UNIVERSITY OF SARGODHA
OFFICE OF THE REGISTRAR
(ACAD BRANCH)

NOTIFICATION

On the recommendations of Academic Council made in its 19th (4/2023) meeting held on 13.09.2023, the Syndicate in its 64th (4/2023) meeting held on 03.11.2023 approved the curriculum of B.Sc. Computer Engineering for implementation w.e..f. Fall 2025 (Annex-'A').

(WAQAR AHMAD)
Additional Registrar (General)

No. SU/Acad/25/971

Dated: 17.09.2025

Distribution:

- Chairman Department of Electrical, Electronics and Computer System, CET
- Controller of Examinations
- Director Academics

C.C:

- Principal, College of Engineering & Technology
- Director, QEC
- Secretary to the Vice-Chancellor
- PA to Registrar
- Notification File

Curriculum Booklet 2025

BSe Computer Engneering

Department of Electrical, Electronics and Computer Systems

College of Engineering and Technology

University of Sargodha

August 21, 2025

Contents

1. Introduction

The BSc Computer Engineering curriculum is designed to provide students with a comprehensive foundation in computer engineering principles, theories, and practices. The program covers a wide range of topics, including programming, networking and communication, signal processing, artificial intelligence and machine learning, and basic to advance level electronics. Students also learn about computer-aided design, simulation, and hardware interfacing. The curriculum is structured to develop students' problem-solving skills, critical thinking, and analytical abilities, preparing them for careers in computer engineering, research, and development.

2. Aims and Objectives

Aims:

1. To align the BSc Computer Engineering curriculum with the latest industry trends, technologies, and research advancements, ensuring students are well-prepared for the changing engineering landscape.
2. To enhance the curriculum's focus on developing essential skills such as problem-solving, critical thinking, and communication, enabling graduates to effectively address real-world engineering challenges.

Objectives:

1. To strengthen the program's emphasis on design, innovation, and entrepreneurship, enabling students to develop innovative solutions and products that address societal needs and promote sustainable development.
2. To ensure that the curriculum meets the accreditation requirements of the Pakistan Engineering Council (PEC) and other relevant regulatory bodies, maintaining the program's high standards and reputation.
3. To include emerging areas in computer engineering, such as cloud computing, artificial intelligence and machine learning, and to ensure that students are equipped with the necessary knowledge and skills to work in these fields

3. Program Learning Outcomes (PLOs)

Program Learning Outcomes (PLOs) are the narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills and attitude that the students acquire while progressing through the program. Specifically, it is to be demonstrated that the students have acquired the defined PLOs/GAs. By the time of graduation, the students have to attain a certain set of knowledge, skills and behavioral traits, at-

least to some acceptable minimum level (usually known as a Key Performance Indicator (KPIs), which is 50% at present).

1. **PLO-1 Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and Engineering specialization to the solution of complex engineering problems (WK1-WK4).
2. **PLO-2 Problem Analysis:** Identify, formulate, conduct research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1- WK4).
3. **PLO-3 Design/Development of Solutions:** An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (WK5).
4. **PLO-4 Investigation:** Conduct investigation of complex Engineering problems using research-based knowledge and research methods, including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions (WK8).
5. **PLO-5 Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex Engineering problems, with an understanding of the limitations (WK2 and WK6).
6. **PLO-6 The Engineer and the World:** Analyze and evaluate sustainable development impacts to society, the economy, sustainability, health and safety, legal frameworks, and the environment while solving complex engineering problems (WK1, WK5, and WK7).
7. **PLO-7 Ethics:** Apply ethical principles and commit to professional ethics and norms of engineering practice and adhere to relevant national and international laws. Demonstrate an understanding of the need for diversity and inclusion (WK9).
8. **PLO-8 Individual and Collaborative Team Work:** Function effectively as an individual, and as a member or leader in diverse and inclusive teams and in multi-disciplinary, face-to-face, remote and distributed settings (WK9).
9. **PLO-9 Communication:** Communicate effectively and inclusively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, and make effective presentations, taking into account cultural, language, and learning differences (WK1 and WK9).

10. **PLO-10 Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision- making and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments (WK2 and WK5).
11. **PLO-11 Lifelong Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8 and WK9).

These PLOs are evaluated for each student using,

1. **Directly Assessment:** The tools/methods for direct assessment are as follows.
   - Quizzes
   - Assignments
   - Presentation
   - Viva
   - Complex Engineering Problems
   - Class participation /discussion
   - Open Ended Labs / Assignments.
   - Problem Based Learning
   - Final Year Design Projects and Semester Projects
   - Exam(s): Mid and Final
2. **Indirect Assessment:** The tools/methods for indirect assessment are as follows.
   - Internship survey
   - Exit survey

4. Admission Requirements

1. **Eligibility:**
   a. At least 60% marks in HSSC (Part I/II). Pre-Engineering/Pre-Medical, ICS. Relevant DAE or Equivalent.
   b. PEC designated entry test marks (Minimum Marks as specified by PEC from time to time).
2. **Merit Determination**:
   a. 50 % Weightage of HSSC (Part-I / II) or Equivalent or DAE (1st and 2nd years/1st, 2nd & 3rd year).
   b. 17% Weightage of SSC or Equivalent.

c. 33% weightage to latest PEC designated entry test.

d. 20 marks for Hafiz-e-Quran if applicable.

5. Degree Requirements

1. Successful completion of 133 credit hours with no "F" Grade.
2. An industrial training/internship of 6-8 weeks.

6. Program Structure

Title of Degree Program	BSc Computer Engineering
Duration	Minimum 4-Years (8-Semesters), Maximum 6-Years (12-Semesters))
Number of weeks per semester	18 (16 for Teaching and 2 for Examinations)
Number of credit hours per semester	14-18
Total number of credit hours	133
Non-Engineering Courses	16 Courses, 48 Credit Hours, 36.1% of total
Engineering Course	24 Courses, 85 Credit Hours, 63.9 % of total

Lec CH: Lecture Credit Hours *(1 Credit Hour = 1 Contact Hour)*

Lab CH: Laboratory Credit Hours *(1 Credit Hour = 3 Contact Hours)*

7. Detailed Curriculum

	Knowledge Area	S#	Code	Subject Title	Cr. Hour		Total Crh.
					Th.	Lab	
Non-Engineering Domain	Natural Sciences	1	GS1101	Calculus & Analytical Geometry	3	0	18
		2	GS1201	Linear Algebra and Differential Equations	3	0	
		3	GS2101	Complex Variable and Transforms	3	0	
		4	GS4101	Numerical Methods	3	0	
		5	GS1102	Applied Physics	2	0	
		6	GS1103	Applied Physics Lab	0	1	
		7	GS3201	Probability and Statistics	3	0	
	Total				**17**	**1**	
	Management Sciences	1	EM2201	Engineering Project Management	3	0	5
		2	URCG-5124	Entrepreneurship	2	0	

	Total				5	0	
	Humanities	1	URCG-5118	Functional English	3	0	**19**
		2	URCG-5119	Expository Writing	3	0	
		3	URCG-5105/ URCG-5126	Islamic Studies/Ethics	2	0	
		4	URCG-5128	Pakistan Studies	2	0	
		5	HU2201	Communication Skills	2	0	
		6	HU3101	Engineering Economics	2	0	
		7	URCG-5125	Civics and Community Engagement	2	0	
		8	URCG-5127	Seerat of the Holy Prophet (SAW)	1	0	
		9	URCG-5129	Understanding of Holy Quran/Fehm-e-Quran-I	1	0	
		10	URCG-5130	Understanding of Holy Quran/Fehm-e-Quran-II	1	0	
	Total				**19**	**0**	
Non-Engineering Domain Total					**41**	**1**	**42**
Engineering Domain	Basic Computing	1	CSE1101	Information and Communication Technologies	2	0	**10**
		2	CSE1102	Information and Communication Technologies Lab	0	1	
		3	CSE2101	Discrete Structures	3	0	
		4	CSE1201	Computer Programming	3	0	
		5	CSE1202	Computer Programming Lab	0	1	
	Total				**8**	**2**	
	Engineering Foundation	1	EE1201	Linear Circuit Analysis	3	0	**29**
		2	EE1202	Linear Circuit Analysis Lab	0	1	
		3	CSE1103	Computer Engineering Workshop	0	1	
		4	EE2201	Signals & Systems	3	0	
		5	EE2202	Signals & Systems Lab	0	1	
		6	CSE2102	Digital Logic Design	3	0	
		7	CSE2103	Digital Logic Design Lab	0	1	

