



Course Outlines

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

National University of Pakistan



Course Outlines for
Computer Science
BS Program

2026-2030

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Guiding Principles

The curriculum serves as a comprehensive blueprint for the teaching-learning process that students must navigate through to achieve specific academic objectives. This encompasses clearly defined objectives, a scheme of studies and learning outcomes. Knowledge rapidly evolves and new fields emerge so it is crucial to develop such curricula as are current, relevant, and impactful.

As mandated by its Charter through Section 31(2) (i), National University of Pakistan has developed curricula for various disciplines of BS Program. The criteria, schemes of studies and course outlines of HEC set the benchmark for development of schemes of studies and course outlines at National University of Pakistan. The subject committees, appointed for development of curricula, comprised of subject matter experts and researchers. In response to the evolving needs of the 21st century, National University of Pakistan, in collaboration with HEC, undertook the task of developing robust standards of curricula for BS Program.

It is hoped that this document, developed by dedicated subject experts from across the country, will not only fulfill our national educational and economic requirements but also elevate the competency levels of our graduates.

With support of affiliated colleges in implementation of these curricular standards, National University of Pakistan envisions a future where its graduates are at the forefront of scientific discovery and technological innovation, driving progress and contributing to the betterment of the society both nationally and internationally.

BS CS

Program Description

Bachelor of Science in Computer Science (BSCS) at National University of Pakistan provides an in-depth understanding of computing principles and their practical applications. It covers both theoretical foundations and practical skills necessary for designing, developing and maintaining software systems. The program includes topics such as algorithms, programming languages, software engineering, database systems, computer architecture, mobile application development and networking while also exploring advanced areas like artificial intelligence, cloud computing, cyber security and many more. The BSCS degree prepares students to solve complex computing problems in a rapidly evolving technological landscape.

Program Structure

Minimum Credit Hours	133
General Education Courses	34 credit hours (15 courses)
Disciplinary Courses	72 credit hours (17 courses)
Interdisciplinary Courses	12 credit hours (4 courses)
Certification	3 credit hours (3)
Internship / Field work	3 credit hours (6 to 8 weeks)
Capstone Project	6 credit hours
Program Duration	Minimum: 4 Years Maximum: 6 Years The maximum limit is further extendable to another year in extra-ordinary circumstances subject to approval of the Rector.
Semester Duration	18 weeks
Course Load (per semester)	15-19 credit hours for regular semesters (22 credit hours for remedial/deficiency/failure/repetition courses only)
3 Credit Hours (Theory)	3 classes (1 hour each) OR 2 classes (1.5 hour each) OR 1 class (3 hours) per week throughout the semester.
1 Credit Hours (Lab / Field Work)	1 credit hour in laboratory or practical work / project requires lab contact of three hours per week throughout the semester.

Semester-Wise Breakdown

Sem	Course Code	Course Title	Pre-Requisites	Cluster/ Domain	Credit Hrs (Theory + Lab)
1 st	GEN-101	Functional English	-	Gen Ed	3
	GEN-102	Quantitative Reasoning-I		Gen Ed	3
	GEN-103	Application of Information and Communication Technologies	-	Gen Ed	3 (2+1)
	GEN-106	*Islamic Studies	-	Gen Ed	2
	GEN-125	**Understanding of Quran-I	-	Gen Ed	(0,1)
	CCC-111	Programming Fundamentals	-	Disciplinary	4 (3+1)
	CAL-121	Calculus and Analytic Geometry		Interdisciplinary	3
	MTD-111	***Pre-Mathematics-I	-	Math Deficiency	3
2 nd	Total Credit Hours				19
	GEN-104	Expository Writing	Functional English	Gen Ed	3
	GEN-105	Quantitative Reasoning-II		Gen Ed	3
	GEN-109	Sociology		Gen Ed	2
	CCC-112	Object Oriented Programming	Programming Fundamentals	Disciplinary	4 (3+1)
	CCC-161	Database Systems	-	Disciplinary	4 (3+1)
	CCC-222	Computer Networks	-	Disciplinary	3 (2+1)
	MTD-112	***Pre-Mathematics-II		Math Deficiency	3
	Total Credit Hours				19
	GEN-108	Technical Communication		Gen Ed	2
	GEN-110	Ideology and Constitution of Pakistan		Gen Ed	2

3 rd	GEN-126	**Understanding of Quran-II	-	Gen Ed	(0,1)
	CCC-213	Data Structures	Object Oriented Programming	Disciplinary	4 (3+1)
	CCC-231	Digital Logic Design (DLD)	-	Disciplinary	4 (3+1)
	CCC-251	Software Engineering	-	Disciplinary	3
	Total Credit Hours				16
4 th	GEN-111	Entrepreneurship		Gen Ed	2
	GEN-112	Civics and Community Engagement		Gen Ed	2
	GEN-119	Applied Physics	-	Gen Ed	3 (2+1)
	GEN-124	Pakistan Studies		Gen Ed	2
	MATH-202	Linear Algebra	Calculus & Analytic Geometry	Interdisciplinary	3
	CCC-221	Information Security		Disciplinary	3
	CCC-232	Computer Organization & Assembly Language	Digital Logic Design	Disciplinary	3 (2+1)
	Total Credit Hours				18
5 th	MS-211	Probability and Statistics	-	Interdisciplinary	3
	DSE-206	Fundamentals of Data Science	-	Major Elective	3
	CCC-352	Operating System	-	Major	4 (3+1)
	CDE-353	Software Project Management	Software Engineering	Disciplinary	3
	CCC-341	Artificial Intelligence (AI)	-	Disciplinary	3 (2+1)
	CDC-371	Web Technologies		Disciplinary	3 (2+1)
	Total Credit Hours				19
6 th	CDC-214	Theory of Automata		Disciplinary	3
	CDC-262	Advance Database Management Systems	Database Systems	Disciplinary	3 (2+1)
	CCC-318	Analysis of Algorithm	-	Disciplinary	3
	CDC-371	Advanced Programming		Disciplinary	3 (2+1)

	DSP-315	Machine Learning	-	Major Elective	3 (2+1)
	MGT-313	Digital Marketing & E-Commerce	-	Interdisciplinary	3
	Total Credit Hours				18
7th	CDE-423	Cyber Security	Information Security	Disciplinary	3
	CDE-437	Digital Forensic & Incident Response/ Mobile App Development	-	Major Elective	3 (2+1)
	CDE-442	Cloud Computing	-	Disciplinary	3 (2+1)
	CDE-455	Professional Certification	-	Certification	3
	CCC-491	Final Year Project-I	-	Capstone Project	2 (0+2)
	Total Credit Hour				17
8th	CDE-477	Internet of Things (IOT) & its Applications	-	Major Elective	3
	CCC-492	Final Year Project-II	Final Year Project-I	Capstone Project	4 (0+4)
	INT-400	Field Experience/ Internship	-	Field Experience	3
	Total Credit Hours				10
	Total Credit Hours of the Program				133

***Non-Muslims students may opt 'GEN-123 Ethics' as a substitute.**

****Non-Muslim students may opt for (GEN-130) Study of World Religions as a substitute for Understanding of the Quran (I & II) in Semester IV.**

***Pre-Mathematics-I and Pre-Mathematics-II courses are only for those students who have not studied Mathematics at intermediate level. Students must pass deficiency courses of Mathematics (Non-credit) in the first year. These deficiency courses of Mathematics are offered in compliance with NCEAC (National Computing Education Accreditation Council) revised curriculum 2023. Summer semester can also be offered (if required) to cover deficiency courses.

Semester-I Course Outlines

**Functional English
GEN-101**

Program-Discipline	BS – Computer Science
Credit Hours	3 (3+0)
Duration	18 Weeks

Course Title: Functional English**Course Code:** GEN-101**Course Description**

The course covers the fundamental concepts of English composition and comprehension. The course is designed in such a way that students can use this knowledge to further enhance their language skills in English. The course aims at enhancing students' skill and competence in communicating their ideas in writing and speaking in English language. It primarily focuses on four areas of language i.e. listening, reading, the conventions of written English, speaking and building build-up vocabulary to help students achieve proficiency in language use.

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student will be able to:

CLO No.	CLO Description
CLO-1	To <u>write</u> coherently and cohesively. To write and reply applications/ letters/ emails. To construct grammatically correct oral and written sentences. To tell and write stories/ essays.
CLO-2	To <u>pronounce</u> words in English language correctly. To <u>read</u> and interpret text written in English language. To <u>listen</u> and decipher spoken forms of English language.
CLO-3	To <u>improve</u> writing, presentation, listening and communication skills.

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

Exam		Weightage
(a)	End-Semester Exam	50
(b)	Mid-Semester Exam	30
(c)	Quiz / assignment*	20
(d)	Practical / Lab / Projects	
(e)	Class Participation	
Total		100

*One Quiz and One Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. $3 \times 16 = 48$ contact hours in the semester.

