programming using Intel 8085, SAP1 and SAP2 computer architecture, timing diagrams, instruction cycles, machine cycles, control unit, central processing unit, RISC, CISC, Direct Memory Access, interrupts, serial and parallel interfaces to students of Bachelor Degree.

3. Course Contents:

Specific Objective	Contents
- To provide the basic history of computer - To provide the basic knowledge of stored program. - To provide the basic information about processor Components. - To provide the basic knowledge of internal communication of computer System - To provide the basic knowledge of SAP -1 and SAP- 2 Architecture	Unit 1: Introduction to Microprocessor (9 Hours) 1.1 Introduction and History of Microprocessors, Basic Block Diagram of a Computer, Bus Organization with Microprocessor Based System. 1.2. Stored Program Concept and its Processing Cycle, Microprogrammed and Hardwired control unit. 1.3. Microprocessor Components: Registers, ALU, Control and Timing, System Buses (Address, Data, Control), Microprocessor System with Bus Organization 1.4. SAP-1 Architecture: Block Diagram, and Function of each Block SAP-1 Instructions: LDA, ADD, SUB, OUT, HLT Fetch and Execution Cycle of SAP-1 Instructions with Timing Diagram Fetch Cycle: Address State, Increment State,

	Memory State Execution Cycle of LDA only 1.5. SAP-2 Architecture: Block Diagram and Functions of each Block, Architectural Differences with SAP-1 Bidirectional Registers Flags
• To provide the basic knowledge of Block diagram of 8085 microprocessor • To provide the basic knowledge of PIN • To provide the basic knowledge of ALL command • To provide the basic knowledge of ALL program with arithmetic's operation.	Unit 2: Intel 8085 (8 Hours) 2.1. Functional Block Diagram, Pin Configuration, Description of each Block: Registers, Flag (Description of each Flag), Data and Address Bus including Bidirectional Address/Data Bus, Timing and Control Unit, Interrupts (Introduction Only), Instructions: Op-Code and Operands, Addressing Modes, Instructions and Data Flow 2.2. 8085 Instructions: Data Transfer Instructions, Arithmetic and Logic Instructions, Branching and Machine Instructions 2.3. Basic Assembly Language Programming using 8085 Instruction Sets Addition, Subtraction, Multiplication and Division, Simple Sequence Programs, Array Searching and Sorting using Branching and Looping
	Unit 3: Computer Architecture Basics (3 Hours) 3.1. History of Computer Architecture Overview of 3.2. Computer Organization Architecture of Basic Computer: Register organization, Common Bus System Instruction Format, Register Stack and Memory Stack
• To provide the basic knowledge of Arithmetic's and logical operations.	Unit 4: Micro Operations (3 Hours) 4.1. Arithmetic Micro Operations: Addition, Subtraction, Increment, Decrement, Hardware Implementation 4.2. Logic Micro Operations: AND, OR, NOT, NAND, NOR, XOR, Selective Set, Set(preset), selective Complement(toggling) Insert, Hardware Implementation 4.3. Shift Micro Operations: Logical, Circular and Arithmetic, Arithmetic Logic Shift Unit

	Control Unit and Central Processing Unit
- To provide the basic knowledge of Control Unit structure. - To provide the basic knowledge of Control unit function. - To provide the basic knowledge of computer architecture - To provide the basic knowledge of Types of microprocessors.	Unit 5: Control Unit and Central Processing Unit (9 Hours) 5.1. Control Unit of Basic Computer and Timing Signal (Hardwired Vs. Microprogrammed) 5.2. Micro-operation, Micro-instruction, Micro-program: Symbolic and Binary Micro-program (FETCH and ADD) 5.3. Data Transfer operations and Manipulation (Arithmetic, Logical, Shift) 5.4. Introduction to RISC and CISC (Basic Differences)
	Fixed point Computer Arithmetic
- To provide the basic knowledge of Data representation. - To provide the basic knowledge of complement's method. - To provide the basic knowledge of Hardware algorithm.	Unit 6: Fixed Point Computer Arithmetic (5 Hours) 6.1. Signed number Representation: Signed Magnitude, 1's Complement and 2's Complement Form 6.2. Addition and Subtraction (with Numerical Example), Addition and Subtraction with Signed Magnitude Data, Hardware implementation, Hardware Algorithm, Addition and Subtraction with Signed 2's Complement Data 6.3. Multiplication Algorithm: Hardware Implementation for Signed Magnitude Data, Booth Multiplication Algorithm (with Numerical Example) 6.4. Division Algorithm: Hardware Implementation for Signed Magnitude Data, Hardware Algorithm (Restoring Only)
	Input and Output Organization
- To provide the basic knowledge of I/O interface. - To provide the basic knowledge of I/O mapped. - To provide the basic knowledge of DMA - To provide the basic knowledge	Unit 7: Input and Output Organization (5 Hours) 7.1. Introduction to Peripheral Devices, I/O interface-I/O bus and Interface Modules, isolated versus Memory Mapped I/O 7.2. Direct Memory Access (DMA): Introduction, Basic DMA Procedures (DMA

of protocol.	controller only) 7.3. I/O Processor, Data Communication Processor: Character Oriented Protocol and Bit Oriented Protocol
	Memory Organization
- To provide the basic knowledge of Memory System. - To provide the basic knowledge of I/O function of Memory devices. - To provide the basic knowledge of Memory core architecture.	Unit 8: Memory Organization (5 Hours) 8.1. Hierarchy of Memory System 8.2. Primary Memory: RAM and ROM, Memory Address Map with examples of Address Decoding. Secondary Memory: Structure of Magnetic Disk 8.3. Virtual Memory: Concept, Address Mapping with Pages, Basic Idea about Page Fault and page Replacement 8.4. Memory Management Hardware: Segmented Page Mapping (Introduction) , Memory Protection
	Pipelining
- To provide the basic knowledge of pipelining. - To provide the basic knowledge of pipelining instruction.	Unit 9: Pipelining (4 Hours) 9.1. Concept of Pipelining and Flynn's Classification, Pipelining Example with Speed Up Ratio 9.2. Arithmetic Pipeline, Pipeline for Floating-point Addition and Subtraction 9.3. Instruction Pipeline: Four Segment Instruction Pipeline 9.4. Data Dependency, Handling of Branch Instruction

Laboratory Works:

The laboratory works should be carried out in 8085 trainer kit. The programming should include arithmetic operation, base conversion, conditional branching etc.

Kit

1. Data swap and data transfer programs
2. 8-bit addition and subtraction

3. 16-bit addition and subtraction
4. 8-bit division and multiplication

Kit/Simulator

5. Series generation: odd-even, multiples of integers
6. BCD to ASCII
7. Searching largest/smallest value in an array
8. Ascending/ Descending sorting of array
9. Program involving bitwise AND, bitwise OR, bitwise X-OR, RLC, RRC

Text Books:

1. Ramesh S. Gaonkar: Microprocessor Architecture, Programming, and Applications with 8085, prentice Hall
2. Morris Mano: Computer system Architecture, Third Edition, prentice Hall

Reference Books:

1. Malvino: Digital Computer system Electronics (An introduction to Microcomputers)
2. Douglas V. Hall: Microprocessor and Interfacing programming and Hardware, McGraw Hill

Pokhara University
Faculty of Management Studies

Course Code: CMP 274
 Course title: **Numerical Methods**
 Nature of the course: Theory + Practical
 Year: Second
 Level: Bachelor
 Semester: IV

Full marks: 100
 Pass marks: 45
 Credit Hrs: 3
 Total periods: 48 hours
 Program: BCSIT

1. Course Description

This course provides a comprehensive exploration of numerical methods, equipping students with the necessary tools to solve mathematical problems encountered in computer system. The curriculum is structured around the foundation principles of Numerical Methods, integrating theoretical understanding with practical implementation. It also includes the use of methods like Bisection, Newton-Raphson methods to estimate the roots. It covers the concept of interpolation, Integration, Moreover, it covers solving ordinary and partial differential equations.