	8	EE1203	Electronic Devices and Circuits	3	0	
	9	EE1204	Electronic Devices and Circuits Lab	0	1	
	10	CSE2201	Data Structures and Algorithms	3	0	
	11	CSE2202	Data Structures and Algorithms Lab	0	1	
	12	CSE2203	Computer Organization and Architecture	3	0	
	13	CSE2204	Computer Organization and Architecture Lab	0	1	
	14	CSE2104	Object Oriented Programming	3	0	
	15	CSE2105	Object Oriented Programming Lab	0	1	
Total				**21**	**8**	
Major Based Core Courses (Breadth)	1	CSE3101	Computer Communication and Networks	3	0	**23**
	2	CSE3102	Computer Communication and Networks Lab	0	1	
	3	CSE3103	Microprocessors and Interfacing	3	0	
	4	CSE3104	Microprocessors and Interfacing Lab	0	1	
	5	CSE3105	Operating Systems	3	0	
	6	CSE3106	Operating Systems Lab	0	1	
	7	CSE3201	Database Management System	3	0	
	8	CSE3202	Database Management System Lab	0	1	
	9	CSE3203	Software Engineering	3	0	
	10	CSE3107	Digital Signal Processing	3	0	
	11	CSE3108	Digital Signal Processing Lab	0	1	
Total				**18**	**5**	
Major Based Core Courses (Depth)	1	CSE4101	Digital System Design	3	0	**20**
	2	CSE4102	Digital System Design Lab	0	1	
	3	CSE4103	Cloud and Distributed Computing	3	0	
	4	CSE4104	Cloud and Distributed Computing Lab	0	1	
	5	CSE32--	CEDE-1	3	0	
	6	CSE32--	CEDE-1 Lab	0	1	
	7	CSE32--	CEDE-2	3	0	

		8	CSE32--	CEDE-2 Lab	0	1	
		9	CSE42--	CEDE-3	3	0	
		10	CSE42--	CEDE-3 Lab	0	1	
	Total				**15**	**5**	
	Interdisciplanary Engineering Electives	1	XX42--	IDEE 1	3	0	**7**
		2	XX42--	IDEE 2	3	0	
		3	CSE1104	Occupational Health and Safety	1	0	
	Total				7	0	
	Final Year Design Project	1	EE4199	Final Year Design Project (Part 1)	0	3	**6**
		2	EE4299	Final Year Design Project (Part 2)	0	3	
	Total				**0**	**6**	
Total (Engineering Domain)					**69**	**26**	**95**
GRAND TOTAL					**110**	**27**	**137**

Theory	**Practical**	
80.3 %	**19.7 %**	
Engineering	**Non-Engineering**	
69.3 %	**30.7 %**	

8. List of Elective Courses

Category	S.#	Course Code	Course Title	Cr. Hrs.	
				Th	Lab
IDEE 1	1	EE4201	Linear Control System	3	0
	2	EE4202	Renewable Energy Resources	3	0
	3	EE4203	VLSI Design	3	0
	4	EE4204	Analog Filter Design	3	0

	5	EE4205	Robotics and Automation	3	0
IDEE 2	1	EE4206	Digtal Control System	3	0
	2	EE4207	Introduction to Embedded Systems	3	0
	3	EE4208	Wireless Sensor Networks	3	0
	4	EE4209	Cellular Communication	3	0
	5	EE4210	Introduction to Nanotechnology	3	0
	6	EE4211	Integrated Circuit Fabrication	3	0
CEDE 1	1	CSE3208	Introduction to Embedded Systems	3	0
	2	CSE3209	Introduction to Embedded Systems Lab	0	1
	3	CSE3210	Digital Image Processing	3	0
	4	CSE3211	Digital Image Processing Lab	0	1
	5	CSE3212	Artificial Intelligence and Machine Learning	3	0
	6	CSE3213	Artificial Intelligence and Machine Learning Lab	0	1
	7	CSE3214	Neural Networks and Fuzzy Logic	3	0
	8	CSE3215	Neural Networks and Fuzzy Logic Lab	0	1
	9	CSE3216	Human Computer Interaction	3	0
	10	CSE3217	Human Computer Interaction Lab	0	1
CEDE 2	1	CSE3218	System and Network Security	3	0
	2	CSE3219	System and Network Security Lab	0	1
	3	CSE3220	High Performance Computing	3	0
	4	CSE3221	High Performance Computing Lab	0	1
	5	CSE3222	Computer Vision	3	0
	6	CSE3223	Computer Vision Lab	0	1
	7	CSE3224	Game Development	3	0
	8	CSE3225	Game Development Lab	0	1
	9	CSE3226	Mobile Applications	3	0

	10	CSE3227	Mobile Applications Lab	0	1
CEDE 3	1	CSE4203	Algorithm Design and Analysis	3	0
	2	CSE4204	Algorithm Design and Analysis Lab	0	1
	3	CSE4205	Big Data Analysis	3	0
	4	CSE4206	Big Data Analysis Lab	0	1
	5	CSE4207	Internet of Things	3	0
	6	CSE4208	Internet of Things Lab	0	1
	7	CSE4209	Virtual Reality	3	0
	8	CSE4210	Virtual Reality Lab	0	1
	9	CSE4211	Pattern Recognition	3	0
	10	CSE4212	Pattern Recognition Lab	0	1

9. Scheme of Study

Nomenclature:

1. **GS:** General Sciences
2. **HU:** Social Sciences and Humanities
3. **IDEE:** Interdisciplinary Engineering Electives
4. **EE:** Electrical Engineering
5. **EM:** Management Sciences
6. **CSE:** Computer Engineering
7. **URCG:** University Assigned Code
8. **Couse Code Nomenclature**

Category	Year	Semester	Couse Number
CSE	1	2	01
Computer Engineering course number 01 in 2nd semester of 1st year.			

Year	Sem.	S.#	Course Code	Course Name	Credit Hours		Cont. Hrs.
					Th	Lab	
First Year	Semester 1	1	GS1101	Calculus & Analytical Geometry	3	0	23
		2	GS1102	Applied Physics	2	0	
		3	GS1103	Applied Physics Lab	0	1	
		4	CSE1101	Information and Communication Technologies	2	0	
		5	CSE1102	Information and Communication Technologies Lab	0	1	
		6	URCG-5118	Functional English	3	0	
		7	URCG-5105/ URCG-5126	Islamic Studies/Ethics	2	0	
		8	CSE1103	Computer Engineering Workshop	0	1	
		9	CSE1104	Occupational Health and Safety	1	0	
		10	URCG-5127	Seerat of the Holy Prophet (SAW)	1	0	
				Total	**14**	**3**	
					17		
	Semester 2	1	GS1201	Linear Algebra and Differential Equations	3	0	24
		2	CSE1201	Computer Programming	3	0	
		3	CSE1202	Computer Programming Lab	0	1	
		4	URCG-5128	Pakistan Studies	2	0	
		5	EE1201	Linear Circuit Analysis	3	0	
		6	EE1202	Linear Circuit Analysis Lab	0	1	
		7	EE1203	Electronic Devices and Circuits	3	0	
		8	EE1204	Electronic Devices and Circuits Lab	0	1	
		9	URCG-5129	Understanding of Holy Quran/Fehm-e-Quran-I	1	0	
				Total	**15**	**3**	
					18		
Second Year	Semester 3	1	GS2101	Complex Variable and Transforms	3	0	22
		2	CSE2101	Discrete Structures	3	0	
		3	URCG-5119	Expository Writing	3	0	
		4	CSE2102	Digital Logic Design	3	0	
		5	CSE2103	Digital Logic Design Lab	0	1	