Week Wise Course Outline

Week	Contents
1	- Basics of Grammar - Parts of Speech
2	Vocabulary Building (Use the Provided Booklet) - Synonyms - Antonyms - Homonyms
3	Vocabulary Building (Use the Provided Booklet) - One word Substitution - Words often confused (Pairs of Words)
4	Vocabulary Building (Use the Provided Booklet) Verbal Phrases and Idiomatic Phrases (including Phrasal Verbs)
5	Sentence Structure (simple, compound, complex and compound-complex)
6	Tenses
7	Elimination of Common Errors (Correction) Subject-Verb Agreement, Noun
8	Elimination of Common Errors (Correction) Adjective, Verb, Adverb
9	MID TERM EXAMS
10	Listening - Quiz on audios - Quiz on videos
11	Comprehension/ Reading Skill - Critical Reading - SQ4R - Reading of passages and comprehension exercises (Level Advance)
12	Public speaking - Informal communication (small talk, conversational skills) - Public speaking (overcoming stage fright, voice modulation and body language)
13	Controlled and Guided Writing

	• Pre writing (Brainstorming, mind-mapping, planning, information gathering, preparing to write), writing, search for topic sentences • Developing a theme, following up ideas and arguments, outline plans etc.
14	Paragraph Writing • Topics at the discretion of the teacher
15	Precis Writing • Rules of précis writing • Practice précis.
16	Essay Writing • Types of writing: descriptive, narrative expository, argumentative
17	Essay Writing • Expository, argumentative
18	END SEMESTER EXAMS

Recommended Books

1. College Writing Skills with Readings, by John Langan, McGraw-Hill, 5th Edition.
2. High School English Grammar & Composition by Wren & Martin
3. Practical English Grammar by A. J. Thomson and A. V. Martinet

**Quantitative Reasoning-I
GEN-102**

Program-Discipline	BS – Computer Science
Credit Hours	3
Duration	18 Weeks

Course Title: Quantitative Reasoning-I**Course Code:** GEN-102**Course Description**

The course objectives to provide students with an understanding of the basic Mathematical and Financial Techniques used in Business Enterprises or Accountancy Profession through application of techniques rather than its theoretical aspect. To equip students with Mathematical Skills and Knowledge that can be applied to solve Financial Problems in field of Accountancy, Enhancement of students' competency in application of mathematical linear & quadratic, Equations in solving business management problems. Understanding the concepts of matrices and its applications. Derivatives and its role in business and economic approach

Learning Outcomes

Upon the successful completion of this course, students should have learnt:

- Mathematical Function
- Building and solving linear and quadratic equations
- Types of functions
- Matrices and its applications
- Determinants and its applications
- Derivatives & its business applications

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

*One One	Exam		Weightage	Quiz and
	(a)	End-Semester Exam	50	
	(b)	Mid-Semester Exam	30	
	(c)	Quiz / assignment*	20	
	(d)	Practical / Lab / Projects		
	(e)	Class Participation		
	Total		100	

Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. $3 \times 16 = 48$ contact hours in the semester.

Week Wise Course Outline

Week	Contents
1	• Cartesian Product (Basic Examples only) • Relations, Types of relations (Reflexive, Symmetric, Transitive and Equivalence relation)
2	• Definition: Function, Domain, Co-domain, Range • Types (one one, onto, Into, bijective). • Identifying type of a given function.
3	• Set Operations (subsets, Power Set, Set Notations, Union and intersection of sets), Compliments
4	• Logic, Simple Statement, Compound Statement, negation, Conjunction, Disjunction, Conditional, biconditional, Tautology, absurdity.
5	• Translating from Symbols to English and vice versa., • Constructing Truth Table, logical Equivalence, De Morgan's Laws.
6	• Introduction of matrices, Types of matrices (row, column, square, identity, zero, diagonal) • Addition and subtraction of matrices, Multiplication of Matrices (2×2 & 3×3).
7	• Determinant and inverses, Minor and cofactor up to 3×3 matrices. • Inverse of a matrix by using adjoint method (up to 3×3)
8	• To transform a Matrix of order 3×3 to row echelon form • To determine if a given matrix is in row echelon form or not.
9	MID TERM EXAMS
10	• Definition of Equation, Linear equations containing one or more variables and operations on these equations, • Simultaneous Equations in two variables and methods of solving such problems (By elimination, By substitution)
11	• Solution of System of equations containing three variables by Matrix Inversion method, Cramer's rule.
12	• To transform a Matrix of order 3×3 to reduced row echelon form • Linear equations in three variables and their solution by Gaussian

	Elimination method, Gauss Jordan elimination method.
13	Slope (Positive, Negative, Zero, Undefined slopes) and its interpretation, X and Y intercepts and their interpretation.
14	- Finding slope, a) If inclination is given b) If two points are given.
15	Formation of Equation of straight-line using point slope form, slope intercept form, Two-point form.
16	Conversion of straight-line equation into point slope form, slope intercept form, two-point form.
17	Parallel and perpendicular lines.
18	END SEMESTER EXAMS

Recommended Books

1. Business Mathematics by Frank.S. Budnick Latest Edition.
2. Business Mathematics by Gary Clendenen and Stanley A. Salman 13th edition.

Reference Book

1. Text book of 1st Year & 2nd Year of SNC of Punjab Curriculum and Textbook board

**Application of Information and
Communication Technologies
GEN-103**

Program-Discipline	BS – Computer Science
Credit Hours	3 (2+1)
Duration	18 Weeks

Course Title: Application of Information and Communication Technologies

Course Code: GEN-103

Course Description

This introductory course in Computer Science provides a comprehensive exploration of fundamental computing concepts and practical applications. The course is designed for beginners and covers the history of computing, computer hardware and software, computer fundamentals, web programming, and the utilization of popular productivity tools.

Theoretical sessions span various aspects of computing, beginning with the definition of computers and their historical evolution. This course cover major topics related to fundamentals of computer, operating system, data communication, networking, computer security and World Wide Web. Practical insights into HTML and web page creation will be covered to enhance the students' understanding of applied technologies.

Laboratory sessions focus on hands-on applications of computing skills. Students will engage in practical exercises covering email communication, operating system tasks, Microsoft Office suite proficiency (PowerPoint, Word, Excel), and introductory HTML for web page creation. The lab sessions aim to strengthen theoretical concepts through practical application and develop essential skills for professional computing.

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student will be able to:

CLO No.	CLO Description
CLO-1	<u>Understand</u> basics of computing technology i.e. Computer Hardware and Software, Basic Operations of computers, Basic OS Concepts.
CLO-2	<u>Understand</u> and can-do number systems conversions and arithmetic.

CLO-3	Have <u>knowledge</u> of network components, communication medium, Computer security and privacy.
CLO-4	<u>Analyze</u> how various applications can be used to solve different problem. Students will be able to <u>create</u> professional documents, spread Sheets and presentations using productivity tools such as MS Word, MS Excel, MS PowerPoint.
CLO-5	<u>Identify and Explore</u> valuable resources for education and research and <u>synthesize</u> information from multiple sources to achieve objectives. Students will be able to <u>use</u> email for professional communication. Students will be able to <u>create</u> professional Profile/CV.

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

Exam		Weightage
(a)	End-Semester Exam	50
(b)	Mid-Semester Exam	30
(c)	Quiz / assignment*	20
(d)	Practical / Lab / Projects	
(e)	Class Participation	
Total		100

Practical / Lab Courses

	Exam	Weightage
(a)	End-Semester Exam	30
(b)	Mid-Semester Exam	20
(c)	Experiment/Lab Reports / Viva Voce / Project / PBL (Problem Based Learning)	50
	Total	100

*One Quiz and One Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. $3 \times 16 = 48$ contact hours in the semester.

Week Wise Course Outline (Theory)

Week	Contents
1	Definition of Computer, Computer Processing System (Input, Process, Output), Difference between data and information, Role of Computers in various fields (Education, Business, Media, Manufacturing), History & Generations of Computers with Characteristics of each generation.
2	Types of Computers (Analog, Digital, Hybrid), Types of Digital Computer (Super, Mainframe, Mini and Micro Computer), Introduction to CBIS (Computer Based Information System), Methods of Input and Processing. Basic Operations of a computer (Input, Process, Storage, Output), Computer Elements, Processor, Memory, Hardware, Software.
3	Computer Hardware: Input devices (Keyboard, mouse etc), Output Devices (Speakers, Monitors and its Types, Printers and its Types, Plotters and its types).
4	Storage Units, Primary and Secondary Memories and their types, RAM and its Types, Cache, Hard Disks, RAID, Optical Disk Storages (DVD, CD ROM), flash memory storage systems (memory cards and readers, USB flash drives) Other types of storage systems (network and cloud storage system, smart cards)
5	Types of Computer Software: System Software and Types, Operating System, Device Drivers, Utility Software(backup and recovery utilities), Language Processors (Assembler, Compiler and Interpreter), Importance, Uses, Limitations and Types of Application Software (Productivity Software, Business Software, Entertainment Software, Educational Software), Internet Applications (Web Applications, Cloud Computing Applications, Social Media Network Applications), Others (Licensed Software, Open source Software, Shareware/Trial-ware, Freeware).
6	Software Development life Cycle (SDLC), Importance of SDLC, SDLC Phases/Steps, Personnel involved in SDLC (Project Manager, System Analyst, Programmer, Software Tester, Customer or End User).