2. General Objectives

The general objectives of this course are:

- To provide students with fundamental numerical techniques, equipping them for effective problem-solving
- To equip students with the proficiency to analyze, implement, and execute numerical algorithms

3. Methods of Instruction

Lecture, Tutorial, Discussion, Lab works

4. Course Contents

Specific Objectives	Contents
- Understand the types of errors occurred in numerical problems - Explore different tools to compute numerical methods	Unit I: Introduction (2 hrs) 1.1 Errors in Numerical Calculations 1.2 Computer and Numerical Software(C,GNU Octave/Matlab) 1.3 Mathematical Preliminaries(Taylor Series)
- Understand the types of bracketing and non-bracketing methods to solve algebraic and transcendental equations - Calculate roots by using iterative	Unit II: Solution of non-linear equations (8 hrs) 2.1 Bisection Method 2.2 False position method 2.3 Newton-Raphson Method 2.4 Secant Method

approach	2.5 Fixed point iteration Method
- Describe interpolation - Understand the types of interpolating techniques to find interpolating polynomial - Implement Least square method	Unit III: Interpolation & Approximation (8 hrs.) 3.1 Linear interpolation 3.2 Lagrange's interpolation 3.3 Newton's divided difference method 3.4 Newton's forward difference interpolation 3.5 Newton's Backward difference interpolation 3.6 Least square method (fitting a straight line & Non-linear curve fitting)
- Implement numerical differentiation methods - Explain Newton Cote's integration - Explain Romberg and Gauss quadrature integration	Unit IV: Numerical Differentiation & Integration (7 hrs.) 4.1 Forward, backward, and central difference methods 4.2 Trapezoidal rule 4.3 Simpson's rule 4.4 Romberg integration 4.5 Gaussian Integration (two point & three point formula)
- Understand the solution of ordinary differential equation - Implement techniques to solve higher order equations (second order) - Solve BVP by shooting method	Unit V: Solution of Ordinary Differential Equations (8 hrs.) 5.1 Euler's method 5.2 Heun's method 5.3 Runge-Kutta Method (RK-4) 5.4 Solution of Higher order equations 5.5 Boundary Value Problems (Shooting Method)
- Describe existence and behavior of solutions in numerical methods - Implement elimination, factorization, iterative methods to solve linear equations	Unit VI: Solution of Linear algebraic equations (10 hrs.) 6.1 Existence of solution of linear equations 6.2 Elimination methods (Gauss-elimination, Gauss-Jordan, Partial pivoting) 6.3 Factorization methods (Do-

• calculate Inverse of a matrix by Gauss-jordan elimination • Understand power method to evaluate eigen value and eigen vector	little, Crout, Cholesky's method) 6.4 Iterative methods (Gauss-Siedel, Gauss-Jacobi method) 6.5 Inverse of a matrix 6.6 Power method for eigen value and eigen vector
• Describe second order PDE • Understand Different types of PDE (hyperbolic, parabolic, elliptical) • Implement Laplace and Poisson's equation	Unit VII: Solution Of Partial Differential Equations (5 hrs.) 7.1 Introduction to partial differential equations 7.2 Laplace equation 7.3 Poisson's equation

Note: The figures in the parentheses indicate the approximate periods for the respective units.

5. Laboratory Works

Use of Gnu Octave/Matlab/C/C++ high level programming language for applied numerical analysis.

- Solve non-linear equation using bisection method, secant method, Newton-Raphson method.
- Interpolation using Lagrange's interpolation and Newton's Interpolation
- Use of Newton's integration formula
- Numerical Differentiation using forward, backward and central difference quotient
- Program to solve Euler's method, Heun's method and classical method
- Solution of Partial Differential equation

6. Evaluation system and Students' Responsibilities

Evaluation System

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

Internal Evaluation	Weight	Marks	External Evaluation	Marks
Theory		30	Semester-End	50
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		20		
Attendance & Class Participation	10%			

Lab Report/Project Report	20%		examination	
Practical Exam/Project Work	40%			
Viva	30%			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Student's Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are required to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

7. Prescribed Books and References

Text Book

1. Balagurusamy, E. (2012). Numerical Methods. McGraw-Hill Education

References Books

- Dukktipati, R. V. (2023). Numerical Methods Fundamentals. Mercury Learning & Inform.
- Gerald, C. F., & Wheatley, P. O. (2004). Applied Numerical Analysis. Pearson/Addison-Wesley.
- Cheney, E. W., & Kincaid, D. (2020). Numerical Mathematics and Computing. Brooks/Cole.
- Sastry, S. S. (2022). Introductory methods of numerical analysis. Prentice-Hall of India.

Pokhara University
Faculty of Management Studies

Course Code: CMP 276

Course title: **Software Engineering and Project management**

Nature of the course: Theory + Practical

Year: Second

Level: Bachelor

Semester : IV

Full marks: 100

Pass marks: 45

Credit Hrs: 3

Total periods: 48 hours

Program: BCSIT

1. Course Description

This course aims to introduce the fundamental concepts of software engineering, including software project management. It is designed to provide students with a comprehensive understanding of software engineering principles and project management practices. It intends to equip students with the knowledge and skills necessary to develop high-quality software products while effectively managing the entire software development lifecycle. At the end of this course, a student will be able to understand the fundamental concepts of software engineering and project management.

2. General Objectives

Through this course, students shall be able:

- To evaluate and relate different software processes, system models and architectural designs and assess their suitability in a given context
- To describe basic concepts and principles of requirements engineering, software implementation, testing and maintenance
- To describe the software configuration process and quality assurance
- To apply the software project management practices and principles in software development
- To understand software engineering fundamentals
- To understand programming and design practices
- To use software development tools and technologies
- To understand project management and its relevance in software development
- To understand agile principles and values
- To communicate effectively within development teams

3. Method of Instructions

General instructional techniques: lecture, discussion, readings, question answer, field work/s

Specific instructional techniques: practical works, project-based learning, self-directed learning, industry insights and case study