		6	CSE2104	Object Oriented Programming	3	0	
		7	CSE2105	Object Oriented Programming Lab	0	1	
		8	URCG-5130	Understanding of Holy Quran/Fehm-e-Quran-II	1	0	
		Total			**16**	**2**	
					18		
	Semester 4	1	HU2201	Communication Skills	2	0	**23**
		2	EM2201	Engineering Project Management	3	0	
		3	EE2201	Signals & Systems	3	0	
		4	EE2202	Signals & Systems Lab	0	1	
		5	CSE2201	Data Structures and Algorithms	3	0	
		6	CSE2202	Data Structures and Algorithms Lab	0	1	
		7	CSE2203	Computer Organization and Architecture	3	0	
		8	CSE2204	Computer Organization and Architecture Lab	0	1	
		Total			14	**3**	
					17		
Third Year	**Semester 5**	1	HU3101	Engineering Economics	2	0	**26**
		2	CSE3101	Computer Communication and Networks	3	0	
		3	CSE3102	Computer Communication and Networks Lab	0	1	
		4	CSE3103	Microprocessors and Interfacing	3	0	
		5	CSE3104	Microprocessors and Interfacing Lab	0	1	
		6	CSE3105	Operating Systems	3	0	
		7	CSE3106	Operating Systems Lab	0	1	
		8	CSE3107	Digital Signal Processing	3	0	
		9	CSE3108	Digital Signal Processing Lab	0	1	
		Total			**14**	**4**	
					18		
	Semester 6	1	GS3201	Probability and Statistics	3	0	**24**
		2	CSE3201	Database Management System	3	0	
		3	CSE3202	Database Management System Lab	0	1	
		4	CSE3203	Software Engineering	3	0	
		5	CSE32--	CEDE-1	3	0	

		6	CSE32--	CEDE-1 Lab	0	1	
		7	CSE32--	CEDE-2	3	0	
		8	CSE32--	CEDE-2 Lab	0	1	
		Total			**15**	**3**	
					18		
Fourth Year	**Semester 7**	1	GS4101	Numerical Methods	3	0	**26**
		2	URCG-5124	Entrepreneurship	2	0	
		3	CSE4101	Digital System Design	3	0	
		4	CSE4102	Digital System Design Lab	0	1	
		5	CSE4103	Cloud and Distributed Computing	3	0	
		6	CSE4104	Cloud and Distributed Computing Lab	0	1	
		7	EE4199	Final Year Design Project (Part 1)	0	3	
		Total			**11**	**5**	
					16		
	Semester 8	1	URCG-5125	Civics and Community Engagement	2	0	**23**
		2	CSE42--	CEDE-3	3	0	
		3	CSE42--	CEDE-3 Lab	0	1	
		4	XX42--	IDEE 1	3	0	
		5	XX42--	IDEE 2	3	0	
		6	EE4299	Final Year Design Project (Part 2)	0	3	
		Total			**11**	**4**	
					15		

Summary				
Domain	**Knowledge Area**	**Total Courses**	**Total Cr Hrs**	**Percentage**
Non-Engineering	Humanities	10	19	30.7 %
	Management Sciences	2	5	
	Natural Sciences	6	18	
	Sub Total	**18**	**42**	
Engineering	Basic Computing	3	**10**	69.3 %
	Engineering Foundation	8	29	
	Major Based Core (Breadth)	6	23	
	Major Based Core (Depth)	5	20	
	Multi-Disciplinary Engineering Elective	3	7	
	Final Year Design Project	1	6	
	Sub Total	**23**	**95**	
Total		**41**	**137**	

10. Course Contents

Calculus and Analytical Geometry (GS1101)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	0	Practical	0
Total	48	Total	3

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Solve the problems of complex number, limits, differentiation integration and vector calculus by various methods.	1	C2	WK2	9	1,2
2	Analyze the problem of differentiation and integration to various engineering scenarios.	2	C3	WK2	8.9	3

Course Outline:

Analytical Geometry

- Review of vectors, scalars and vector products.
- Three dimensional coordinate system and equation of straight line and plane

Functions Limit and Continuity

- Review of functions and graphs,
- Limits & Continuity,
- Techniques of Finding Limits,
- Discontinuity,
- Limits of Sine and Cosine and Exponential Functions

Differentiation

- Introduction to Derivatives
- Examples of Derivatives
- Derivative as Rate of Change
- Derivative's Rules

- Implicit Differentiation
- Higher order derivative
- Leibnitz Theorem

Applications of Derivatives

- Applications of Derivatives
- Monotonic functions
- Optimization problems
- Relative and Absolute extrema
- First and second derivative tests
- Point of inflection
- Concavity
- Curvature
- Indeterminate Forms and L' Hospital rule
- Differentials

Integration

- Integrals and Properties of Integrals
- Techniques of Integration
- Integration by Parts
- Definite Integrals
- Integration of Trigonometric
- Exponential and Inverse Functions
- Integration by Partial Fractions
- Reduction Rules

Applications of Integration

- Applications of Integration
- Area under the curve
- Area between curves
- Solids of Revolution
- Volume of Solids of revolution by disk
- Washer, Cylindrical shell & Cross Section Methods Center of Pressure and Depth of Center of Pressure

- Center of mass
- Are length

Improper Integrals

- Improper Integral
- Integrals and Singularities
- Convergence of improper integrals

Infinite Sequence and Series

- Sequence and Infinite Series
- Convergence and Divergence of sequences and series
- Positive Term Series
- Integral Test
- Basic Comparison Test
- Limit Comparison Test
- Ratio and Root tests
- Alternating series
- Absolute and Conditional Convergence

Power and Taylor Series

- Power series
- Maclaurin and Taylor Series and its Applications

Recommended Books

1. J. R. Hass, C. D. Heil and M. D. Wier,"*Thomas' Calculus*", 14th ed, London, UK: Pearson, 2017
2. James Stewart, "*Essential Calculus*", 2nd Edition, USA: Cengage Learning, 2012
3. Erwin Kreyszig, "*Advanced Engineering Mathematics*", 10th Ed. New Jersey, USA: Wiley 2011

Linear Algebra and Differential Equations (GS1201)

Contact Hours		Credit Hours	
Theory	48	Theory	3

Practical	0	Practical	0
Total	48	Total	3

Complex Variable and Transforms (GS2101)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	0	Practical	0
Total	48	Total	3

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Explain the limit, continuity, integral and differentiability concepts of complex valued function	1	C2	1	9	1,2
2	Apply complex function and transformations to solve engineering problems	2	C3	2	8,9	3

Course Outline:

Introduction:

- Review of complex numbers. Complex valued functions, Elementary functions (exponential and logarithmic functions. Trigonometric and hyperbolic functions and theirs inverses).
- Limits and continuity.
- Applications in Engineering .

Complex Differentiation and Integration

- Derivatives of complex valued functions, Differentiability.
- Analyticity. Cauchy Riemann Equations, Harmonic Functions.
- Complex integrals. Cauchy-Goursat Theorem. Independence of Path. Cauchy's Integral Formulas and Their Consequences. Applications

Power Series:

- Taylor Series, Laurent Series, Singularities, Zeros and poles, Residue integration method, Residue theorem,
- Conformal mapping

Laplace Transformation:

- Linearity, Scaling. First shifting theorem, Heaviside's Shifting theorem,
- Inverse Laplace transformation, Properties of inverse Laplace,
- Convolution theorem, Applications in relevant engineering discipline

Special functions and Fourier Transforms:

- Gamma, Beta functions, Periodic functions, Error function.
- Fourier Series, Fourier Sine and Cosine series,
- Fourier transform, Fourier cosine and sine transform, properties.
- Applications in relevant engineering discipline

Z-Transformation:

- Z-transform. Properties of Z-transform, linearity and scaling. Standard Z-transform, Inverse Z-transform,
- Inverse Z- transform by using residue, convolution theorem of Z- transform,
- Formation of difference equation and its solution using Z- transform.