7	Introduction to Operating System. Functions of Operating System, Types of Operating System interfaces (Command Line Interface, Menu Driven Interface, and Graphical User Interface), Examples of CLI (DOS, UNIX) and GUI (MacOS, Linux, and Windows).
8	Introduction to Mobile OS (Android and IOS)
9	MID TERM EXAMS
10	Data Communications, Data Communication Model, Data Transmission, Digital and Analog Transmission, Modems, Asynchronous and Synchronous Transmission, Modes of Communication: Simplex, Half Duplex, Full Duplex Transmission,
11	Communications Media: Guided and Unguided Medias (Cables, Wireless), Protocols (http, TCP/IP, FTP, POP3), Network Topologies (Star, Bus, Ring, Mesh), LAN, MAN, WAN, PAN.
12	Security and privacy: Malware and its Types (Virus, Worm, Adware, Spyware), Computer Virus and its Forms., Authentication and Authorization, Symptoms of Malware, How Malware Spreads, Precautions to protect computers.
13	Number Systems and Conversions: Binary, Octal, Decimal, Hexa-Decimal.
14	Internet, A Brief History, Internet Services provider, DNS, web Hosting.
15	Introduction to World Wide Web, Terms related to WWW (Web Page, Website, Web Browser, Web Server, Uniform Resource Locator and its different parts, Search Engine, Home Page).
16	Types of Websites (Web portals, News Websites, Informational Websites, Educational Websites, Personal Websites, Business Websites, Entertainment Websites)
17	Ethical and responsible use of ICT, Digital citizenship, Cybercrime and its types, Intellectual property rights.
18	END SEMESTER EXAMS

Week Wise Course Outline (Lab)

Week	Contents
1	Email: Creating an Email Account, Create and Send Email, use to various folders (Inbox, Drafts, Spam, and Sent folder etc.), Use of "To", "Subject", "Attach files button", "Send Button", "Composing Area", "CC" and "BCC". Working with Received Emails (Reading an Email, Downloading Attachments, replying to an Email), Sign out and Email Account. LMS (Google Classroom)
2	Operating System: Create file and folders, Move or delete file and folders, Basic Shortcut keys (Cut, Copy, Paste, Delete, select all etc), Windows Task Manager (ALT+CTRL+DEL), Control Panel Overview (System and Security, User Accounts, Appearance and Personalization, Network and Internet, Clock, Language and Region, Uninstall a Program), Command Prompt Overview and Commands (dir, cd, md, rd).
3	MS Power Point: Interface (Title Bar, Quick Access Toolbar, Ribbon, Horizontal and Vertical Scroll Bars, Status Bar, Zoom Slider, Notes Pane etc), Creating a Power Point Presentation, apply colors, fonts and effects, changing fill style and background, Selection of Slide layout, Add and Remove Slides, Add Text in Slides, running a Presentation, Saving Presentation, Difference Between Save and Save As.
4	MS Power Point: Formatting Text, Addition of Clipart, Addition of a Drawing, Adding Animations to the Presentation, Adding Pictures, Videos or Sounds in Presentation. Applying Slide Transition,
5	MS Word: Interface (Title Bar, Quick Access Toolbar, Ribbon, Horizontal and Vertical Scroll Bars, Status Bar), Creating a New Microsoft Word Document, opening a Document, Saving and Printing a Document, Inserting and Editing Text, Selecting Text, Copy and Moving Text (Ctrl + X, Ctrl + C, Ctrl + V), Deleting text. Inserting Page Borders, Inserting Table of Contents.

6	MS Word: Inserting Symbol, Inserting Equation, Formatting Text (Changing the Font Type and Size of Text, Changing Font Styles and Effects, Changing Case, Use of Bold, Italics, Underline, Strikethrough, Subscript, Superscript, Text Highlight Color and Font Color), Formatting Paragraph (Changing Paragraph Alignment: Align left Align Centre, Align Right, Justify ,Indenting Paragraph: Increase and decrease indent, Changing Spacing between Paragraphs and Lines), Formatting Page (Document Theme, Page Margins, Page Orientation: Portrait and Landscape, Page Background: Watermark, Page Color and Page Borders). Use of Find and Replace.
7	MS Word: Inserting Header, footer and Page numbers, Inserting Cover page, Inserting Page and Section Breaks, Inserting and Positioning Picture, Inserting Word Art
8	MS Word: Creating and Formatting table, Adding and Deleting Rows or Columns, resizing rows and columns, Adding or Changing Border Lines and Shading, Merging and Splitting Cells, Changing Margins, Using Hyperlink, make regular text as hyperlink, Remove Hyperlink.
9	MID TERM EXAMS
10	MS Excel: Opening the Microsoft Excel Program, Interface (Title Bar, Quick Access Toolbar, Cell, Row, Column, Formula Bar, Cell Address, Active Cell Address, Worksheet Window), Filling Columns and Rows, Auto fill and its options, Fill Series, Use of formulas (total, percentage, average etc), Merge and Split Cells, Insert Border on table, Wrapping Text, Use of Built in Functions (sum, product, average, max, min, power, sqrt, count).
11	MS Excel: Cell Addressing and its types (Relative Cell Addressing, Absolute Cell Addressing), Paste Special and its various options.
12	MS Excel: Resizing Rows and Columns, Insert New Rows and Columns in between, Delete Rows and Columns, Rename Sheets and Add Sheets in Excel Workbook. Graphical Representation of Data (i.e. Creating Column Chart).

13	MS Excel: Manipulating and Formatting Data (Filtering Data, Data Validation, protecting a Worksheet, Unlocking Cells, Conditional Formatting).
14	MS Paint, Elementary Video editing
15	Video Conferencing (Zoom, Google Meet).
16	Google Forms (creating data collection forms, surveys etc).
17	Development of professional CV & linked in profile (Semester Project)
18	END SEMESTER EXAMS

Recommended Books

1. Charles S. Parker, Understanding Computers: Today and Tomorrow, Course Technology, 25 Thomson Place, Boston, Massachusetts 02210, USA
2. Livesley, Robert Kenneth. An introduction to automatic digital computers. Cambridge University Press, 2017.
3. Zawacki-Richter, Olaf, and Colin Latchem. "Exploring four decades of research in Computers & Education." Computers & Education 122 (2018): 136-152.
4. Sinha, Pradeep K., and Priti Sinha. Computer fundamentals. BPB publications, 2010.
5. Alan Evans, Kendall Martin, Mary Anne Poatsy. Technology in Action. Pearson Education Inc. © 2024, ISBN 978-0-13-793278-8.

**Islamic Studies
GEN-106**

Program-Discipline	BS – Computer Science
Credit Hours	2 (2+0)
Duration	18 Weeks

Course Title: *Islamic Studies

Course Code: GEN-106

Course Description

This course provides Basic information about Islamic Studies to enhance understanding of the students regarding Islamic Civilization. This course discusses History of Islam, understanding of the worship and its usefulness, the basic concept of Quran Pak: wisdom, patience, loyalty. The course also discusses comparative analysis of Islam with other religions. The Concept and Value of Haqooq ul Ibad (Bandon Kay Haqooq) in Islam is discussed. The rights of people in Islamic Point of View are also discussed.

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student will be able to:

CLO No.	CLO Description
CLO-1	<u>Enhance</u> the knowledge of Islam.
CLO-2	<u>Understand</u> the basic concept of Islam and Quran Pak. To enhance the skill of the students for understanding of issues related to Faith and Religious Life.
CLO-3	<u>Understand</u> the concept of Haqooq ul Ibad in the light of Quran. <u>Develop</u> an understanding of Divine Verses, Mandates and Provisions concerning permissible Methods and Modes of Islamic Trade and Commerce.

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

Exam		Weightage
(a)	End-Semester Exam	50
(b)	Mid-Semester Exam	30
(c)	Quiz / assignment*	20
(d)	Practical / Lab / Projects	
(e)	Class Participation	
Total		100

*One Quiz and One Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. 3x16 = 48 contact hours in the semester.

تدریسی اوقات	تدریسی مواد
نواں ہفتہ	وسط مدتی امتحانات
اٹھارہواں ہفتہ	اختتامی سمسٹر امتحانات

Week Wise Course Outline

پہلا ہفتہ	• سورة البقرة: آیت نمبر 1 تا 5 اور آیت نمبر 284 تا 286، حدیث نمبر 1، 2
دوسرا ہفتہ	• سورة الاحزاب: آیت نمبر 6، 21، 32، 33، حدیث نمبر 3، 4
تیسرا ہفتہ	• سورة الاحزاب: آیت نمبر 40 اور آیت نمبر 56 تا 59، حدیث نمبر 5، 6
چوتھا ہفتہ	• سورة الفتح: آیت نمبر 29، سورة الصف: آیت نمبر 1 تا 9
پانچواں ہفتہ	• سورة الصف: آیت نمبر 10 تا 14، سورة الحجرات: آیت نمبر 1 تا 10
چھٹا ہفتہ	• سورة الحجرات: آیت نمبر 11 تا 18، حدیث نمبر 7، 8
ساتواں ہفتہ	• مطالعہ سیرت کی ضرورت اور اہمیت، نبی کریم ﷺ کی حکمت انقلاب: ہجرت، مؤاخات، میثاق مدینہ
آٹھواں ہفتہ	• اسلامی تہذیب کے خصائص، اسلامی تہذیب و ثقافت کے عالمی اثرات
دسواں ہفتہ	• سورة الانعام: آیات نمبر 151 تا 153، حدیث نمبر 9، 10
گیارہواں ہفتہ	• سورة الفرقان: آیت نمبر 63 تا 77، سورة النحل: آیت نمبر 12 تا 14
بارہواں ہفتہ	• صلح حدیبیہ، خطبہ حجة الوداع، حدیث نمبر 11، 12
تیرہواں ہفتہ	• تشکیل اجتماعیت و معاشرت اور اسوہ حسنہ، حدیث نمبر 13، 14، 15، 16
چودھواں ہفتہ	• مغربی تہذیب و ثقافت اور اسلام، مغربی تہذیب و ثقافت کے خصائص و اثرات
پندرہواں ہفتہ	• تہذیبوں کے تصادم کے نظریے کا تنقیدی جائزہ، حدیث نمبر 17، 18، 19، 20
سولہواں ہفتہ	• حدیث نمبر 21 تا 23، عشرہ مبشرہ • اسلامی معاشی نظام کے بنیادی تصورات • تجارت اور تجارت کے اسلامی طریقے • سورة البقرة: آیت نمبر 275 • سورة النساء: آیت نمبر 29 • حدیث نمبر 11، 12، 16
سترہواں ہفتہ	• حدیث نمبر 24 تا 26، امہات المؤمنین، اولاد النبی ﷺ