4. Course Contents

Specific Objectives	Contents
---------------------	----------

• Understand the fundamental nature of software and its applications • Understand the basic concept of software engineering and its processes	Unit 1: Software and software engineering(4) 1.1 The Nature of Software 1.2 Software Application Domains 1.3 Legacy Software 1.4 The Unique Nature of WebApps 1.5 Software Engineering 1.6 The Software Process 1.7 Software Engineering Practice 1.8 General Principles 1.9 Software Myths
• Explain the use and importance of the software development life cycle. • Describe the types of software development process • Comparison of different software process models	Unit 2: Software process models (8) 2.1 A Generic Process Model 2.1.1 Defining a Framework Activity 2.1.2 Identifying a Task Set 2.1.3 Process Patterns 2.3 Prescriptive Process Models 2.1.1 Waterfall model and enhance waterfall model 2.2.2. Incremental Process Models 2.2.3. Rapid application development 2.2.4. Prototype and Spiral Model 2.2.5. Spiral Process Model 2.2.6. Rational Unified Process Model 2.2.7. Agile model: XP and Scrum, a toolset for the agile process 2.2.8. Big-Bang Model 2.4 Specialized Process Models 2.4.1 Component-Based Development 2.4.2 The Formal Methods Model 2.4.3 Aspect-Oriented Software Development
• Discuss software requirement engineering • Explain about requirement management and SRS documents • Understanding and creating SRS	Unit 3: software requirement specification and modeling (8) 3.1 Software requirements and its types 3.2 Requirement modeling approaches 3.3 Requirement engineering 3.4 Eliciting requirements 3.5 Collaborative requirements gathering 3.6 Requirement analysis 3.7 Negotiating requirements 3.8 Requirement documentation and validation 3.9 Requirement management 3.10 Scenario, data, Cclass and flow-oriented modeling 3.11 Requirement modeling for web apps

	3.12 SRS documents and their importance
- Understand importance of software design - Discuss about software design models - Discuss different software design strategies and design patterns - Compare and contrast between Function oriented design vs. object-oriented design	Unit 4: Design Concepts (6) 5.1. The evolution of software design, design concepts, design processes, Design models, software design architecture 5.2. Software design strategies, interface analysis, interface design Steps, WebApp interface design, design evaluation, 5.3. Design patterns -Pattern-based software design, architectural patterns, user interface design patterns, web app design patterns 5.4. Function oriented design 5.5. Object-oriented design
- Understand software measurement and metrics - Discuss object-oriented matrices - Understand the basic concept of software quality	Unit 5: Software measurement and metrics (2) 6.1. Software measurement 6.2. Software metrics, Review Matrices and their use, Formal technical Reviews 6.3. Control flow graph 6.4. Cyclomatic complexity 6.5. Object-oriented matrices 6.6. Lossless decomposition Lab Work Unit 5: 1. Imagine you are part of a development team working on a simple web application for a bookstore. The application allows users to browse books, add them to their cart, and make a purchase. The codebase is maintained in a version control system, and you have been asked to analyze it using software metrics.
- Identify the types of software testing - Explain the software quality attributes and quality assurance - Explain quality standards	Unit 6: Software testing and quality assurance (4) 6.1. Software testing approach 6.2. Types of system testing (internal and external views of testing, basis path testing, control structure testing, black-box testing, white-Box testing) System debugging 6.3. Software quality attributes and quality factors 6.4. Software quality control and quality assurance Statistical software quality assurance, software reliability 6.5. Software safety 6.6. The ISO 9001 quality standards 6.7. SEI capability maturity model

	6.8. Verification and validation
- Understand the concept of configuration management. - Discuss types of software maintenance. - Understand Software maintenance costs.	Unit 7: Configuration management and software maintenance (3) 7.1. Software configuration and change management 7.3. Version and release management 7.5. Types of software maintenance 7.4. Need for software maintenance 7.6. Software maintenance process models 7.7. Software maintenance cost
- Explain software project management and planning. - Discuss project estimation techniques. - Understand the COCOMO model.	Unit 8: Software project management (4) 8.1. Software project, project manager, qualities of project manager 8.2. Activities in project management 8.3. Software project planning and management plan 8.5. Software project scheduling and techniques 8.6. Software project team management and organization 8.7. Project estimation techniques: COCOMO model
Understand what is project scheduling and identify and use project scheduling tools	Unit 9: Project Scheduling (2) 9.1. Project scheduling 9.2. Defining a task for the software project 9.3. Project scheduling and its types 9.4. Tools for project scheduling 9.5. PERT and Scheduling CPM
Discuss risk, software configuration management	Unit 10: Risk Management (2) 10.1. Software risk 10.2. Risk Identification, Projection and Refinement 10.3. Risk Projection 10.4. Risk Refinement 10.5. Risk analysis management and process 10.6. The RMMM plan
- Discuss about the basic concept of software re-engineering, forward and reverse engineering - Discuss software reuse	Unit 11: Concept of software re-engineering (3) 11.1. Steps in re-engineering 11.2. Re-engineering process and process models 11.3. Forward engineering, Reverse engineering process 11.4. Characteristics of forward and reverse engineering 11.5. Restructuring 11.6. The economy of engineering 11.7. Software reuse 11.8. Economic of reengineering

	Unit 12: Emerging trends in software engineering (2) 12.1. Observing Software Engineering Trends 12.2. Identifying “Soft Trends” 12.3. Technology Directions 12.4. Tools related trends 12.5. Software engineer's responsibility
--	--

5. Laboratory Work

In this laboratory session on Software Engineering and Project Management, students engage in practical exercises to apply key principles of software development and project management methodologies. Students will gain hands-on experience in designing, testing, and debugging software, emphasizing the importance of efficient project planning and execution. The lab integrates tools and techniques for version control, collaboration, and issue tracking. Through simulated project scenarios, students learn to manage resources, timelines, and deliverables, fostering skills essential for successful software development projects. The listed units in this subject cultivate a comprehensive understanding of software engineering practices and project management essentials, preparing students for real-world applications in the field.

Some important contents that should be included in lab exercises are as follows:

Units	Laboratory Activity
Unit 1: Software and software engineering	- Identify the different types of software available in the market, list their features, and identify the challenges associated with the system.
Unit 2: Software process models	- Visit any two software development companies and identify the process models used.
Unit 3: software requirement specification and modeling	- Create a detailed Software Requirement Specification document for an Online Bookstore System, outlining the functional and non-functional requirements. - Create a SRS sample of any software you are developing in this semester as a part of your project work.
Unit 4: Design Concepts	- Create the design solution to the problems identified in Lab work of unit I.
Unit 5: Software measurement and metrics	- Imagine you are part of a development team working on a simple web application for a bookstore. The application allows users to browse books, add them to their cart, and make a purchase. The codebase is maintained in a version control system, and you have been asked to analyze it using software metrics. Tools Required:

	- Integrated Development Environment (IDE) - Version Control System (e.g., Git). - Code analysis tools (e.g., SonarQube, PMD, or any tool of your choice).
Unit 6: Software testing and quality assurance	- Create a basic Quality Assurance Plan outline for a software development project. - Given a hypothetical software project scenario, propose three metrics that could assist project managers in making informed decisions.
Unit 7: Configuration Management and Software Maintenance	- Use any version control software.
Unit 8: Software project management	- AgileTrack - Implementing Agile Methodology for Project Management. - Use any project management tools to manage the project created in Unit 3 or Project II.
Unit 9: Project Scheduling	- Create a complete project schedule using any project scheduling tools.
Unit 10: Risk Management	- As a part of the group discussion take any software, identify risks and make an RMMM plan.
Unit 11: Concept of software re-engineering	- Identify different versions of popular (system software and application software) and identify the reused component.
Unit 12: Emerging trends in software engineering	- Identify and trending software and present the features in class.