Recommended Books:

1. Advanced Engineering Mathematics, by Erwin Kreyszing, Latest Edition
2. Complex Variables and Applications by Churchill, Latest Edition
3. R. J. Beerends, Fourier and Laplace Transform, Cambridge University Press, Latest Edition.
4. Jeffry A, Advanced Engineering Mathematics, Elsevier, Latest Edition

Applied Physics (Theory: GS1102, Practical: GS1103)

Contact Hours		Credit Hours	
Theory	32	Theory	2
Practical	48	Practical	1
Total	80	Total	3

Course Learning Objective:

An Applied Physics course covers fundamtal topics such as vectors, mechanics. electrostatics, and magnetism, providing a strong foundation in classical physics. It then delves into specialized areas like semiconductor physics, exploring the behavior of materials crucial to modern electronics. Additionally. students study waves, oscillations, optics, and lasers. exploring into the principles behind light and its applications. The course may conclude with an overview of modern physics. offering insights into cutting-edge research and technologies.

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1	Discuss the electrostatic, electromagnetic and fundamental mechanics	1	C2	1	9	1,2
2	Apply basic laws of physics to solve numerical questions	1	C3	2	9	1,2
Lab						
1	Execute experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Organize individual and team working skills in the performance of given task	8	A3	9	10	5,101,6
3	Design a project of application of Physics	11	P4	8	9.13	11,12,13

Course Outline:

Vectors

Review of vectors, Ordinary Differentiation of Vector, Gradient of Scaler field. Divergence and Curl of Vector Field, Line and Surface Integrals with applications.

Mechanics

Newton Laws and their Applications (Simple Accelerometer. Banked Curve and Rotor), Frictional Forces and determination of Co-efficient of Friction, Work-Energy Theorem, applications of law of Conservation of Energy. Angular Momentum, Centre of Mass of two-particles. Many-particles and Solid Object, Rotational Inertia of Solid Bodies.

Electrostatics And Magnetism

Electric field due to Discrete and Continuous Charge Distribution, Electrostatic Potential of discrete and Continuous charges, Applications of Gauss's Law. Lorentz Force and Hall effect, Ampere's Law. Magnetic Field due to Circular Current Loop and Solenoid. Magnetic dipole, Atomic and Nuclear Magnetism, Magnetization. Magnetic Materials.

Semiconductor Physics

Energy levels in a Semiconductor, Hole concept, Intrinsic and Extrinsic regions, Law of Mass Action. P-N junction, Transistors

Waves And Oscillations

Simple Harmonic Oscillator, Damped Harmonic Oscillation, Forced Oscillation and Resonance, Types of Wave and Superposition Principle, Wave Speed on a stretched string, Wave equation, Energy & Power of a Wave.

Optics And Lasers

Huygens Principle, Two-slit interference, Single-Slit Diffraction, Resolving power of Optical Instruments. Principles for Laser action, Types of Laser, Applications of Laser.

Modern Physics

Planck's explanations of Black Body Radiation Photoelectric Effect, Compton Effect, De-Broglie Hypothesis, Electron Microscope, Atomic structure, X-rays and Moseley's Law, Atomic Nucleus and Properties of Nucleus, Radioactive Decay and Radioactive Dating. Radiation Detection Activate Instruments, Nuclear Reactions

Recommended Books:

1. R.A. Serway and J.W. Jewett, Jr, "*Physics for Scientists and Engineers*" 7th Edition, USA: Cengage Learning, 2007
2. Hugh D. Young and Roger A. Freedman, "*University Physics*"14th Edition. New York City, USA: Pearson, 2015
3. D. Halliday, R. Resnick, J. Walker. "*Fundamentals of Physics Extended*", 10th edition, New Jersey, USA: Willey, 2013
4. D. Corson & Lorrain, "*Fundamentals of Electromagnetic Phenomenon*", 1st ed, New York, USA:W. H. Freeman, 2000

Probability and Statistics (GS3201)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	0	Practical	0
Total	48	Total	3

Prerequisites: Calculus and Analytic Geometry

Course Learning Objective:

This course provides the students with a deeper understanding about the theory of probability and the concepts of statistical data analysis. It discusses the types, collection, interpretation, and analysis of statistical data and gives an insight about its use in inferential statistics like regression,

confidence ranges, and hypothesis testing. The course enables the students to learn and apply the tools for curve fitting via linear regression and correlation. The course also enables them to aptly deal with the problems of probability and random functions later in their engineering degree program.

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Apply the basic concepts of probability, random variables, and their use in different problems	1	C3	2	9	1,2
2	Analyze descriptive statistics using numerical and graphical techniques.	2	C4	2,3	4,8	3
3	Use statistical methodology and tools in the engineering problem-solving	2	C3	2,3	11,12	3

Course outline:

Basic Statistical Parameters and Data Representation

- Importance of statistics, population, sample, variables, and measurement
- Primary and secondary data,
- Frequency distribution, stem, and leaf display,
- Histogram, frequency polygon, cumulative frequency polygon,
- Simple & Multiple Bar diagrams

Measure of Central Tendency and Dispersion

- Measures of central tendency, AM, GM, HM
- Quantiles, Mode, Applications of averages
- Quartile and mean deviation, Variance, Standard deviation,
- Moments, Moment ratios, Skewness, Kurtosis
- Applications of Measure of dispersion in Engineering

Regression, Correlation and Curve Fitting

- Regression theory, Simple linear regression line
- Correlation, coefficient of correlation.
- Fitting of a first- and second-degree curves
- Principle of least squares.

Fundamental Concepts of Probability

- Set Operation
- Sample Space
- Events and Probabilities
- Probability Axioms
- Conditional Probability
- Independence
- Bayes' Theorem

Discrete Random Variables

- Probability Mass Function
- Bernoulli, Geometric, Binomial and Poisson Random Variable
- Variance and Standard Deviation
- Conditional Probability Mass Function

Continuous Random Variables

- CDF of Continuous Random Variables
- Probability density function
- Expected Value
- Uniform, Gaussian, Standard Normal Random Variables
- Probability Models
- Error Functions and Q-Functions
- Finding probabilities of a normally distributed random variable by using Standard Normal Curve.

Recommended books:

1. Alberto Leon-Garcia, *"Probability and Random Processes for Electrical Engineering."* 3rd ed, New Jersey, USA: Prentice Hall, 2008.
2. Peyton Z. Peeble Jr,*"Probability and Random Variables and Random Signal Principles"* 4th ed, New York City, USA: McGraw Hill, 2001.
3. Richard L. Scheaffer and James T. McClave," *Probability and Statistics for Engineers"* 5th ed, USA: Brooks /Cole, 2011.
4. Probability and Stochastic Processes - A friendly introduction for Electrical and Computer Engineers by Roy D. Yates & David J. Goodman, John Wiley and Sons Inc., 2005, Ed: 3rd
5. Probability, Random variables and Stochastic Processes by Papoulis and Pillai, Ed: 4th
6. Statistical Methods and Estimations by M. Anwar Solangi

7. Applied Statistics and Probability for Engineering by Douglas C. Montgomery
8. A First Course in Probability by Sheldon Ross 9th Edition, Prentice Hall

Numerical Methods (GS4101)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	0	Practical	0
Total	48	Total	3

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Apply Numerical techniques to solve the mathematical problems of calculus, Differential Equations and optimization.	1	C3	2	9	1,2
2	Analyze simple Engineering problems using Numerical Methods.	2	C4	2	9,11,12	3

Course Outline:

Error Analysis and Interpolation

- Error analysis, Types of error, Sources of error, Norms of vectors and matrices, Computer arithmetic, Condition number of a matrix, Significant digits and loss of significant digits, Floating point arithmetic, Binary and decimal representation, Single and double precision
- Interpolation: Newton forward and backward difference formula for interpolation, Central difference interpolation formulae, Lagrange's interpolation, Error in interpolation, Linear least square approximation, Interpolation versus least square approximation, Relevant engineering case studies

Numerical Differentiation and Integration

- Derivation of numerical differentiation of first order and second order derivatives using two points, three points, and five points formulas along with its application in engineering. Relevant case studies
- Numerical integration: Trapezoidal rule, Simpson's rules, Composite Trapezoidal Simpson Rules and Romberg integration, Applications of numerical in engineering, Relevant case studies

Methods of solution a system of Linear Equations

- Solution of system of linear algebraic equations, Gauss elimination method
- LU factorization, Tridiagonal solver
- Applications of these methods in engineering disciplines, Relevant case studies

Iterative Methods for Linear and Nonlinear Equations

- Numerical Solution of nonlinear equations: Bisection method, Newton's method, Secant method, Convergence analysis of these methods
- Newton's method for system of nonlinear equations
- Solution of system of linear equations by Jacobi, Gauss Seidel and SOR methods, Applications of these methods in engineering disciplines, relevant case studies.