نوٹ: نصاب میں موجود منتخب آیات (از سورة البقرة، سورة الاحزاب، سورة الفتح، سورة الصف، سورة الحجرات، سورة الانعام، سورة الفرقان، سورة النحل) اور منتخب احادیث کا ترجمہ اور تشریح دونوں مطلوب ہیں۔

ضمیمہ: منتخب احادیث مبارکہ

1. عَنْ عُمَرَ بْنِ الْخَطَّابِ رَضِيَ اللَّهُ عَنْهُ قَالَ: سَمِعْتُ رَسُولَ اللَّهِ ﷺ يَقُولُ: إِنَّمَا الْأَعْمَالُ بِالنِّيَّاتِ، وَإِنَّمَا لِامْرِئٍ مَّا نَوَى، فَمَنْ كَانَتْ هِجْرَتُهُ إِلَى اللَّهِ وَرَسُولِهِ، فَهَاجَرَتْهُ إِلَى اللَّهِ وَرَسُولِهِ، وَمَنْ كَانَتْ هِجْرَتُهُ إِلَى دُنْيَا يُصِيبُهَا أَوْ امْرَأَةٍ يَتَرَوُّجُهَا، فَهَاجَرَتْهُ إِلَى مَا هَاجَرَ إِلَيْهِ. صحيح البخاري (140 /8)
2. عَنْ عُثْمَانَ رَضِيَ اللَّهُ عَنْهُ ، عَنِ النَّبِيِّ ﷺ قَالَ: خَيْرُكُمْ مَنْ تَعَلَّمَ الْقُرْآنَ وَعَلَّمَهُ. صحيح البخاري (192 /6)
3. عَنْ مَالِكِ بْنِ أَنَسٍ قَالَ: قَالَ رَسُولُ اللَّهِ ﷺ تَرَكْتُ فِيكُمْ أَمْرَيْنِ لَنْ تَضِلُّوا مَا تَمَسَّكْتُمْ بِهِمَا: كِتَابَ اللَّهِ وَسُنَّةَ رَسُولِهِ. موطأ مالك (1323 /5)
4. عَنْ ابْنِ عُمَرَ رَضِيَ اللَّهُ عَنْهُمَا قَالَ: قَالَ رَسُولُ اللَّهِ ﷺ: بُنِيَ الْإِسْلَامُ عَلَى خَمْسٍ، شَهَادَةُ أَنْ لَا إِلَهَ إِلَّا اللَّهُ، وَأَنَّ مُحَمَّدًا عَبْدُهُ وَرَسُولُهُ، وَإِقَامُ الصَّلَاةِ، وَإِيتَاءُ الزَّكَاةِ، وَحَجُّ الْبَيْتِ، وَصَوْمُ رَمَضَانَ. صحيح مسلم (45 /1)
5. عَنْ عُمَرَ بْنِ الْخَطَّابِ رَضِيَ اللَّهُ عَنْهُ قَالَ: بَيْنَمَا نَحْنُ عِنْدَ رَسُولِ اللَّهِ ﷺ ذَاتَ يَوْمٍ، إِذْ طَلَعَ عَلَيْنَا رَجُلٌ شَدِيدُ بَيَاضِ الثِّيَابِ، شَدِيدُ سَوَادِ الشَّعْرِ، لَا يُرَى عَلَيْهِ أَثَرُ السَّفَرِ، وَلَا يَعْرِفُهُ مِمَّا أَحَدٌ، حَتَّى جَلَسَ إِلَى النَّبِيِّ ﷺ ، فَأَسْنَدَ رُكْبَتَيْهِ إِلَى رُكْبَتَيْهِ، وَوَضَعَ كَفَّيْهِ عَلَى فَخْذَيْهِ، وَقَالَ: يَا مُحَمَّدُ! أَخْبِرْنِي عَنِ الْإِسْلَامِ. فَقَالَ رَسُولُ اللَّهِ ﷺ: «الْإِسْلَامُ أَنْ تَشْهَدَ أَنْ لَا إِلَهَ إِلَّا اللَّهُ وَأَنَّ مُحَمَّدًا رَسُولُ اللَّهِ ﷺ ، وَتُقِيمَ الصَّلَاةَ، وَتُؤْتِيَ الزَّكَاةَ، وَتَصُومَ رَمَضَانَ، وَتُحِجَّ الْبَيْتَ إِنْ اسْتَطَعْتَ إِلَيْهِ سَبِيلًا.» قَالَ: صَدَقْتَ. قَالَ: فَعَجِبْنَا لَهُ يَسْأَلُهُ وَيُصَدِّقُهُ. قَالَ: فَأَخْبِرْنِي عَنِ الْإِيمَانِ. قَالَ: «أَنْ تُؤْمِنَ بِاللَّهِ، وَمَلَائِكَتِهِ، وَكُتُبِهِ، وَرُسُلِهِ، وَالْيَوْمِ الْآخِرِ، وَتُؤْمِنَ بِالْقَدَرِ خَيْرِهِ وَشَرِّهِ» قَالَ: صَدَقْتَ. قَالَ: فَأَخْبِرْنِي عَنِ الْإِحْسَانِ. قَالَ: «أَنْ تَعْبُدَ اللَّهَ كَأَنَّكَ تَرَاهُ، فَإِنْ لَمْ تَكُنْ تَرَاهُ فَإِنَّهُ يَرَاكَ» قَالَ: فَأَخْبِرْنِي عَنِ السَّاعَةِ. قَالَ: «مَا الْمَسْئُولُ عَنْهَا بِأَعْلَمَ مِنَ السَّائِلِ» قَالَ: فَأَخْبِرْنِي عَنْ أَمَارَتِهَا. قَالَ: «أَنْ تَلِدَ الْأُمَةُ رَبَّتَهَا، وَأَنْ تَرَى الْحُقَاةَ الْعُرَاةَ الْعَالَةَ رِعَاءَ الشَّيْءِ يَتَطَاوَلُونَ فِي الْبُنْيَانِ» قَالَ: ثُمَّ انْطَلَقَ فَلَبِثْتُ مَلِيًّا، ثُمَّ قَالَ لِي: «يَا عُمَرُ! أَتَدْرِي مِنَ السَّائِلِ؟» قُلْتُ: اللَّهُ وَرَسُولُهُ أَعْلَمُ. قَالَ: «فَإِنَّهُ جَبْرِيْلُ أَتَاكُمْ يُعَلِّمُكُمْ دِينَكُمْ.» (صحيح مسلم: 37 /1)
6. عَنْ سَيِّدَةِ بَنِي مَعْبِدٍ الْجُهَنِيِّ رَضِيَ اللَّهُ عَنْهُ قَالَ: قَالَ النَّبِيُّ ﷺ: مُرُوا الصَّبِيَّ بِالصَّلَاةِ إِذَا بَلَغَ سَبْعَ سِنِينَ وَإِذَا بَلَغَ عَشَرَ سِنِينَ فَاضْرِبُوهُ عَلَيْهَا. (سنن أبي داود (133 /1) حسن) واخرجه الترمذي في سننه ولفظه: عَلِّمُوا الصَّبِيَّ الصَّلَاةَ ابْنَ سَبْعَ سِنِينَ، وَاضْرِبُوهُ عَلَيْهَا ابْنَ عَشْرِ. سنن الترمذي ت شاكر (259 /2) حسن صحيح
7. عَنْ مُعَاوِيَةَ رَضِيَ اللَّهُ عَنْهُ قَالَ: قَالَ رَسُولُ اللَّهِ ﷺ: مَنْ يُرِدِ اللَّهُ بِهِ خَيْرًا يُفَقِّهْهُ فِي الدِّينِ. صحيح البخاري (25 /1)
8. عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ قَالَ: قَالَ رَسُولُ اللَّهِ ﷺ: «مَنْ سَلَكَ طَرِيقًا يَلْتَمِسُ فِيهِ عِلْمًا، سَهَّلَ اللَّهُ لَهُ بِهِ طَرِيقًا إِلَى الْجَنَّةِ، وَمَا اجْتَمَعَ قَوْمٌ فِي بَيْتٍ مِنْ بُيُوتِ اللَّهِ، يَتْلُونَ كِتَابَ اللَّهِ، وَيَتَذَكَّرُونَ فِيهِ، إِلَّا نَزَلَتْ عَلَيْهِمُ السَّكِينَةُ، وَغَشِيَتْهُمُ الرَّحْمَةُ وَحَفَّتْهُمُ الْمَلَائِكَةُ، وَذَكَرَهُمُ اللَّهُ فِيمَنْ عِنْدَهُ، وَمَنْ بَطَأَ بِهِ عَمَلُهُ، لَمْ يُسْرِعْ بِهِ نَسَبُهُ.» صحيح مسلم (2074 /4)
9. عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ قَالَ: كَانَ رَسُولُ اللَّهِ ﷺ يَقُولُ: اَللّٰهُمَّ اِنِّيْ اَعُوْذُ بِكَ مِنَ الْاَرْبَعِ: مِنْ عِلْمٍ لَا يَنْفَعُ، وَمِنْ قَلْبٍ لَا يَخْشَعُ، وَمِنْ نَفْسٍ لَا تَتَّقِي، وَمِنْ دُعَاءٍ لَا يُسْمَعُ. مسند أحمد ط الرسالة (188 /14) سنن أبي داود (92 /2) سنن ابن ماجه (1261 /2)
10. عَنْ ابْنِ مَسْعُودٍ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ ﷺ قَالَ: «لَا تَزُولُ قَدَمُ ابْنِ آدَمَ يَوْمَ الْقِيَامَةِ مِنْ عِنْدِ رَبِّهِ حَتَّى يُسْأَلَ عَنْ خَمْسٍ؛ عَنْ عُمْرِهِ فِيمَ أَفْنَاهُ، وَعَنْ شَبَابِهِ فِيمَ أَبْلَاهُ، وَمَالِهِ مِنْ أَيْنَ اكْتَسَبَهُ وَفِيمَ أَنْفَقَهُ، وَمَاذَا عَمِلَ فِيمَا عِلِمَ. سنن الترمذي ت شاكر (4 /612)
11. عَنْ عَبْدِ اللَّهِ رَضِيَ اللَّهُ عَنْهُ قَالَ: قَالَ رَسُولُ اللَّهِ ﷺ: طَلَبُ كَسْبِ الْحَلَالِ فَرِيضَةٌ بَعْدَ الْفَرِيضَةِ. شعب الإيمان (176 /11)