Note:

1. Motivate students to create small project work integrating all of the above concepts.
2. Each of the above lab sessions should cover more than 3 hours of practical work.

6. Evaluation system and student's responsibility

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

External Evaluation	Marks	Internal Evaluation	Marks	
Semester End Examination		Theory		40
		Practical		20
	40	Attendance & Class Participation	5	
		Lab Report/Project Report	5	

		Practical Exam/Project Work	5	
		Viva	5	
Total External	40	Total Internal		60
Full Marks: 40 + 40 + 20 = 100				

Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with 80% attendance in the class to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear in the semester-end Examinations. Students are advised to attend all the classes, formal exams, tests, etc. and complete all the assignments within the specified period. ***Students are required to complete all the requirements defined for the completion of the course.***

7. Prescribed Books and References

Prescribed Text Books:

1. Roger S. Pressman, Software Engineering (7th Edition). Boston, Mass: McGraw Hill.

Reference Books:

2. Sommervill, I. (2011). *Software engineering* (9th ed.). Boston: Pearson.
3. Bob Hughes and Mike Cotterell (Latest Edition). Software Project Management (Latest Edition). Boston, Mass: McGraw Hill.
4. Pressman, R. S. (2010). *Software engineering: a practitioner's approach* (7th ed.). Boston, Mass: McGraw Hill.
5. Software engineering, Udit Agarwal
6. Software Engineering Fundamentals, “ Ali Behforooz and Frederick J. Hudson

Pokhara University
Faculty of Management Studies

Course Code: CMP 277

Course title: **Data Communication and Networks**

Nature of the course: Theory + Practical

Year: Second,

Level: Bachelor

Semester: IV

Full marks: 100

Pass marks: 45

Credit Hrs: 3

Total periods: 48 hours

Program: BCSIT

1. Course Description

Data Communication and Networks is an introductory course designed to provide students with a comprehensive understanding of the fundamental concepts, principles, and technologies underlying data communication and computer networks. The course covers various topics, including digital communication system, network architecture, network reference models, standards and protocols, transmission media, transmission impairment, networking devices, network protocols, flow control and error control, congestion control mechanism and network security. Through a combination of theoretical knowledge and practical exercises, students will gain the necessary skills to design, implement, and manage computer networks effectively.

It includes the following information about the course:

- Understand the basic concepts and terminology related to data communication and networking.
- Learn about the Nyquist Theorem and Shannon Channel Capacity Theorem.
- Explore the OSI (Open Systems Interconnection) and TCP/IP (Transmission Control Protocol/Internet Protocol) reference models and their layers.
- Analyze different network topologies, such as bus, star, ring, mesh, and hybrid, and understand their advantages and limitations.
- Learn about various networking devices, including routers, switches, hubs, and access points, and their roles in network communication.
- Examine different types of transmission media, such as twisted pair, coaxial cable, fiber-optic cable, and wireless, and understand their characteristics and applications.
- Explore networking protocols, including Ethernet, IP, TCP, UDP, HTTP, DNS, and SMTP, and understand their functions and mechanisms.
- Learn about network addressing and subnetting, including IPv4 and IPv6 addressing schemes.
- Understand the principles of error detection and correction, including parity check, checksum, and cyclic redundancy check (CRC).
- Understand the different types of interior and exterior routing protocols.
- Get the hands-on experience on connecting ethernet and RJ45 connectors and transfer the data.
- Study various network security concepts and mechanisms, including encryption, authentication, firewalls, intrusion detection/prevention systems (IDS/IPS), and virtual private networks (VPNs).

- Gain practical experience in configuring and managing computer networks using network simulation tools (cisco packet tracer and Wireshark) and real-world networking equipment.
- Gain practical experience on configuring different routing protocols on cisco devices.

2. General Objectives

After the completion of this course student will be:

- Understand the basics of data communication, networking, internet and their importance.
- Understand the capacity of noisy and noiseless communication channel.
- Analyze the services and features of various protocol layers in data networks.
- Differentiate wired and wireless computer networks.
- Analyze TCP/IP and their protocols.
- Recognize the different internet devices and their functions.
- Identify the basic security threats of the network.
- Design and configure peer-to-peer networks to share resources.
- Analyze requirements and design network architecture for a given scenario.
- Design and configure IP addressing schemes for a given scenario.
- Design and configure a client-server network and required network services for a given scenario.
- Evaluate and critique a design for a systems and network solution

3. Method of Instructions

General Instructional Technique: Lecture, Discussion, Readings, Question Answer

Specific Instructional Technique: Practical works, Project Based Learning, Self-Directed Learning, Industry Insights and Case Study

4. Course Contents

Specific Objectives	Contents
● Understand the concept of data and its significance in communication systems. ● Explore different data transmission modes such as simplex, half-duplex, and full-duplex. ● Identify the fundamental characteristics of data communication systems. ● Illustrate the block diagram of a digital communication system. ● Compare and contrast the advantages of digital transmission over analog transmission. ● Explain the statement of the Nyquist Sampling Theorem ● Apply Shannon's Channel Capacity Theorem to determine the maximum rate of error-free data transmission over	Unit I: Introduction to Data Communication [5 Hrs.] 1.1 Introduction to data communication 1.2 Data Transmission Modes (simplex, half-duplex, and full-duplex) 1.3 Fundamental Characteristics of Data Communication 1.4 Components of Data Communication System 1.5 Block Diagram of Digital Communication System 1.6 Introduction to Analog to Digital System 1.7 Advantages of digital transmission over Analog 1.8 Sampling Theorem/Nyquist Sampling Theorem 1.9 Numerical 1.10 Shannon Channel Capacity

a communication channel. • Solve numerical problems to calculate channel capacity based on given parameters. • Explain the concept of line coding and its role in digital data transmission. • Discuss the characteristics and implementation of unipolar, polar, and bi-polar line coding schemes.	Theorem 1.11 Bit Rate Vs Baud Rate 1.12 Numerical 1.13 Line Coding (Unipolar, Polar and Bi-Polar)
Specific Objectives	Contents
• Define computer networks and explore their various uses and benefits in modern computing environments. • Identify and describe different network topologies including bus, star, ring, mesh, and hybrid. • Classify computer networks based on their geographical scope • Differentiate between client/server and peer-to-peer networking architectures, highlighting their respective characteristics and applications. • Define Protocols and Standards • Explain the OSI (Open Systems Interconnection) Reference Model and its seven layers, illustrating the functions of each layer in the network communication process and compare it with TCP/IP • Identify and describe various networking hardware components including Network Interface Card (NIC), Hub, Repeater, Switch, Bridge, and Router, elucidating their functions and roles in network communication. • Familiarize with basic networking commands used for network configuration	Unit 2: Introduction to Computer Networks[5 Hrs.] 2.1 Definitions, Uses, Benefits 2.2 Network Topologies and its types (Bus, Star, Ring, Mesh, Hybrid,...) 2.3 Types of Computer Networks (PAN, LAN, MAN, WAN, CAN,...) 2.4 Networking Types (Client/Server, P2P) 2.5 Overview of Protocols and Standards 2.6 OSI Reference Model 2.7 TCP/IP Models and its Comparison with OSI 2.8 Networking Hardware: NIC, Hub, Repeater, Switch, Bridge, Router) 2.9 Basic Networking Commands
Specific Objectives	Contents
• Explore the duties and functions performed by the physical layer in transmitting data. • Differentiate between guided and unguided transmission media. • Compare and contrast Ethernet, Fast Ethernet, and Gigabit Ethernet	Unit 3: Physical Layer and its Design Issues [7 Hrs.] 3.1 Introduction, Design Issues and Duties of Physical Layer 3.2 Transmission Media: Guided (Twisted Pair, Coaxial Cable, Optical Fiber), Unguided (Radio Wave, Microwave,