Numerical Methods for IVPs and BVPs

- Euler's method and its variations, Taylor's higher order methods. Error analysis, Consistency, stability and convergence.
- Runge-Kutta methods of order 2, 3, and 4, Stiff ODEs, Consistency, stability and convergence.
- Linear multistep methods, Numerical solution of system of ODEs
- Numerical solution of BVPs by Finite Difference Method
- Applications in engineering: Some relevant case studies

Numerical Methods for Computing Eigenvalues

- Eigenvalues and Eigenvectors of matrix: power method; inverse power method, Shifted inverse power method; Applications of eigenvalues in engineering disciplines.

Numerical Optimization

- Unconstrained Optimization, Golden search ratio, Lagrange Multipliers, Method of steepest descent Applications of optimization in engineering disciplines.

Recommended Books:

1. Numerical Analysis by Richard L. Burden Numerical Methods with Applications by Autar K. Kaw
2. Numerical Methods for Scientist and Engineers by R. W. Hamming (Latest Edition)

Numerical Methods for Engineers by Steven C. Chapra and R. P. Canale (Latest Edition)

Information and Communication Technologies (Theory: CSE1101, Practical: CSE1102)

Contact Hours	Credit Hours

Theory	32	Theory	2
Practical	48	Practical	1
Total	80	Total	3

Course Learning Objective:

This course is designed to provide students with an exploration of the practical applications of Information and Communication Technologies (ICT) and software tools in various domains. Students will gain hands on experience with range of software applications, learning how to leverage ICT to solve daily life problems, enhance productivity and innovate in different fields. Through individual and interactive exercises and discussions, students will develop proficiency in utilizing software for communication, creativity and more.

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1	Explain the fundamental concepts, components and scope of Information and Communication Technologies (ICT).	1	C2	1	9	1, 2
2	Apply ICT platforms and tools for different purposes to address basic needs in different domains of daily, academic and professional life.	6	C3	7	1, 3, 11	6, 7
3	Understand the ethical and legal considerations in use of ICT platforms and tools.	7	A2	9	5, 10, 16	8
Lab						
1	Utilize appropriate simulation software.	5	P3	2.6	9	3,5
2	Express individual and team working skills in the execution of given task	8	A3	9	5,10	10
3	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2.8	9	5

Course Outline:

Introduction to Information and Communication Technologies

- Components of Information and Communication Technologies (Basics of Hardware, Software, ICT platforms, Networks, Local and Cloud data storage etc.).

- Scope of Information and Communication Technologies (use of ICT in Education, Business, Governance, Healthcare, Digital Media and Entertainment etc.).
- Emerging technologies and future trends.

Basic ICT Productivity Tools

- Effective use of popular search engines (e.g. Google, Bing etc.) to explore www (World Wide Web).
- Formal Communication tools and etiquettes (Gmail, Microsoft Outlook etc.).
- Microsoft Office Suits (Word, Excel, PowerPoint).
- Google Workspace (Google Docs, Sheets, Slides).
- Cloud Storage (Dropbox, Google Drive, Microsoft OneDrive).
- Evernote (Note taking and organization applications) and OneNote (Microsoft's digital notebook for capturing and organizing ideas).
- Video conferencing (Google Meet. Microsoft Teams, Zoom etc.).
- Social Media Applications (LinkedIn, Facebook, Instagram etc.),

ICT in Education

- Working with learning management systems (Moodle, Canvas, Google Classrooms etc.).
- Sources of online education courses (Cousera, edX, Udemy, Khan Academy etc.).
- Interactive multimedia and virtual classrooms.

ICT in Health and Well-being

- Health and fitness tracking devices and applications (Google Fit, Samsung Health, Apple Health, Xiaomi Mi Band, Runkeeper etc.).
- Telemedicine and online health consultation (OLADOC, Sehat Kahani, Marham etc.).

ICT in Personal Finance and Shopping

- Online banking and financial management tools (JazzCash, Easypaisa, Zong PayMax, 1Link and MNet, Keenu Wallet etc.).
- E commerce platforms (Daraz.pk, Telemart, Shopive etc.).

Digital Citizenship and Online Etiquette

- Digital identity and online reputation.
- Netiquette and respectful online communication.
- Cyberbullying and online harassment

Ethical considerations in use of ICT platforms and tools

- Intellectual property and copyright issues.
- Ensuring originality in content creation by avoiding plagiarism and unauthorized use of information sources.
- Content accuracy and integrity (ensuring that the content shared through ICT platforms is free from misinformation, fake news, and manipulation).

Lab Work Outline:

As part of overall learning requirements, the course will include:

1. Guided tutorials and exercises to ensure that students are proficient in commonly used software applications such as word processing software (e.g. Microsoft Word.), presentation software (e.g. Microsoft PowerPoint), spreadsheet software (e.g. Microsoft Excel) among such other tools students may be assigned practical tasks that require then to create documents, presentations and spreadsheets etc.
2. Assigning of tasks that involve creating, managing, and organizing files and folders on both local and cloud storage systems, students will practice file naming conventions, creating directories, and using cloud storage solutions (e.g. Google Drive, OneDrive).
3. The use of online learning management systems (LMS) where students can access course materials, submit assignments, participate in discussion forums and take quizzes or tests. This will provide students with the practical experience with online platforms commonly used in education and the workplace.

Recommended books:

1. "Discovering Computers" by Vernmaat, Shaffer and Freund.
2. "GO! With Microsoft Office" Series by Gaskin, Vargas, and Mc Lellan.
3. "Exploring Microsoft Office" Series by Grauer and Poatsy
4. "Computing Essentials" by Morley and Parker
5. "Technology in Actions" by Evans, Martin and Poatsy

Computer Programming (Theory: CSE1201, Practical: CSE1202

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	48	Practical	1
Total	96	Total	4

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1		1	C2			
2	Analyze code to compute the output and identify logical and syntax errors	2	C4	2,3	8,9	3
3	Design logic and implement the solution of problem using loops, arrays, functions, structures and Classes	3	C3	5	1,2,11	4
Lab						
1	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Utilize appropriate simulation tool.	5	P3	2,6	9	3,5
3	Express individual and team working skills in the performance of given task	8	A3	9	5,10	10

Course Outline:

- Introduction to problem solving
- Brief review of Von-Neumann architecture,
- Introduction to programming.
- Role of compiler and linker, Introduction to algorithms
- Basic data types and variables
- Input/output constructs
- Arithmetic, comparison and logical operators,
- Conditional statements and execution flow for conditional statements, repetitive statements and execution flow for repetitive statements
- Lists and their memory organization, multi-dimensional lists,
- Introduction to modular programming, function definition and calling, stack rolling and unrolling, string and string operations, arrays, pointers/references, static and dynamic memory allocation, File I/O operations.
- Recursion and Searching Algorithms
- Sorting Algorithms
- Graphs and Graph Algorithms
- Trees and Binary Search Trees

- Exception Handling and Debugging
- Programming language: C/C++/Java/Python.

Lab Work Outline:

Programming in C++ using simple programs, single and multidimensional arrays, functions and pointers, file i/o.

Text and Reference books:

1. Kernighan and Riechie, "*The C programming language*", 2nded, London, UK: Pearson, 1988
2. P. Deitel and H. Deitel, "*C++, How to Program*", 10thed, London, UK: Pearson, 2016
3. Starting out with Python, 4th Edition, Tony Gaddis
4. Starting out with Programming Logic & Design, 4th Edition, Tony Gaddis.
5. The C Programming Language, 2nd Edition by Brian W. Kernighan, Dennis M. Ritchie
6. Object Oriented Programming in C++ by Robert Lafore.
7. Introduction to Computation and Programming using Python: With Application to Understanding Data, 2nd Edition by Guttag, John
8. Practice of Computing Using Python, 3rd Edition by William Punch & Richard Enbody
9. Problem Solving and Program Design in C++, 7th Edition by Jeri R. Hanly & Elliot Koffman

Engineering Project Management (EM2201)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	0	Practical	0
Total	48	Total	3

Course Learning Objective:

The primary objective of this course is to get the fair understanding of core issues pertaining to Engineering Project Management. This course is aimed at providing both basic as some advanced exposure to emerging trends in the field of Project Management, so as to enable the engineering professionals of tomorrow to successfully complete sophisticated projects within the constraints of capital, time, and other resources with due regards to stakeholders set of expectations.