12- عَنْ أَبِي سَعِيدٍ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ ﷺ قَالَ: التَّاجِرُ الصَّدُوقُ الْأَمِينُ مَعَ النَّبِيِّينَ وَالصِّدِّيقِينَ وَالشُّهَدَاءِ. سنن الدارمي (3/ 1653) سنن الترمذي ت شاكر (507/ 3)

13- عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ أَنَّ رَسُولَ اللَّهِ ﷺ قَالَ: أَتَدْرُونَ مَا الْمُفْلِسُ؟ قَالُوا: الْمُفْلِسُ فِينَا مَنْ لَا دِرْهَمَ لَهُ وَلَا مَتَاعَ. فَقَالَ: إِنَّ الْمُفْلِسَ مَنْ أَمَّتِي يَأْتِي يَوْمَ الْقِيَامَةِ بِصَلَاةٍ، وَصِيَامٍ، وَزَكَاةٍ، وَيَأْتِي قَدْ شَتَمَ هَذَا، وَقَذَفَ هَذَا، وَأَكَلَ مَالَ هَذَا، وَسَفَكَ دَمَ هَذَا، وَضَرَبَ هَذَا، فَيُعْطَى هَذَا مِنْ حَسَنَاتِهِ، وَهَذَا مِنْ حَسَنَاتِهِ، فَإِنْ فَنِيَتْ حَسَنَاتُهُ قَبْلَ أَنْ يُفْضَلَ مَا عَلَيْهِ، أُخِذَ مِنْ خَطَايَاهُمْ فَطُرِحَتْ عَلَيْهِ، ثُمَّ طُرِحَ فِي النَّارِ. صحيح مسلم (4/ 1997)

14- عَنْ أَبِي الدَّرْدَاءِ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ ﷺ قَالَ: إِنَّ أَثْقَلَ شَيْءٍ يُوضَعُ فِي مِيزَانِ الْمُؤْمِنِينَ يَوْمَ الْقِيَامَةِ خُلُقٌ حَسَنٌ. وَإِنَّ اللَّهَ يُبْعِضُ الْفَاحِشَ الْبَذِيَّ. شرح السنة للبغوي (13/ 78)

15- عَنْ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا أَنَّ رَسُولَ اللَّهِ ﷺ قَالَ: أَرْبَعٌ مَنْ أُعْطِيَهُنَّ فَقَدْ أُعْطِيَ خَيْرَ الدُّنْيَا وَالْآخِرَةِ؛ قَلْبًا شَاكِرًا، وَلِسَانًا ذَاكِرًا، وَبَدَنًا عَلَى الْبَلَاءِ صَابِرًا، وَزَوْجَةً لَا تَبْغِيهِ خَوْنًا فِي نَفْسِهَا وَلَا مَالِهِ. المعجم الأوسط (7/ 179)

16- عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ، عَنِ النَّبِيِّ ﷺ قَالَ: اجْتَنِبُوا السَّبْعَ الْمُؤْبَقَاتِ. قَالُوا: يَا رَسُولَ اللَّهِ! وَمَا هُنَّ؟ قَالَ: الشِّرْكَ بِاللَّهِ، وَالسِّخْرُ، وَقَتْلُ النَّفْسِ الَّتِي حَرَّمَ اللَّهُ إِلَّا بِالْحَقِّ، وَكُلُّ الرِّبَا، وَكُلُّ مَالِ الْيَتِيمِ، وَالتَّوَلَّى يَوْمَ الرَّحْفِ، وَقَذْفُ الْمُحْصَنَاتِ الْمُؤْمِنَاتِ الْغَافِلَاتِ. صحيح البخاري (4/ 10)

17- عَنْ أَبِي سَعِيدٍ الْخُدْرِيِّ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ ﷺ قَالَ: مَنْ رَأَى مِنْكُمْ مُنْكَرًا فَلْيُغَيِّرْهُ بِيَدِهِ، فَإِنْ لَمْ يَسْتَطِعْ فَبِلِسَانِهِ، فَإِنْ لَمْ يَسْتَطِعْ فَبِقَلْبِهِ، وَذَلِكَ أَضْعَفُ الْإِيمَانِ. صحيح مسلم (1/ 69)

18- يُجَاءُ بِالرَّجُلِ يَوْمَ الْقِيَامَةِ، فَيُلْقَى فِي النَّارِ، فَيَنْدَلِقُ أَقْتَابُهُ فِي النَّارِ، فَيَطْحَنُ فِيهَا كَطْحَنِ الْحِمَارِ بِرَحَاهُ، فَيَجْتَمِعُ أَهْلُ النَّارِ عَلَيْهِ، فَيَقُولُونَ: أَيُّ فُلَانٍ! مَا شَأْنُكَ؟ أَلَيْسَ كُنْتَ تَأْمُرُنَا بِالْمَعْرُوفِ، وَتَنْهَانَا عَنِ الْمُنْكَرِ؟ قَالَ: كُنْتُ أَمُرُّكُمْ بِالْمَعْرُوفِ وَلَا آتِيهِ، وَأَنْهَأُكُمْ عَنِ الْمُنْكَرِ وَآتِيهِ. شرح السنة للبغوي (14/ 352، 351)

19- عَنْ أَنَسٍ رَضِيَ اللَّهُ عَنْهُ، عَنِ النَّبِيِّ ﷺ قَالَ: وَالَّذِي نَفْسِي بِيَدِهِ، لَا يُؤْمِنُ عَبْدٌ حَتَّى يُحِبَّ لِأَخِيهِ مَا يُحِبُّ لِنَفْسِهِ. صحيح مسلم (1/ 68)

20- عَنِ الثَّعْمَانِ بْنِ بَشِيرٍ رَضِيَ اللَّهُ عَنْهُ يَقُولُ: قَالَ رَسُولُ اللَّهِ ﷺ: تَرَى الْمُؤْمِنِينَ فِي تَرَاحِمِهِمْ وَتَوَادِهِمْ وَتَعَاطُفِهِمْ، كَمَثَلِ الْجَسَدِ، إِذَا اشْتَكَى عُضْوًا تَدَاعَى لَهُ سَائِرُ جَسَدِهِ بِالسَّهَرِ وَالْحُمَى. صحيح البخاري (8/ 10)

21- عَنْ عَبْدِ اللَّهِ بْنِ عُمَرَ رَضِيَ اللَّهُ عَنْهُمَا: أَنَّ رَسُولَ اللَّهِ ﷺ قَالَ: أَلَا كُلُّكُمْ رَاعٍ وَكُلُّكُمْ مَسْئُولٌ عَنْ رَعِيَّتِهِ، فَالْإِمَامُ الَّذِي عَلَى النَّاسِ رَاعٍ وَهُوَ مَسْئُولٌ عَنْ رَعِيَّتِهِ، وَالرَّجُلُ رَاعٍ عَلَى أَهْلِ بَيْتِهِ، وَهُوَ مَسْئُولٌ عَنْ رَعِيَّتِهِ، وَالْمَرْأَةُ رَاعِيَةٌ عَلَى أَهْلِ بَيْتِ زَوْجِهَا، وَوَلَدِهِ وَهِيَ مَسْئُولَةٌ عَنْهُمْ، وَعَبْدُ الرَّجُلِ رَاعٍ عَلَى مَالِ سَيِّدِهِ وَهُوَ مَسْئُولٌ عَنْهُ، أَلَا فَكُلُّكُمْ رَاعٍ وَكُلُّكُمْ مَسْئُولٌ عَنْ رَعِيَّتِهِ. صحيح البخاري (9/ 62)

22- عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ، قَالَ: قَالَ رَسُولُ اللَّهِ ﷺ: «مَثَلِي وَمَثَلُ الْأَنْبِيَاءِ كَمَثَلِ قَصْرِ أَحْسَنِ بُنْيَانِهِ، تُرِكَ مِنْهُ مَوْضِعٌ لِبَنَةِ، فَطَافَ بِهَا النَّظَارُ يَتَعَجَّبُونَ مِنْ حُسْنِ بِنَانِهِ إِلَّا مَوْضِعَ تِلْكَ اللَّبَنَةِ، لَا يَعْيَبُونَ سِوَاهَا، فَكُنْتُ أَنَا سَدَدْتُ مَوْضِعَ تِلْكَ اللَّبَنَةِ، خُتِمَ بِي الْبُنْيَانُ، وَخُتِمَ بِي الرُّسُلُ» وفي رواية: فَأَنَا اللَّبَنَةُ، وَأَنَا خَاتَمُ النَّبِيِّينَ. شرح السنة للبغوي (13/ 201)

23- عَنْ أَنَسِ بْنِ مَالِكٍ رَضِيَ اللَّهُ عَنْهُ، عَنِ النَّبِيِّ ﷺ قَالَ: "أَرْحَمُ أُمَّتِي بِأُمَّتِي أَبُو بَكْرٍ، وَأَشَدُّهُمْ فِي أَمْرِ اللَّهِ عُمَرُ وَأَصْدَقُهُمْ حَيَاءُ عُثْمَانُ وَأَفْضَاهُمْ عَلِيٌّ، وَأَفْرَضُهُمْ زَيْدُ بْنُ ثَابِتٍ، وَأَفْرَوُهُمْ لِكِتَابِ اللَّهِ أَنَبِيُّ بْنُ كَعْبٍ، وَأَعْلَمُهُمْ بِالْحَلَالِ وَالْحَرَامِ مُعَاذُ بْنُ جَبَلٍ، أَلَا وَإِنَّ لِكُلِّ أُمَّةٍ أَمِيئًا، وَإِنَّ أَمِينَ هَذِهِ الْأُمَّةِ أَبُو عُبَيْدَةَ بْنُ الْجَرَّاحِ. مسند أحمد ط الرسالة (21/ 406) سنن ابن ماجه (1/ 55)

24. عَنْ أَبِي بَكْرَةَ رَضِيَ اللَّهُ عَنْهُ يَقُولُ: رَأَيْتُ رَسُولَ اللَّهِ ﷺ عَلَى الْمُنْبَرِ وَالْحَسَنُ بْنُ عَلِيٍّ إِلَى جَنْبِهِ، وَهُوَ يُقِيلُ عَلَى النَّاسِ مَرَّةً، وَعَلَيْهِ أُخْرَى وَيَقُولُ: «إِنَّ ابْنِي هَذَا سَيِّدٌ وَلَعَلَّ اللَّهَ أَنْ يُصْلِحَ بِهِ بَيْنَ فِتْنَتَيْنِ عَظِيمَتَيْنِ مِنَ الْمُسْلِمِينَ. صحيح البخاري (186/3)

25. عَنْ عِمْرَانَ بْنِ حُصَيْنٍ رَضِيَ اللَّهُ عَنْهُمَا، يَقُولُ: قَالَ رَسُولُ اللَّهِ ﷺ: " خَيْرُ أُمَّتِي قَرْنِي، ثُمَّ الَّذِينَ يَلُونَهُمْ، ثُمَّ الَّذِينَ يَلُونَهُمْ. صحيح البخاري (2/5)

26. عَنْ جَابِرِ بْنِ عَبْدِ اللَّهِ رَضِيَ اللَّهُ عَنْهُ قَالَ: حَظَبْنَا رَسُولَ اللَّهِ ﷺ فِي وَسْطِ أَيَّامِ التَّشْرِيقِ حُطْبَةَ الْوَدَاعِ، فَقَالَ: " يَا أَيُّهَا النَّاسُ، إِنَّ رَبَّكُمْ وَاحِدٌ، وَإِنَّ آبَاكُمْ وَاحِدٌ، أَلَا لَا فَضْلَ لِعَرَبِيٍّ عَلَى عَجَمِيٍّ، وَلَا لِعَجَمِيٍّ عَلَى عَرَبِيٍّ، وَلَا لِأَحْمَرَ عَلَى أَسْوَدَ، وَلَا أَسْوَدَ عَلَى أَحْمَرَ، إِلَّا بِالتَّقْوَى، إِنَّ أَكْرَمَكُمْ عِنْدَ اللَّهِ أَتْقَاكُمْ، أَلَا هَلْ بَلَّغْتُ؟ "، قَالُوا: بَلَى يَا رَسُولَ اللَّهِ، قَالَ: " فَلْيُبَلِّغِ الشَّاهِدَ الْغَائِبَ. شعب الإيمان (132/7)

Recommended Books

1. Translation of the Holy Qur'an by Abdullah Yousuf Ali
2. The Glorious Qur'an by Dr Muhammad Tahir-ul-Qadri
3. Hameed ullah Muhammad, "Muslim Conduct of State"
4. Hameed ullah Muhammad, 'Introduction to Islam'
5. Hussain Hamid Hassan, "An Introduction to the Study of Islamic Law" Leaf Publication Islamabad, Pakistan.
6. Ahmad Hasan, "Principles of Islamic Jurisprudence" Islamic Research Institute, International Islamic University, Islamabad (Latest Edition)
7. Mir Waliullah, "Muslim Jurisprudence and the Quranic Law of Crimes" Islamic Book Service (Latest Edition)
8. H.S. Bhatia, "Studies in Islamic Law, Religion and Society" Deep & Deep Publications New Delhi (Latest Edition)
9. Dr. Muhammad Zia-ul-Haq, "Introduction to Al Sharia Al Islamia" Allama Iqbal Open University, Islamabad (Latest Edition)

نصابی کتاب

تفہیم اسلامیات از پروفیسر محمد نواز چوہدری و دیگر یا کوئی بھی کتاب جس میں کورس آؤٹ لائن کے مطابق مواد موجود ہو

حوالہ جاتی کتاب

تفسیر القرآن العظیم از ابن کثیر
تفسیر روح المعانی از شہاب الدین محمود آلوسی
معارف القرآن از مفتی محمد شفیع

ضیاء القرآن از پیر کرم شاہ الازہری
 مشکاة المصابیح از منظور تبریزی
 معارف الحدیث از منظور نعمانی
 سیرت النبی ﷺ از شبلی نعمانی و سید سلمان ندوی
 الرحیق المختوم از صفی الرحمن مبارکپوری
 سیر الصحابہ از شاہ معین الدین ندوی
 تاریخ اسلام از شاہ معین الدین ندوی
 عشرہ مبشرہ از محمود احمد ظفر
 اسلامی تہذیب اور اس کے اصول و مبادی از سید ابوالاعلیٰ مودودی
 اسلام اور جدید ذہن کے شبہات از سید محمد قطب
 خطبات بہاولپور از ڈاکٹر محمد حمید اللہ

Other Reference Materials

1. Tafheem e Islamiyat by Prof Dr. M. Nawaz Chohdary
2. Islamic Education by M D Zafar
3. Islamic Studies by Rafique Mohammad

Understanding of Quran-I
GEN-125

Program-Discipline	BS – Computer Science
Credit Hours	(0,1)
Duration	18 Weeks

Course Title: Understanding of Quran-I

Course Code: GEN-125

Course Description

This required course focuses on writing clearly and cogently, overcoming prevalent errors in language, mastering rules in grammar and syntax, and developing skills in organizing and structuring different forms of writing. The course consists of two major parts: the reading section-focuses on recognizing a topic sentence, skimming, scanning, use of cohesive devices, identifying facts and opinions, guess meanings of unfamiliar words etc. The writing section deals with the knowledge and the use of various grammatical components and essay writing skills which would enable students to write effective and advanced expository writing.

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student will be able to:

- Develop the ability to understand basic words of the Quran, phrases and sentences that do not contain verbs (unit 1 to 5 of Muallim ul Quran Book) and then sentences having present tense (first half of unit 6 of Muallim ul Quran Book).
- Acquire a strong foundation for understanding long verses of the Quran with clarity.
- Comprehend Quranic vocabulary, particles (operative & non operative particles), compounds (Adjective & Possessive compound), pronouns (singular & plural) and types of plural through hundreds of Quranic sentences.
- Recognize and understand different styles of Quranic sentences, including nominal sentence, emphatic sentence, double emphatic sentence, negative sentence, interrogative sentence, oath –based sentences.
- Strengthen understanding of fundamental Quranic linguistic styles, expressions and idioms.
- Understand at least 30 to 40% of each page of the holy Quran.