technologies, including their data transfer speeds and applications. ● Introduce IEEE 802.11 (Wi-Fi) and IEEE 802.15.1 (Bluetooth) standards for wireless communication, including their specifications and applications. ● Identify and analyze common types of transmission impairments such as attenuation, distortion, and noise. ● Explain the concept of multiplexing and its importance in communication systems. ● Define different switching techniques including circuit switching, message switching, packet switching, and virtual circuit switching ● Define and quantify network performance metrics including bandwidth, throughput, latency, bandwidth-delay product, and jitter.	Infrared and Satellite) 3.3 Ethernet Cable Standards 3.4 Ethernet, Fast-Ethernet and Giga-Ethernet 3.5 IEEE 802.11 (Wi-Fi) and IEEE 802.15.1(Bluetooth) Standards 3.6 Signals 3.7 Transmission Impairment: Attenuation, Distortion and Noise 3.8 Multiplexing: TDM, FDM and WDM 3.9 Switching: Circuit Switching, Message Switching, Packet Switching, Virtual Circuit Switching 3.10 Network Performance: Bandwidth, Throughput, Latency, Bandwidth-Delay Product, Jitter
Specific Objectives	Contents
● Define the Data Link Layer and its role in providing reliable data transfer over the physical layer. ● Differentiate between Logical Link Control (LLC) and Media Access Control (MAC) sublayers. ● Discuss different framing techniques, including character stuffing, bit stuffing, and frame check sequence. ● Explain flow control mechanisms such as Simple Stop and Wait ARQ, Sliding Window, Go-Back-N ARQ, and Selective Repeat ARQ. ● Describe error detection techniques, including Parity Check, Checksum, Cyclic Redundancy Check (CRC), and Hamming Code. ● Discuss Random Access, ALOHA, Pure ALOHA, and Slotted ALOHA algorithms for channel allocation. ● Define VLAN and its role in logical segmentation of a LAN.	Unit 4: Data Link Layer [8 Hrs.] 4.1 Functions of Data Link Layer (DLL) 4.2 Overview of Logical Link Control (LLC) and Media Access Control (MAC) 4.3 Framing and its Types 4.4 Flow Control Mechanism: Simple Stop and Wait ARQ, Sliding Window, Go-Back-N ARQ, Selective Repeat ARQ, 4.5 Error Detection and Correction Techniques: Parity Check, Checksum, Cyclic Redundancy Check (CRC) and Hamming Code 4.6 Numerical 4.7 Channel Allocation Techniques (Multiple Access Techniques): Random Access, ALOHA, Pure ALOHA, Slotted ALOHA, 4.8 Carrier Sense Multiple Access (CSMA): CSMA/CD and CSMA/CA 4.9 VLAN
Specific Objectives	Contents
● Understand the role and functionality of the network layer in communication protocols.	Unit 5: Network Layer [10 Hrs.] 5.1 Network Layer and its Functions 5.2 IPV4 Address and its Headers, IPV4

• Explore IPV4 addressing and its header structure, including the classification of IPV4 addresses into different classes. • Study various IPV4 addressing schemes such as static, dynamic, and automatic configuration. • Differentiate between private and public IP addresses and their significance in networking. • Learn the concepts of subnetting, subnet masks, Fixed-Length Subnet Masking (FLSM), and Variable-Length Subnet Masking (VLSM). • Engage in numerical exercises to reinforce understanding of IPV4 addressing, subnetting, and related concepts. • Explore the limitations and challenges associated with IPV4 addressing scheme. • Introduce IPV6 addressing and its header structure as the next generation of internet protocol. • Understand the strategies and challenges involved in transitioning from IPV4 to IPV6 (Dual Stack, Tunneling and Header Translation) • Study routing algorithms including adaptive and non-adaptive, as well as distance vector and link state routing. • Explore popular routing protocols including Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), and Border Gateway Protocol (BGP). • Understand tools and protocols used for network troubleshooting such as Ping, Internet Control Message Protocol (ICMP), Network Address Translation (NAT)	Classes 5.3 Private IP vs Public IP 5.4 Subnetting, Subnet Mask, FLSM, VLSM 5.5 Case Study 5.6 Issues with IPv4 5.7 Overview of IPv6 and its header format 5.8 Transition from IPv4 to IPv6 5.9 Routing: Adaptive and Non-Adaptive Routing, Distance Vector and Link State Routing 5.10 Famous Routing Protocols: RIP, OSPF, EIGRP, BGP 5.11 Ping(Lab Related), ICMP and NATing
Specific Objectives	Contents
• Understand the role and functions of transport layer in the OSI Model • Compare and contrast TCP and UDP. • Understand SCTP (Stream Control	Unit 6: Transport Layer [5 Hrs.] 6.1 Introduction, Functions and Services 6.2 Transport Layer Protocols: TCP, UDP, SCTP, RTP and Their Comparisons,

Transmission Protocol) and Real-time Transport Protocol (RTP). • Differentiate between connection oriented and connectionless services provided by the transport layer • Explain the concept of port addressing and its significance and its significance in network communication. • Understand the concept of ports and Sockets. • Define congestion control and its importance in network performance. • Compare open loop and closed loop congestion control algorithms • Introduce traffic shaping algorithms such as Leaky Bucket and Token Bucket • Describe queuing techniques used in scheduling data transmission.	TCP/UDP Segment Structure 6.3 Connection Oriented vs Connection less Services 6.4 Port Addressing Overview 6.5 Introduction to Ports and Sockets, Socket Programming 6.6 Congestion Control: Open Loop and Closed Loop Congestion Control 6.7 Traffic Shaping Algorithms: Leaky Bucket and Token Bucket 6.8 Queuing Techniques for Scheduling
Specific Objectives	Contents
• Define the concept and functions of application layers in network architecture. • Explain the Hypertext Transfer Protocol (HTTP) and its significance in web communication. • Discuss the secure variant, HTTPS, and its role in ensuring secure data transmission over the web. • Define the Domain Name System (DNS) and its importance in translating domain names to IP addresses. • Explore the working principle of DNS, including the hierarchical structure of domain names and the resolution process. • Introduce email protocols, including Simple Mail Transfer Protocol (SMTP), Internet Message Access Protocol (IMAP), and Post Office Protocol (POP3). • Compare and contrast FTP and SFTP in terms of security, authentication, and data transfer mechanisms. • Understand the working principle of DHCP, including the DHCP discovery, offer, request, and acknowledgment	Unit 7: Application Layers [4 Hrs.] 7.1 Introduction and Functions 7.2 Web and HTTP/HTTPS 7.3 DNS and its Working Principle, DNS Query 7.4 Email Protocols: SMTP, IMAP, POP3 7.5 File Transfer Protocols: FTP, SFTP 7.6 DHCP and its working Principle

process.	
Specific Objectives	Contents
● Explore the objectives of network management, including monitoring, configuration, troubleshooting, and optimization of network resources. ● Introduce the Simple Network Management Protocol (SNMP) and its role in network management. ● Explain the data security, its importance and types ● Define network security and its importance in protecting data, systems, and network infrastructure from unauthorized access, misuse, and attacks. ● Introduce countermeasures and best practices to mitigate network security risks and prevent network attacks. ● Define symmetric key cryptography and asymmetric key cryptography and explain their respective principles of operation. ● Explain the concepts of tunneling and encryption in VPNs and their importance in securing remote connections.	Unit 8: Network Management and Network Security [4 Hrs.] 8.1 Introduction to Network Management 8.2 SNMP Protocol 8.3 Data security, its types, key risks in data security 8.4 Network Security: Introduction, Types of Network Attacks, Countermeasures to prevent network attacks 8.5 Cryptography: Symmetric Key and Asymmetric key Cryptography 8.6 VPN, Firewalls and Proxy