Engineering students will learn key Project Management skills and strategies and will be able to face emerging challenges.

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Use quality control tools to improve project management	6	C3	1,7	8,12.17	6,7
2	Care for the environmental significance and sustainability of projects	7	A2	9	5,10,16	8
3	Discuss the techniques used to manage project time, cost and scope	10	C2	2	9	9
4	Apply the techniques of project management on electrical engineering projects	10	C3	2	9	9

Course Outline:

- **Project Management Concepts**

History of Project Management, Introduction to Project Management, Project, Program & Portfolio Management, Project characteristics, Objectives& Requirements, Project Phases/Stages, Project Life Cycle, Project Environment, Project Scope & Project Charter, Project Manager, Project Stakeholder Analysis

- **Project Proposal Development**

Project Proposal, Characteristics of good proposal, Types of Proposals, Request for Proposal, Request for Quotation etc.). Proposal Templates etc.

- **Project Feasibility**

Brief review of various aspects of Project Feasibility like Technical, Social. Managerial, Economic, Financial & Marketing, Administrative etc.

- **Project Selection Criteria (Economic Analysis of Engineering Projects)**

Using Break Even Analysis, Cost Benefit Ratio, Internal Rate of Return, Net Present Value etc.

- **Project Contract & Procurement Management**

Engineering contracts, Type of contracts, understanding of procurement Process & Cycle, PPRA Rules

- **Project Planning and Scheduling**

Project Planning (Resource & HR Planning), Work Breakdown Structure, Project Network & Scheduling, Manning Schedule and Activity Charts, Critical Path Method (CPM)/Project Evaluation & Review Techniques

- **Project Costing & Estimation**

Cost Estimation in Projects, Cost components in projects and methods for cost estimation in projects, Cost Control in Projects, Estimation of Outstanding Work, Earned Value Management, Schedule & cost variance analysis

- **Project HRM & Communication Management**

Effective organization and communication for Successful Projects, Project Organizational Structures (Project matrix and project based organizations). Project HR Plan preparation, HR Need Assessment and HR Matrix, Building and Managing effective project team, Selection & control mechanism of HRM in Projects, Effective Communication Plan.

- **Project Risk Management**

Definitions Project Risk, Project Risk Management Tools, Types of Project Risk, Project Risk Assessment, Risk Identification and Mitigation, Monitoring & Controlling Risk, Generic Risk Management Strategies & Technique

- **Computer Application in Project Management**

Basic/Elementary Introduction and hands on basic exposure of use of MS Project & Primavera P6 Software in Project Management

- **Project Quality Management**

Defining Quality, Quality Assurance, Quality Management, 7 Quality Improvement Tools as applied to Project Management, Project Quality Management Plan, Quality Management Processes and Strategies

- **Project Closure & Termination**

Project Evaluation, defining project success, Project Completion Criteria, Project Audit, Project Termination & When to close a project, the termination process, Project Close Up & lesson learnt, & Project Archive

Recommended Books:

1. Project Management: A system Approach to Planning, Scheduling and Controlling 11th Edition. Harold Kerzner
2. Bennett, F. Lawrence. 1996. The management of engineering. New York: Wiley
3. Cleland, David. Field guide to project management. New York: Wiley.
4. Eisner, H. Essentials of project management and systems engineering management. New York: Wiley
5. Frame, J. D. Managing projects in organizations. San Francisco: Jossey-Bass
6. Goldratt, Eliyahu. Critical chain. North River Press
7. Haynes, M.E. Project management: From idea to implementation. Los Altos, CA: Crisp Publications.
8. Lewis, James. Project planning, scheduling & control. New York: McGraw-Hill
9. Lewis, James, P. 1998. Mastering project management. New York: McGraw- Hill

10. Lientz, Bennet & Rea, Kathryn. 1995. Project management for the 21st century. San Diego: Academic Press.
11. Miller, Roger & Lessard, Donald. 2000. The strategic management of large engineering projects. Cambridge, MA: MIT Press.
12. Nicholas, J.M. Managing business & engineering projects. Englewood Cliffs, NJ: Prentice Hall
13. Shtub, Avraham, Bard, Jonathan, & Globerson, Shlomo. 1994. Project management: Engineering, technology, and implementation. Englewood Cliffs, Prentice-Hall
14. Project Management by Adrienne Watt
15. J.R. Meredith and S.J. Mantel. Project Management: A Managerial Approach. John Wiley and Sons. New York. 2019, (Reference).
16. Jack R. Meredith and Samuel J. Mantel, Jr." Project Management: A managerial approach" 7th edition, New Jersey, USA: John Wiley and Sons, Inc. 2008
17. John M. Nicholas and Herman Steyn," Engineering and Technology: Principles and Practice", 3rd ed, Oxford, UK: Elsevier Publications, 2008
18. Paul Gardiner," Project Management: A Strategic Planning Approach", 2nd Ed, London, UK: Palgrave Macmillan, 2017

Entrepreneurship (URCG-5124)

Contact Hours		Credit Hours	
Theory	32	Theory	2
Practical	0	Practical	0
Total	32	Total	2

This course addresses the unique entrepreneurial experience of conceiving, evaluating, creating, managing, and potentially selling a business idea. The goal is to provide a solid background with practical application of important concepts applicable to the entrepreneurial environment. Entrepreneurial discussions regarding the key business areas of finance, accounting, marketing and management include the creative aspects of entrepreneurship. The course relies on classroom discussion, participation, the creation of a feasibility plan, and building a business plan to develop a comprehensive strategy for launching and managing a new venture.

Course Learning Objectives

1. To enhance the 'entrepreneurial intentions' of the students by improving their natural willingness to start a business.
2. To understand the process of entrepreneurship and learn the ways to manage it by working individually in the class and in the form of groups outside the class to conduct field assignments.
3. To educate the students about the practical underpinnings of the entrepreneurship with the aid of practical assignments and idea pitching.

Contents

1. **Background:** What is an Organization, Organizational Resources, Management Functions, Kinds of Managers, Mintzberg's Managerial Roles.
2. **Forms of Business Ownership:** The Sole proprietorship, Partnership, Joint Stock Company
3. **Entrepreneurship:** The World of the Entrepreneur, what is an entrepreneur? The Benefits of Entrepreneurship, The Potential Drawbacks of Entrepreneurship, Behind the Boom: Feeding the Entrepreneurial Fire.
4. **The Challenges of Entrepreneurship:** The Cultural Diversity in Entrepreneurship, The Power of "Small" Business, Putting Failure into Perspective, The Ten Deadly Mistakes of Entrepreneurship, How to Avoid the Pitfalls, Idea Discussions & Selection of student Projects, Islamic Ethics of Entrepreneurship.
5. **Inside the Entrepreneurial Mind:** From Ideas to Reality: Creativity, Innovation, and Entrepreneurship, Creativity – Essential to Survival, Creative Thinking, Barriers to Creativity, How to Enhance Creativity, The Creative Process, Techniques for Improving the Creative Process, Protecting Your Ideas, Idea Discussions & Selection of student Projects.
6. **Products and technology, identification opportunities**
7. **Designing a Competitive Business Model and Building a Solid Strategic Plan:** Building a strategic plan, Building a Competitive Advantage, The Strategic Management Process, Formulate strategic options and select the appropriate strategies, Discussion about execution of Students' Project.
8. **Conducting a Feasibility Analysis and Crafting a Winning Business Plan:** Conducting a Feasibility Analysis, Industry and market feasibility, Porter's five forces model, Financial feasibility analysis. Why Develop a Business Plan, The Elements of a Business Plan, What Lenders and Investors Look for in a Business Plan, Making the Business Plan Presentation.
9. **Building a Powerful Marketing Plan:** Building a Guerrilla Marketing Plan, Pinpointing the Target Market, Determining Customer Needs and Wants Through Market Research, Plotting a Guerrilla Marketing Strategy: How to Build a Competitive Edge, Feed Back & Suggestions on Student Project, Islamic Ethics for Entrepreneurial Marketing
10. **E-Commerce and the Entrepreneur:** Factors to Consider before Launching into E-Commerce, Ten Myths of E-Commerce, Strategies for E-Success, Designing a Killer Web Site, Tracking Web Results, Ensuring Web Privacy and Security, Feed Back & Suggestions on Student Project.
11. **Pricing Strategies:** Three Potent Forces: Image, Competition, and Value, Pricing Strategies and Tactics, Pricing Strategies and Methods for Retailers, The Impact of Credit on Pricing
12. **Attracting Venture Capitalist:** Projected Financial Statements, Basic Financial Statements, Ratio Analysis, Interpreting Business Ratios, Breakeven Analysis, Feed Back &Suggestions on Student Project.
13. **Idea Pitching:** Formal presentation, 5-minutes pitch, funding negotiation and launching.