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

Exam		Weightage
(a)	End-Semester Exam	50
(b)	Mid-Semester Exam	30
(c)	Quiz / assignment*	20
(d)	Practical / Lab / Projects	
(e)	Class Participation	
Total		100

Practical / Lab Courses

	Exam	Weightage
(a)	End-Semester Exam	30
(b)	Mid-Semester Exam	20
(c)	Experiment/Lab Reports / Viva Voce / Project / PBL (Problem Based Learning)	50
	Total	100

*One Quiz and One Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. 3x16 = 48 contact hours in the semester.

Week Wise Course Outline

Week	Lessons	Assignments/Home Task	Linguistic Rules
1	1-6	Writing the meaning of Quranic words Lesson 1-8	Proper Noun Masculine & Feminine
	9-14	Writing the meaning of Quranic words 9-14	Two kinds of plural Concept of (و) "And "Common Noun
2	15-17	Writing the meaning of Quranic Words, phrases & Translation of Sentences 15-17	Demonstrative Noun (This & That for Masculine (هذه - هذا) Demonstrative Noun (This & That for Feminine) (ذلك - تلك)
	18-19 & Revision (Unit 1)	Writing the meaning of Quranic words, Phrases & Translation of sentences 17-19 QUIZ	Laam for emphasis (لام التأكيد) Superlative Degree like أكبر Revision of all Quranic Sentences
3	1-3	Writing the meaning of Quranic words, phrases & translation of Sentences 1-3	Emphatic Particle إن Preposition "for" (اللام) Preposition (في)
	4-6	Writing the meaning of Quranic words, phrases & translation of Sentences 4-6	Preposition (على - من - الى)
4	7-9	Writing the meaning of Quranic words & translation of Sentences 7-9	Preposition (الباء) Absolute Negation Particle Exceptive Particle (لا النافية للجنس - ما النافية - الآ)
	10-13 & Revision (Unit 2)	Writing the meaning of Quranic words, phrases & translation of Sentences 10-13 QUIZ	Subordinating Conjunction (أن), Was (كان), Vocative Particle (حرف النداء)
5	1-2	Writing the meaning of Quranic phrases 1-2	Quranic Adjective Compounds (صفت وموصوف)

	3-5	Writing the meaning of Quranic words, phrases & translation of Sentences 3-5	Quranic Possessive Construction (مضاف ومضاف اليه)
6	6-7	Writing the meaning of Quranic phrases & Translation of Sentences 8-10	Quranic Possessive Construction (مضاف ومضاف اليه)
	8-10 & Revision (Unit 3)	Writing the meaning of Quranic words, phrases & translation of Sentences 3-5 QUIZ	Active Participle (اسم الفاعل), Passive Participle (اسم المفعول), Dual(مثنى)
7	1-2	Writing the meaning of Quranic phrases & Translation of Sentences 1-2	Personal Pronoun He (هو المنفصل) Possessive Pronoun His (هو المتصل)
	3-4	Writing the meaning of Quranic words, phrases & translation of Sentences 3-4	Possessive Pronouns with Prepositions like في Pronoun "His" with prepositions like له، منه، فيه
8	5-8	Writing the meaning of Quranic Sentences 5-8	Personal Pronoun You(له - منه - فيه) Possessive Pronoun Your (أنت المنفصل) Possessive Pronouns with Prepositions like في Pronoun "your" with prepositions Like., منك، فيك ،
9	MID TERM EXAMS		
10	9-11	Writing the meaning of Quranic phrases & sentences 9-11	Personal Pronoun She (هي المنفصل) Possessive Pronoun Her (هي المتصل) Possessive Pronoun with prepositions Like في Pronoun "Her" with prepositions like لها،
	12-14	Writing the meaning of Quranic phrases & sentences 12-14	Personal Pronoun (أنا المنفصل) Possessive Pronoun Her ي المتصل

11	15-16	Writing the meaning of Quranic phrases & sentences 15-16	Possessive Pronoun with Prepositions like Pronoun "My" with prepositions like لي
	17 & Revision (Unit 4)	Revision of all Quranic sentences of Unit 4 QUIZ	Adverb (حال)
12	1-2	Writing the meaning of Quranic phrases & sentences 1-2	Masculine Plural جمع المذكر السالم وجمع المذكر السالم المسبوق بحرف الجر
	3-4	Writing the meaning of Quranic phrases & sentences 3-4	Possessive Construction with Plurals جمع المذكر السالم المسبوق بالإضافة
13	5-6	Writing the meaning of Quranic phrases, sentences & verses 5-6	Personal Pronoun They (هم المنفصل) Personal Pronoun Their (هم المتصل)
	7-8	Writing the meaning of Quranic phrases, sentences & verses 7-8	Possessive Pronoun with Prepositions like في بيتهم Pronoun "Their" with prepositions like لهم
14	9-11	Writing the meaning of Quranic phrases, sentences & verses 9-11	Personal Pronoun You (أنت المتصل) Personal Pronoun Your (كم المتصل) Personal Pronoun with Prepositions فيكم
	12-14	Writing the meaning of Quranic phrases & sentences & verses 12-14	Pronoun "Your,, with prepositions like لكم Personal Pronoun We (نحن) Possessive Pronoun Our like لنا (المتصل)
15	15-16	Writing the meaning of Quranic sentences & verses 15-16	Possessive Pronouns with Prepositions like في بيتنا Pronoun "Our" with prepositions like لنا
	17-18	Writing the meaning of Quranic sentences & Verses 17-18	Demonstrative Pronoun: These, Those (هؤلاء – أولئك)

16	19-20	Writing the meaning of Quranic sentences & Verses 19-20	ما / إلا، إن / إلا، إنما، ليس، ما، (/إم، أن، بل، كأن،
	21-22	Writing the meaning of Quranic sentences & Verses 21-22	(ألا، أليس، اليوم، يومئذ، سبحان، ما بينها، قل، إذن، بئس، نعم، كلا، ما أدراك، حسب، أعلم ب، مصير، مرجع، دينا (تمييز)
17	23	Translation of Quranic Sentences & Verses 23	(ألا، أليس، اليوم، يومئذ، سبحان، ما بينها، قل، إذن، بئس، نعم، كلا، ما أدراك، حسب، أعلم ب، مصير، مرجع، دينا (تمييز)
	Revision (Unit 5)	QUIZ	Revision of all Quranic Sentences
18	END SEMESTER EXAM		

Recommended Book

1. Muallim ul Quran (Volume1&2) by Dr. Ubaid ur Rahman

Other material, content and books

1. Paper book: All volumes are available in printed book form.
2. Tutorial videos: Teaching video of each lesson available on YouTube.
3. Confirmation Videos: A complete series of confirmation videos of all lessons is available, in which the student can confirm his answers.
4. A flipbook: A flipbook edition is also accessible.
5. Helping material: Helping material for the teachers like quizzes, question papers and images is available on website.

**Programming Fundamentals
CCC-111**

Program-Discipline	BS – Computer Science
Credit Hours	4 (3+1)
Duration	18 Weeks

Course Title: Programming Fundamentals

Course Code: CCC-111

Course Description

This course provides fundamental concepts of programming to freshmen. This foundational course serves as the gateway to the world of programming for freshmen, offering essential concepts and skills to build a solid understanding of programming. Recognizing its pivotal role, the course is designated as a prerequisite for various subsequent courses, emphasize its significance in laying the groundwork for a comprehensive understanding of programming. As the courses is prerequisite to many other courses, therefore, students are strongly advised to cover all contents and try to achieve course learning objectives to the maximum possible level. The primary objective of this course is to equip students with a robust foundation in programming and introduce problem-solving skills. The course is taught using C++ programming language for the practical/Lab purpose, providing students with hands-on experience in applying theoretical concepts to real-world programming scenarios. Through a series of programming assignments and lab sessions, students gain practical insights into the art and science of coding.

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student will be able to:

CLO No.	CLO Description
CLO-1	<u>Understand</u> the basic problem-solving steps and logic constructs.
CLO-2	<u>Apply</u> basic programming concepts by developing software and by applying debugging and testing techniques to identify and resolve errors in code.
CLO-3	<u>Design</u> and implement algorithms to <u>solve</u> real world problems.
CLO-4	Proficiently <u>use</u> modern tools and techniques, to create solutions for solving complex problems.

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

Exam		Weightage
(a)	End-Semester Exam	50
(b)	Mid-Semester Exam	30
(c)	Quiz / assignment*	20
(d)	Practical / Lab / Projects	
(e)	Class Participation	
Total		100

Practical / Lab Courses

Exam		Weightage
(a)	End-Semester Exam	30
(b)	Mid-Semester Exam	20
(c)	Experiment/Lab Reports / Viva Voce / Project / PBL (Problem Based Learning)	50
Total		100

*One Quiz and One Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. 3x16 = 48 contact hours in the semester.