5. Laboratory Work

- i. Build and Test a Network Cable (Ethernet Cable and RJ45 Crimping)
- ii. OS (Ubuntu/Windows) Installation, Practice Basic Networking Commands (ipconfig, ipconfig/all, ping, arp, netstat, nbtstat, nslookup,....)
- iii. File sharing between PCs connected across static IP addresses
- iv. Introduction to Cisco Packet Tracer, Connection of Simple Network and Ping all the devices
 - v. VLAN Creation and VLAN Trunking cisco packet tracer/cisco devices
 - vi. Basic Router Configuration, Static Routing Implementation
 - vii. Subnetting Implementation cisco packet tracer/cisco devices
- viii. Implementation of Cyclic Redundancy Check using any programming language
- ix. DHCP Implementation cisco packet tracer/cisco devices
 - x. Implementation of Dynamic/interior/Exterior Routing Protocols (RIP, OSPF, EIGRP and BGP) cisco packet tracer/GNS3/cisco devices
- xi. Firewall Implementation, Router Access Control List (ACL) cisco packet tracer
- xii. Packet Capture and Header Analysis by Wireshark
- xiii. DNS, Web, FTP, DHCP Server Configuration using cisco packet tracer/cisco devices
- xiv. Case Study: Visit Nearby Enterprise Network or ISP or Nepal Telecom BTS/BSC/MSC/Data Centers and Prepare report.

xv. Lab Exam, Report and VIVA

6. Evaluation system and Student's Responsibility

In addition to the formal exam(s), the internal evaluation of a student may consist of quizzes, assignments, lab reports, projects, class participation, etc. The tabular presentation of the internal evaluation is as follows.

Internal Evaluation	Weight	Marks	External Evaluation	Marks
Theory		30	Semester End	50
Attendance & Class Participation	10%	3		
Assignments	20%	6		
Presentations/Quizzes	10%	3		
Internal Assessment	60%	18		
Practical		20		
Attendance & Class Participation	10%	2		
Lab Report/Project Report	20%	4		
Practical Exam/Project Work	40%	8		
Viva	30%	6		
Total Internal		50		
Full Marks: 50 + 50 = 100				

Student's Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. ***Students are required to complete all the requirements defined for the completion of the course.***

7. List of Tutorials

- **Unit I** – Nyquist Sampling Theorem, Nyquist Rate, Shannon Channel Capacity, Bit Rate vs Baud Rate and Line Coding
- **Unit IV**- Error Correction and Detection Techniques: Checksum, Cyclic Redundancy Check (CRC), Hamming Code
- **Unit V**- IPV4 Subnetting

8. Prescribed Books and References**Prescribed Text Books**

1. Data Communications and Networking, 4th Edition, Behrouz A Forouzan. McGraw-Hill
2. Computer Networking; A Top Down Approach Featuring The Internet, 2nd Edition, Kurose James F., Ross W. Keith PEARSON EDUCATION ASIA

3. Peterson and Davie, "Computer Networks, A Systems Approach", 5th Edition, Morgan Kaufman, ISBN: 978-0123850591.

Reference Books

- Steven Holzner, "HTML Black Book" Dremtech press.
- Web Technologies, Black Book, dreamtech Press
- Web Applications : Concepts and Real World Design, Knuckles, Wiley-India
- Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel. Pearson.
- Computer Networks, a top down approach, 6th Edition, Kurose/Ross.

Pokhara University
Faculty of Management Studies

Course Code: FIN 222

Course title: **Fundamentals of Financial Management**

Nature of the course: Theory + Practical

Year: Second,

Level: Bachelor

Semester: IV

Full marks: 100

Pass marks: 45

Credit Hrs: 3

Total periods: 48 hours

Program: BCSIT

1. Course Description:

This course introduces students to the basic principles and practices of financial management in the context of information technology (IT) businesses. It covers essential topics such as concept of financial management, financial statements analysis, time value of money, risk and return, capital structure & financing decision, capital budgeting, and project on financial planning. The course emphasizes the application of financial concepts to IT industry scenarios.

2. General Objectives:

The goal of this course is to inculcate in students a basic understanding of the ideas and principles of financial management. It addresses the efficient raising and application of financial resources in the corporate world. In order to help them make financial decisions, this course also provides students with the basic instruments and methods of financial management.

3. Methods of Instructions:

Lecture and Explanation, Brain storming, interactive presentations, reflection and discussion, Group discussion, Demonstrations and Examples, Hands-On Practice, Collaborative Learning, Problem-Solving and Case Studies.

4. Course Contents

Specific Objective	Unit 1: Introduction to Financial Management (5 LH)
✓ Define concept of financial management. ✓ List the function of financial management. ✓ Explain the goal of financial management. ✓ Differentiate wealth maximization and profit maximization. ✓ Describe the forms of business organization. ✓ Discuss the agency problem & corporate governance ✓ Describe the ethics in finance	1.1 Concept of financial management; 1.2 Finance within an organization; 1.3 Functions of financial management; 1.4 The financial goal: Wealth maximization and profit maximization; 1.5 Agency problem and corporate Governance. 1.6 Ethics in finance

	Unit 2: Financial Statement Analysis (10 LH)
✓ List and view the financial statement of Nepalese Public limited company ✓ Discuss the financial statement disclosed by Nepalese public limited company (Case type) ✓ State the nature of ratio and discuss the need the financial ratio analysis. ✓ Calculate and analyze the different types of ratio.	2.1 Financial statements: Balance sheet, Profit or loss statement, Cash flow statement. 2.2 Nature and need of financial ratio analysis 2.3 Types of financial ratios: Liquidity ratios, Asset management ratios, Debt management ratios, Profitability ratios, Market value ratios.
	Unit 3: Time Value of Money (7 LH)
✓ Recognize the concept of time value of money. ✓ Visualize the nature of cash flow with time line. ✓ Differentiate the ordinary annuity and annuity due. ✓ Calculate the present and future value connecting with missing figure. ✓ Discuss the different types of rate. ✓ Prepare loan amortization table. ✓ Contrast the application of time value of money.	3.1 Concept time value of money; Cash flow time line, 3.2 Nature of Cash flow, Ordinary annuity, Annuity due 3.3 Present value, future Value, present value annuity, future value annuity, 3.4 Nominal rate, Periodic rate, Effective rate 3.5 Preparation of Loan amortization Schedule 3.6 Application of time value of money
	Unit 4: Fundamentals of Risk and Return (7 LH)
✓ Summarize the concept of risk and return. ✓ Calculate the return, standard deviation, coefficient of variation, covariance, correlation coefficient and Beta. ✓ Discuss the portfolio risk and return. ✓ Interpret the application of correlation coefficient while making the portfolio. ✓ Visualize Security Market Line. ✓ Describe the Capital Assets Pricing Model connecting with market return and individual Beta.	4.1 Concept of Risk and Return 4.2 Expected rates of return, historical rates of return, Standard deviation, Coefficient of Variation, 4.3 Covariance, Correlation Coefficient, Beta, Systematic risk and unsystematic risk 4.4 Role of correlation coefficient on investment, 4.5 Portfolio Return, Portfolio Risk, Portfolio Beta 4.6 Concept of Capital Assets pricing Model (CAPM) (Only Theory) 4.7 Behavioral finance