Recommended Texts:

1. Scarborough, N. M. (2011). Essentials of entrepreneurship and small business management. Publishing as Prentice Hall, One Lake Street, Upper Saddle River, New Jersey 07458.

Suggested Readings:

1. Burstiner, I. (1989). Small business handbook. Prentice Hall Press.

Data Structure and Algorithms (Theory: CSE2201, Practical: CSE2202)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	48	Practical	1
Total	96	Total	4

Prerequisites: Computer Programming

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1	Describe the fundamental data structures and algorithms	1	C2	3	9	1,2
2	Estimate space and time complexity of different algorithms	2	C3	4	8,9	3
3		3				
	Analyze algorithms to organize, search and sort arbitrary data	2	C4	4	8,9	3
Lab						
1	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Utilize appropriate simulation tool.	5	P3	2,6	9	3,5
3	Express individual and team working skills in the performance of given task	8	A3	9	5,10	10

Course Outline

Introduction to Data Structures and Algorithms

- Overview of data structures and algorithms.
- Basic concepts of complexity analysis
- Notations and asymptotic analysis.

Abstract data types

- Complexity analysis
- Big O notation
- Stacks (linked lists and array implementations)
- Recursion and analyzing recursive algorithms.

SDivide and conquer algorithms.

Sorting algorithms

- Selection, insertion, merge, quick, bubble. heap, shell, radix, bucket). queue, dequeue, priority queues (linked and array implementations of queues)
- Linked list & its various types
- Sorted linked list
- Searching an unsorted array
- Binary search for sorted arrays

Hashing and indexing

- Open addressing and chaining
- Trees and tree traversals,
- Binary search trees, heaps
- M-way tress,
- Balanced tree
- Graphs
- Breadth-first and depth-first traversal
- Topological order
- Shortest path, adjacency matrix and adjacency list implementations.
- Memory management and garbage collection

Dynamic Programing:

- Introduction to dynamic programming
- Memorization and tabulation techniques
- Applications of dynamic programming

- Introduction to greedy algorithms
- Greedy algorithms and optimization problems
- Applications of greedy algorithms
- Introduction to searching algorithms
- Linear search, Binary search
- Time complexity analysis of searching algorithms

Lab Work Outline:

Programming of different functions using simple programming language of relevant to different data structures like stacks, queues, trees, graphs.

Recommended Books:

1. Horowitz Sahni, "*Fundamentals of Data Structures in C++*", 2nded, England: University Press, 1999.
2. Lipshutz, "*Data Structures*", Schaum Outline Series, USA: McGraw-Hill, 1999.
3. Weiss, "*Data structures and algorithm analysis in C++*",4thed, London, UK: Pearson, 2013
4. A. M. Tanenbaum, "*Data structures using C and C++*", 2nded, New Delhi, India: Prentice-Hall of India, 2006
5. Data Structures and Algorithms in C++ by Adam Drozdek
6. Data Structures and Algorithms Analysis in Java by Mark A. Weiss
7. Data Structures and Abstractions with Java by Frank M, Carrano and Timothy M. Henry
8. Java Software Structures: Designing and using Data Structures by John Lewis and Joseph Chase.

Linear Circuit Analysis (Theory: EE1201, Practical: EE1202)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	48	Practical	1
Total	96	Total	4

Course Learning Outcomes:

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

Theory

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Apply basic circuit laws and techniques to solve DC circuit	1	C3	WK2	9	1.2
2	Analyze the circuits containing capacitors/inductor	2	C4	WK2	7. 8	3
Lab						
1	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Express individual and team working skills in the performance of given task	8	A3	9	10	5,10,16
3	Execute a project of application of Linear Circuit Analysis	11	P4	8	9.13	11,12,13

Course Outline:

Basic Electrical Concepts

- Charge, Current, Voltage, Power
- Voltage and Current sources

Voltage and Current Laws

- Ohm's Law
- Kirchhoff's Current Law
- Kirchhoff's Voltage Lew
- Voltage Division in Series
- Current Division in Parallel
- Series and Parallel Sources

Nodal and Mesh Analysis

- Nodal Analysis and Super Node
- Mesh Analysis and Super Mesh
- Comparison between Nodal and Mesh Analysis

Circuit Analysis Techniques

- Linearity and Superposition
- Source Transformation
- Thevenin's and Norton's Theorems
- Maximum Power Transfer

- Delta-Wye Transformation

Energy Storing Elements

- The Inductor
- The Capacitor
- Physical construction and Mathematical Model

First Order Circuits (RL and RC)

- Transient Response
- Steady State Response

Lab Work Outline:

Learn the use of basic instruments in electrical engineering such as function generators, power supplies, oscilloscopes. Design and implement circuits using R, RL and RC and verify the node voltages and loop currents using instruments. Verify Circuit-theorems using lab instruments. Verify circuit transformations using lab instruments. Complex Engineering Problem using OP-AMP as black box.

Recommended books:

1. Robert L. Boylestad, "*Introductory circuit analysis*", 10th Edition, Pearson, 2003
2. S. Franco, "*Electric Circuits Fundamentals*", Oxford University Press, (Latest Edition).
3. R E Thomas, A J Rosa and G J Toussaint, "*The Analysis and Design of Linear Circuits*", 6th Edition, John Wiley, 2009
4. C Alexander and M Sadiku, "*Fundamentals of Electric Circuits*", 4th Edition, McGraw- Hill, 2008
5. J D Irwin and R M Nelms, "*Basic Engineering Circuit Analysis*", 9th Edition, Willey, 2008

Signals & Systems (Theory: EE2201, Practical: EE2202)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	48	Practical	1
Total	96	Total	4

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1	**Comment** on the basic concepts and properties of signals and systems	1	C2	3	9	1,2
2	**Analyze** signals and systems by **selecting** suitable mathematical operations	2	C4	2	9	1,2
3	Visualize the effects/properties on/of signals and systems by **Implementing** them in MATLAB/Simulink	5	C3			
Lab						
1	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Utilize appropriate simulation tools.	5	P3	2,6	9	3,5
3	Express individual skills in the performance of given task	9	A3	9	5.10	10
4	Execute project of application of signals and system	11	P4	8	9.13	11,12,13

Course Learning Outcomes:

Fundamental Concepts of Signals & Systems

- Introduction
- Signals and their Classification
- Basic Continuous and Discrete Time Signals
- Sampling theorem and aliasing
- Operations on Signals
- Systems and Classification of Systems
- Interconnections of Systems

Linear Time Invariant Systems

- Response of a Continuous Time LTI System and Convolution Integral
- Properties of Continuous and Discrete Time LTI System
- Response of a Discrete Time LTI System and Convolution Sum
- Eigen function of Continuous and Discrete Time LTI System
- Correlation

- Convolution and Properties of Convolution
- Systems Described by Difference and Differential Equations

Laplace Transform and Continuous Time LTI Systems

- The Laplace Transform
- Laplace Transform of Some Common Signals
- Properties of Laplace Transform
- The Inverse Laplace Transform
- The System Function
- Unilateral Laplace Transform
- Solving Differential Equations by Using Laplace Transform