Week Wise Course Outline

Week	Contents
1	• Introduction to problem solving, steps of problem solving, a brief review of Von-Neumann architecture, introduction to programming, types of programming languages, introduction to IDE.
2	• Role of compiler and linker, introduction to algorithms, introduction to flowcharts, header files and their significance, syntax and semantics.
3	• Types of errors, comments in programming, best practices and coding standards, importance of writing clean, modular and maintainable code and adhering to coding standards, basic data types and variables, escape sequences, input/output constructs or functions
4	• Basic data types and variables, escape sequences, input/output constructs or functions, C++ operators, C++ arithmetic operators, comparison and logical operators
5	• C++ operators, operator precedence, type casting and its types, C++ conditional statements and execution flow for conditional statements (if statement, if else statement, else if statement, switch statement)
6	• C++ conditional statements and execution flow for conditional statements (if statement, if else statement, else if statement, switch statement,
7	• Conditional statement using conditional operator), nested if Repetitive statements and execution flow for repetitive statements(for, while and do while loops),
8	• Nested loops, C++break and continue statement. Functions, Introduction to Functions, Function Declaration, Function Definition, Formal & Informal parameters,
9	MID TERM EXAMS

10	C++ Function parameters, create a Function, call a Function, Parameters and Arguments, Default Parameter Value, Multiple Parameters, Return Values, Pass by Reference, Pass Arrays as Function Parameters
11	C++ function overloading, Over riding C++ , Arrays
12	Structures, create a Structure, Access Structure Member, One Structure in Multiple Variables, Named Structures, C++ Enumeration, (enum), Change Values, Enum in a Switch Statement,
13	References, Creating References, Memory Address, Pointers, Creating Pointers, Dereference, Modify Pointers
14	C++ string and string operations, pointers/references, static and dynamic memory allocation.
15	File Handling, File I/O operations
16	C++ File, Create and Write to a File, Read a File
17	Exception Handling
18	END SEMESTER EXAMS

Lab sessions are aligned with theory lectures. As new concepts are covered in lectures, they will be practiced in the lab to reinforce understanding and enhance skills. Reviewing lecture topics before each lab session is recommended for effective practice.

Week Wise Course Outline (Lab)

Week	Contents
1	• Introduction Programming Fundamentals
2	• Basic Programs for understanding of syntax and language
3	• Operators and Expressions(Arithmetic, logical, relational, assignment operators)
4	• Control Structures (if, if-else, nested if,)
5	• Control Structures (Switch etc)
6	• Iterative Structures (for, while, do-while loops)
7	• Arrays / Lists
8	• Functions(User-defined functions, parameters, return values)
9	MID TERM EXAMS
10	• Recursion(Recursive functions and examples)
11	• Pointers
12	• Structures
13	• Pointers & Functions
14	• Pointers & Structure
15	• File Handling
16	• Exception Handling
17	• Semester Project
18	END SEMESTER EXAMS

Recommended Books

1. Starting out with Programming Logic & Deigns, 4th Edition, Tony Gaddis,
2. The C Programming Language, 2nd Edition by Brian W. Kernighan, Dennis M. Ritchie
3. Object Oriented Programming in C++ by Robert Lafore
4. C How to Program, 7th Edition by Paul Deitel & Harvey Deitel
5. Problem Solving and Program Design in C++, 7th Edition by Jeri R. Hanly & Elliot B. Koffman

**Calculus and Analytic Geometry
CAL-121**

Program-Discipline	BS – Computer Science
Credit Hours	3 (3+0)
Duration	18 Weeks

Course Title: Calculus and Analytic Geometry

Course Code: CAL-121

Course Description

This course provides foundation and basic ground for calculus and analytical geometry background.

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student will be able to:

CLO No.	CLO Description
CLO-1	<u>Understand</u> the concepts of limits, continuity, and differentiation in calculus and their applications.
CLO-2	<u>Apply</u> techniques of differentiation and integration to solve real-world problems.
CLO-3	<u>Analyze</u> and interpret geometrical and physical meanings of derivatives and integrals.
CLO-4	Demonstrate proficiency in <u>solving</u> problems related to extreme values, mean value theorems, and applications of integrals.

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

Exam		Weightage
(a)	End-Semester Exam	50
(b)	Mid-Semester Exam	30
(c)	Quiz / assignment*	20
(d)	Practical / Lab / Projects	
(e)	Class Participation	
Total		100

*One Quiz and One Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. $3 \times 16 = 48$ contact hours in the semester.

Week Wise Course Outline

Week	Contents
1	Limits and Continuity; Introduction to functions, Introduction to limits.
2	Techniques of finding limits, indeterminate forms of limits.
3	Continuous and discontinuous functions and their applications.
4	Differential calculus; Concept and idea of differentiation.
5	Geometrical and Physical meaning of derivatives, Rules of differentiation, Techniques of differentiation.
6	Rates of change, Tangents and Normal lines, Chain rule.
7	Implicit differentiation, linear approximation, Applications of differentiation.
8	Extreme values of functions.
9	MID TERM EXAMS
10	Mean value theorems.
11	Maxima and Minima of a function for single-variable, Concavity.
12	Integral calculus; Concept and idea of Integration, Indefinite Integrals.
13	Techniques of integration, Riemann sums and Definite Integrals.
14	Applications of definite integrals, Improper integral, Applications of Integration.
15	Area under the curve, Analytical Geometry
16	Straight lines in 3D.
17	Equations for planes.
18	END SEMESTER EXAMS

Recommended Books

1. Calculus and Analytic Geometry by Kenneth W. Thomas.
2. Calculus by Stewart, James.
3. Calculus by Earl William Swokowski; Michael Olinick; Dennis Pence; Jeffery A. Cole.

Pre-Mathematics-I
MTD-111

Program-Discipline	BS – Computer Science
Credit Hours	3 (3+0)
Duration	18 Weeks

Course Title: ***Pre-Mathematics-I

Course Code: MTD-111

Course Description

This course is only for those students who have not studied Mathematics of intermediate level. This course provides a comprehensive exploration of fundamental mathematical concepts. It spans from complex numbers and matrices to vectors, sequences, and series. The curriculum delves into permutation, combination, probability, mathematical induction, and the binomial theorem. Functions, graphs, linear programming, and trigonometry, including identities and applications, are covered with a focus on practical problem-solving. The course aims to equip participants with a solid foundation in mathematics, fostering analytical thinking and proficiency in various mathematical domains.

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student will be able to:

CLO No.	CLO Description
CLO-1	<u>Demonstrate</u> proficiency in complex number theory, including properties and solving equations.
CLO-2	<u>Apply</u> algebraic operations to matrices and determinants, solving linear equations systematically. <u>Apply</u> vector operations and products effectively in both two and three-dimensional spaces.
CLO-3	<u>Apply</u> trigonometric identities to solve complex equations and real-world problems involving triangles and circles.

Weightage of Exams

Theory Subjects (May Include Practical / Lab Element)

Exam		Weightage
(a)	End-Semester Exam	50
(b)	Mid-Semester Exam	30
(c)	Quiz / assignment*	20
(d)	Practical / Lab / Projects	
(e)	Class Participation	
Total		100

*One Quiz and One Assignment per Semester is mandatory. More than One Quiz/Assignment may be taken and average or the best score shall be credited in such case.

One (01) Credit Hour of Theory is equivalent to One (01) contact hour per week i.e. One Hour teaching per Week. In the semester of 16 weeks of teaching, 3 Credit Hours of Theory Course means (3x16) 48 contact hours in the semester.

In the semester of 16 weeks of teaching, one (01) Credit Hour of Lab is equivalent to 3 contact hours per week for 16 weeks i.e. $3 \times 16 = 48$ contact hours in the semester.

Week Wise Course Outline

Week	Contents
1	• COMPLEX NUMBERS: Introduction, Properties, and Solution of equations.
2	• MATRICES AND DETERMINANTS: Introduction, Algebra of Matrices, Determinants, Properties of Determinants.
3	• MATRICE ROW OPERATIONS: Row and Column Operations, Solving System of Linear Equations.
4	• VECTORS: Vectors in Plane, Vectors in Space, Properties of Vector Addition, Properties of Scalar Multiplication, Dot or Scalar Product, Cross or Vector Product, Scalar Triple Product.
5	• SEQUENCES AND SERIES: Introduction, Arithmetic Sequence, Arithmetic Mean, Arithmetic Series, Geometric Sequence,
6	• SEQUENCES AND SERIES: Geometric Mean, Geometric Series, Harmonic Sequence, Harmonic Mean.
7	• PERMUTATION, COMBINATION AND PROBABILITY: Factorial of a Natural Number, Permutation, Combination, Probability
8	• BINOMIAL THEOREM: Binomial Theorem, Binomial Series.
9	MID TERM EXAMS
10	• FUNCTIONS AND GRAPHS: Function, Inverse Function, Graphical Representation of Functions
11	• TRIGONOMETRIC IDENTITIES OF SUM AND DIFFERENCE OF ANGLES: Fundamental Law of Trigonometry, Trigonometric Ratios of Allied Angles.
12	• Double, Half and Triple Angle Identities, Sum, Difference and Product of sine and cosine.
13	• APPLICATION OF TRIGONOMETRY: Solving Triangles, Area of a Triangle
14	• FUNCTIONS AND SOLUTION OF TRIGONOMETRIC EQUATIONS: Period of Trigonometric Functions, Graphs of Trigonometric Functions.

15	• Solving Trigonometric Equations Graphically, Inverse Trigonometric Functions
16	• General Trigonometric Equations
17	REVISION
18	END SEMESTER EXAMS

Recommended Book

1. A Textbook of Algebra and Trigonometry Mathematics for class XI National Book Foundation, Islamabad.