	Unit 5: Capital Structure and Financing Decision (10 LH)
✓ List the component of capital structure and financial structure. ✓ Discuss the capital structure component ✓ State the concept of cost of capital. ✓ List and discuss determine the factors affecting capital structure decision. ✓ Define Business Risk & Financial Risk. ✓ Calculate the component of cost of capital and weighted average cost of capital. ✓ Application of cost of capital and WACC connecting service industry.	5.1 Capital structure and financial structure, 5.2 Capital structure component; Common Stock, Preferred Stock, Debt Capital, Retained earning 5.3. Concept and use of cost of capital 5.4. Factors affecting capital structure decisions 5.5. Business risk and financial risk 5.6 Component cost of capital: Cost of debt, cost of preferred stock, cost of retained earnings, cost of common stocks, 5.7 Weighted Average Cost of capital.
	Unit 6: Basics of Capital Budgeting Decisions (9 LH)
✓ Discuss the concept of capital budgeting with significance. ✓ State the capital budgeting process. ✓ List the types of project brief discussion. ✓ Discuss the classification of capital project. ✓ Describe the Cash flow after tax. ✓ Calculate the PBP. ARR, DPBP, NPV, PI, IRR ✓ Evaluate/Choose the project via different evaluating technique from independent and mutually exclusive project.	6.1 Concepts and significance of capital budgeting, 6.2 Process of capital budgeting decisions, 6.3 Classification of capital projects, 6.4 Capital Budgeting technique: Payback Period, Discounted Payback Period, Accounting Rate of Return, Net Present Value, IRR, MIRR, Profitability Index, 6.5 Evaluating techniques.
Laboratory work:	(6 LH)
✓ Apply financial management concept ✓ Financial forecasting and Decision making ✓ Evaluation of capital budgeting project	Final project on financial plan By using excel sheet Or Final project on capital budgeting By using excel sheet

5. Evaluation System and Students' Responsibilities

Evaluation System

The internal evaluation of a student may consist of assignments, attendance, term-exams, lab reports and projects etc. The tabular presentation of the internal evaluation is as follows:

Internal Evaluation	Weight	Marks	External Evaluation	Marks
Theory		30	Semester End	50
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		20		
Lab Report/Project Report	70%			
Viva	30%			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Students' Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

7. List of Practical

SN	Details list of practical (4 project @ 5=20) (60 % Project Report Preparation & 30 % Presentation)
1.	Calculate the different types of ratio from the quarterly financial report disclosed by public limited company of Nepal (project work report focused manufacturing company like Shivam Cement/ Botlers Nepal/ Unilever Company/ Himalyan Distillery)
2.	Prepare project work report regarding financial plan of locally ongoing small and medium scale business focusing IT industry i.e. Information Technology (IT) Business, otherwise from Hotel and Restaurant/ Hydropower company/ Hospital and Nursing Home/ Real State Housing, ...)
3.	Prepare project work report regarding capital budgeting project from locally ongoing small and medium size business focusing IT industry i.e. Information Technology (IT) Business, otherwise from Hotel and Restaurant/ Hydropower company/ Hospital and Nursing Home/ Real State Housing, ...)

8. Prescribed Books and References

Text Books:

1. Brigham, E. F. & Houston, J. F. Fundamentals of Financial Management, New Delhi: Cengage Learning, Thomson South Western
2. Van Horne, J.C. & Wachowicz, J. R. Fundamental of financial management, New Delhi: Pearson Education Prentice Hall

References:

1. Stephen A. Ross, Randolph W. Westerfield and Bradford D. Jordan. Fundamentals of Corporate Finance. New Delhi: Tata McGraw Hill Education Pvt. Ltd.
2. Gitman, L.J. Principles of financial management, New Delhi: Pearson Education, Prentice Hall
3. Pandey, I. M. Financial Management, New Delhi: Vikash Publishing House

8. Prescribed Books and References

Text Books:

1. Brigham, E. F. & Houston, J. F. Fundamentals of Financial Management, New Delhi: Cengage Learning, Thomson South Western
2. Van Horne, J.C. & Wachowicz, J. R. Fundamental of financial management, New Delhi: Pearson Education Prentice Hall

References:

1. Stephen A. Ross, Randolph W. Westerfield and Bradford D. Jordan. Fundamentals of Corporate Finance. New Delhi: Tata McGraw Hill Education Pvt. Ltd.
2. Gitman, L.J. Principles of financial management, New Delhi: Pearson Education, Prentice Hall
3. Pandey, I. M. Financial Management, New Delhi: Vikash Publishing House

Pokhara University
Faculty of Management Studies

Course Code: CMP 281
 Course title: **Project II**
 Nature of the course: Theory + Practical
 Year: Second,
 Level: Bachelor
 Semester: IV

Full marks: 100
 Pass marks: 45
 Credit Hrs: 3
 Total periods: 48 hours
 Program: BCSIT

1. Course Description

This comprehensive full-stack Web Development course is designed to empower students with a deep understanding of both front-end and back-end technologies, utilizing diverse frameworks. Through hands-on experience, participants learn to construct dynamic and responsive web applications while exploring essential concepts, tools, and contemporary development practices. Additionally, the hands-on project requires students to build a computer application, encouraging them to develop software for different devices using programming languages they are already familiar. This project involves fundamental operations, including data creation, retrieval, update, and deletion, with the option to incorporate advanced algorithms. While leveraging languages learned up to the 4th semester is recommended, students are encouraged to explore additional technologies, supported by the use of Computer-Aided Software Engineering (CASE) tools for efficient development. The project themes encompass information systems, e-commerce portals, and game applications, emphasizing independent code creation and minimizing reliance on pre-existing components unless indispensable.

2. Course Objective:

- Develop leadership skills for effective guidance and oversight in software project development.
- Cultivate teamwork abilities, emphasizing collaboration and communication within project teams.
- Acquire proficiency in using Computer-Aided Software Engineering (CASE) tools to streamline and enhance software development processes.
- Develop a solid comprehension of both front-end and back-end web development principles, covering key concepts and methodologies,
- Attain expertise in a modern front-end framework (e.g., React, Angular, or Vue) for crafting interactive user interfaces, and in a back-end framework (e.g., Express.js, Django, or Flask) for server-side development.
- Enhance programming skills by writing and optimizing code, gaining practical experience in software development.

3. Focus of the Study

- Every student within the group is expected to actively participate in identifying and understanding the problem to be addressed by the project.
- System Analysis
 - Feasibility Study

- System Requirement Specification (SRS)
- System Design
 - Architecture Design
 - Interface Design
 - Database/Procedure/Algorithm Design
- Implementation and Testing

4. Evaluation system and Student's Responsibility

SN	Evaluation Details	Day for Evaluation (48 hrs.)	Marks
1.	Introduction to project I	Week -1, Project Seminar (Introduction)	5 marks for attendance and submission of topic on time
2.	Topic finalization	Week -2(Discussion on project topic, Research)	
3.	Proposal Defense	Week-3(Preparation for proposal defense)	10
4.	Mid- Term Defense	Week-10 (Presentation, printed copy of project mid-term report, Demo,)	15
5.	End- Term Defense	Week 12 (Presentation, Demo 80% of the work is to be completed)	25
6.	Final Defense	Week 14 (Final Project presentation, Demo and Q&A)	45
Total			100

5. Project Work Phase:

The entire project work is divided into three phases and evaluation will be done accordingly.

Phase	Description
Phase 1: Conceptual Framework and Proposal	Team formation: Students form teams of 2-4 members based on their interests, skills, and the nature of the project. Conceptual Framework: Teams develop a conceptual framework for their project. This should include: • Problem statement: Clearly define the problem the project aims to address. • Objectives: Outline the goals and expected outcomes. • Scope: Define the boundaries and limitations of the project. • Significance: Explain the relevance and importance of the project. • Methodology: Briefly describe the approach and methods to be used. Documentation Teams document the conceptual framework in the format provided by the department for project proposals. Presentations Teams present their proposal in front of the examiner, providing a clear overview of their project

Phase2: Progress Report	1. Progress Report Teams demonstrate the progress made in the design phase, including. ▪ Overall system design: Present the architecture of the system ▪ Architectural design: Detail the structure and components of the system ▪ Validation scheme: Explain how the system's functionality will be validated 2. Documentation of Progress: Teams document the progress made, highlighting key design decisions and any challenges encountered. 3. Presentation to Internal Evaluator committee: Teams present their progress report to the internal evaluator committee for feedback and assessment.
Phase3: Final Presentation and Defense	1. Completion of all Phase: Ensure that all phases of the project, including design, development, and testing, are completed. 2. Product Output: Teams develop the final output of their product using web technology. This could be a web application, platform, or any relevant web-based solution. 3. Oral Defense: ▪ Teams present the final product and its features to the external examiner. ▪ Conduct an oral defense, addressing questions from the examiner regarding design choices, implementation, and overall project execution 4. Use web Technology / Java : Emphasize the incorporation of web technology in the project. This could include technologies like HTML, CSS, JavaScript, and relevant frameworks for web development 5. Submission of final Documentation: Provide comprehensive documentation covering all aspects of the project, from the initial proposal to the final product.

By following these three phases, students can systematically plan, execute, and present their project work, with a focus on utilizing web technology for effective solutions

6. Project Evaluation Criteria

The marks of Mid-term, End-term and Final Defense are distributed as:

- Report quality 10 %
- Presentation 5%
- Demonstration 15%
- Q&A 15%
- Teamwork 5%

Note:

There can be three members in final defense and the marks are adjusted in average basis:
(Project supervisor, Program Coordinator and External)

The project document shall include the following items:

- Project Team members (At least 2 and maximum of 4)
- Project supervisor(s)
- Technical description of the project.
- Project Analysis, Design, Coding, Testing and Implementation details

7. Students' Requirements

Each student must secure at least 45% marks separately in both internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are required to attend all the evaluation criteria and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

Report Contents:**1. Prescribed content flow for the project proposal**

1. Introduction
2. Problem Statement
3. Objectives of Study
4. Methodology
 - a. Requirement Identification
 - Study of existing system
 - Requirement Collection
 - b. Feasibility Study
 - Technical
 - Operational
 - Economic
 - c. High Level Design of System (system flow chart/ methodology of the proposed system/ working mechanism of proposed system)
5. Gantt Chart (showing the project timeline)
6. Expected Outcome
7. References

2. Prescribed content flow for the project report

1. Cover & Title Page
2. Certificate Page
 - Supervisor Recommendation
 - Internal and External Examiners' Approval Letter
3. Abstract Page
4. Acknowledgements
5. Table of Contents
6. Abbreviations
7. List of Figures
8. List of Tables
7. Main Report
8. Appendices (Screen Shots/ Source Codes/ Supervisor Visit Log Sheets)
9. References

3. Prescribed Chapters in Main Report**Chapter 1: Introduction**

- 1.1. Background of the Study
- 1.2. Statement of the Problem
- 1.3. Objectives of the Study
- 1.4. Scope of the Study
- 1.5. Limitations of the Study

Chapter 2: Review of Literature

- 2.1. Description of fundamental theories, general concepts and terminologies related to the project
- 2.2. Review of the similar Projects and Theories

Chapter 3: System Analysis and Design

- 3.1. System Analysis

3.1.1. Requirement Analysis

- Functional Requirements (Illustrated using use case diagram/list)
- Non-Functional Requirements

3.1.2. Feasibility Analysis

- Technical
- Operational
- Financial
- Schedule

3.1.3. Data Modeling

3.1.4. Process Modeling

3.2. System Design

3.2.1. Architectural Design

3.2.2. Database Schema Design

3.2.3. Interface Design (UI Interface / Interface Structure Diagrams)

3.2.4. Physical Model

Chapter 4: Implementation and Testing

4.1. Implementation

4.1.1. Tools Used (CASE tools, Programming languages, Database platforms)

4.1.2. Implementation Details of Modules (Description of procedures/functions)

4.2. Testing

4.2.1. Test Cases for Unit Testing

4.2.2. Test Cases for System Testing

Chapter 5: Conclusion and Future Recommendations

5.1. Lesson Learnt

5.2. Conclusion

5.3. Recommendations

Appendices (Screen Shots/ Source Codes/ Supervisor Visit Log Sheets)

Citation and Referencing

The listing of references should be listed in the references section. The references contain the list of articles, books, that are cited in the document. The books, articles, and others that are studied during the study but are not cited in the document can be listed in the bibliography section.

Report Format Standards

1. Page Number

The pages from certificate page to the list of tables/figures should be numbered in roman type starting from i. The pages from chapter 1 onwards should be numbered in numeric starting from 1. The page number should be inserted at bottom, aligned center.

2. Page Size and Margin

The paper size must be a page size corresponding to A4. The margins must be set as 6 Top = 1; Bottom = 1; Right = 1; Left 1.5

3. Paragraph Style

All paragraphs must be justified and have spacing of 1.5.

4. Text Font of Document

- The contents in the document should be in Times New Roman font
- The font size in the paragraphs of document should be 12 E. Section Headings

- Font size for the headings should be 16 for chapter title, 14 for section headings, 12 for the sub-section headings. All the headings should be bold faced.

5. Figures and Tables

Position of figures and tables should be aligned center. The figure caption should be centered below the figure and table captions should be centered above the table. All the captions should be of bold face with 12 font size.