The Z-Transform and Discrete Time LTI Systems

- The z-Transform
- z-Transform of some Common Signals
- Properties of z-Transform
- The Inverse z-Transform
- The System Function of Discrete Time LTI System
- The Unilateral z-Transform
- Solving Difference Equations by Using z-Transform

Fourier analysis of Continuous Time Signals and Systems

- Fourier Series Representations of Periodic Signals
- The Fourier Transform
- Properties of Continuous time Fourier Transform
- Time and Frequency characterization of signals and systems
- The Frequency Response of Continuous Time LTI Systems
- Filtering and Bandwidth
- Modulation

Fourier analysis of Discrete Time Signals and Systems

- Discrete Fourier Series
- Discrete Time Fourier Transform (DTFT)
- Properties of Discrete Time Fourier Transform
- The Frequency Response of Discrete time LTI Systems

- Discrete Fourier Transform (DFT)
- Properties of Discrete Fourier Transform (DFT)
- Fast Fourier Transform (FFT)

Lab Work Outline:

Develop and understanding of signal systems and transforms using MATLAB

Recommended books:

1. Alan V. Oppenheim, A. S. Willsky and S. H. Nawab, "*Signals and Systems*", 2nd Ed, USA: Prentice Hall, 1996
2. M. J. Roberts, "*Fundamentals of Signals and Systems*", 1st ed, New York City, USA: McGraw-Hill, 2007
3. B. P. Lathi, "*Linear Systems and Signals*", 2nd Edition, UK: Oxford, 2004
4. S. Haykin and B. Van Veen, "*Signals and Systems*", 2nd Edition, New Jersey, USA: Wiley, 2002
5. C. L. Phillips, J. M. Parr and E. A. Riskin, "*Signals, Systems, and Transforms*", 4th Edition, USA: Prentice Hall, 2007.

Digital Logic Design (Theory: CSE2102, Practical: CSE2103)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	48	Practical	1
Total	96	Total	4

Prerequisites: None

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1	Apply the knowledge of number systems and Boolean logic used in the development of digital circuits	1	C3	2	9	1,2

2	Analyze digital circuits using Boolean Algebra, K-Maps and binary number systems	2	C4	2,3	8,9,12	3
3	Design the combinational and sequential circuits	3	C5	3	4,8,9	3
Lab						
1	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Utilize appropriate simulation tool.	5	P3	2,6	9	3,5
3	Express individual and team working skills in the performance of given task	8	A3	9	5,10	10
4	Execute a project of application of Digital Electronics	11	P 4	8	9,13	11,12,13

Course Learning Outcomes:

Binary Systems

- Introduction
- Number Systems and Conversions
- Arithmetic with number systems
- Signed and unsigned number systems and their arithmetic Binary Codes

Boolean Algebra & Logic Gates

- Boolean Postulates & Theorerns
- Boolean Functions and their Complernents
- Sum of Min Terms & Product of Max Terms
- Standard forms & Canonical Forms
- Digital logic gates

Combinational Logic

- Analysis and Design
- Code Converters
- Adders & its types
- Subtractors, Multiplier
- Magnitude Comparator Decoders and Encoders
- Multiplexers
- Combinational Logic using Verilog simulation

Sequential Circuits

- Latches (SR Latch, D Latch)
- Flip Flops (D Flip Flop, JK Flip Flop, T. Flip Flop)
- Characteristic Tables, Characteristic Equations.
- Design and Analysis of Clocked Sequential Circuits (State Equations, State Tables,
- State Diagrams)
- Designing Counters

Registers & Counters

- Simple registers
- Registers with parallel Load
- Shift Registers/Serial to parallel Convertors
- Universal Shift Register
- Asynchronous and Synchronous Counters
- Ripple, Binary, BCD, & Johnson Counters
- Verilog for sequential logic

Introduction to Arithmetic Logic Units

- Simple Arithmetic Logic Units (ALU)
- Introduction to FPGA

Lab Work Outline:

Basic logic gates, hardware implementation of combinational logic circuits such as multiplexers and de-multiplexers, encoders/decoders, ALU; implementation of sequential circuits such as flip-flops, registers, shift registers, counters and other digital circuits. Complex engineering problem such as ALU Design in Verilog, Introduction to FPGA

Recommended Books:

1. M. Morris Mano and Micheal D. Ciletti, "*Digital Design with an introduction to the Verilog HDL*", 5th Edition. USA: Prentice Hall, 2012
2. Morris Mano and Charles R. Kime, "*Logic and Computer Design Fundamentals*", Latest Edition, UK: Pearson, 2007
3. Tocci and Widmer, "Digital Systems: Principles and Applications", Latest Edition, USA: Prentice Hall, 2000

Electronic Devices and Circuits (Theory: EE1203, Practical: EE1204)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	48	Practical	1
Total	96	Total	4

Prerequisites: None

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1	Describe the basic construction, operation and characteristics of semiconductor devices	1	C2	2,3	9	1,2
2	Analyze dc and ac response of small signal amplifier circuits using device models.	2	C4	2,3	8,12	3
3	Apply the acquired knowledge to solve small scale circuits consisting of semiconductor devices	1	C 3	2,3	9	1,2
Lab						
1	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Express individual and team working skills in the performance of given task	8	A3	9	10	5,10,16
3	Execute a project of application of Electronic Devices and Circuits	11	P 4	8	9,13	11,12,13

Course Outline:

Semiconductor Theory

- Introduction to Semiconductors.
- Intrinsic and Extrinsic Semiconductors.
- Doping and energy levels.

Diodes

- PN junction/ Biased PN junction.
- V-I Characteristics.

- Load Line and dynamic resistance.
- Diode models.
- Reverse recovery time and temperature effects
- Diode Equivalent Circuits Transitions, Recovery, Specification.
- Notations
- Testing of Diode
- Zener Diode. Light Emitting Diodes

Diode Applications

- Load Line Analysis.
- Parallel and Series Configurations.
- Zener Diodes.
- Voltage-Multiplier Circuits
- Half wave and Full wave rectifiers.
- Clippers and Clampers.
- Logic gates

Bipolar Junction Transistors

- Construction. Limits of Operation, Specification and characteristics.
- Testing. Casing and Terminal Identification of BJTs
- Amplifying action and variation in current gain.
- Common Emitter, Common Collector and Common Base Configurations.
- Power Ratings.

BJT Biasing Circuits

- Fixed Bias. Voltage Divider Bias and Emitter feedback Bias Circuits
- DC load line and operating point
- Biasing circuit design and stabilization
- Miscellaneous Configurations
- Transistor as a switch

BJT Small Signal Analysis

- AC Domain and BJT Modeling
- Common Emitter Amplifier
- Common Base Amplifier

- Common Collector Amplifier
- Amplifier Design and Loading effects
- Two Port Systems and Cascaded Systems
- Darlington and Feedback Pair
- Hybrid Equivalent Model and Hybrid z Model

Field Effect Transistors

- JFET Construction and Operation
- Transfer characteristics and parameters

FET Biasing Circuits

- Fixed Bias, Self-Bias and Voltage divider Bias
- Design of a bias circuit

FET Small Signal Analysis

- JFET/Depletion MOSFET small-signal model
- Common source, common drain and common gate amplifiers
- Loading effects and design of amplifier circuits

Recommended Books:

1. H. Boylestad and L. Nashelsky, "*Electronic Devices and Circuit Theory*"11thed, London, UK: Pearson, 2012
2. Thomas L. Floyd, "*Electronic Devices*" 10thed, London, UK: Pearson, 2018
3. Alberto P Malvino, "*Electronics Principles*", 8thed, New York City, USA: McGraw-Hill, 20

Microprocessors and Interfacing (Theory: CSE3103, Practical: CSE3104)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	48	Practical	1
Total	96	Total	3

Prerequisites: Nil

Course Learning Outcomes:

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

Theory						
No.	**CLO**	**PLO**	**Learning Level**	**WKA**	**SDGA**	**EC**
1	Describe the organization of Microprocessor based Systems with emphasis on its architecture	1	C3	2	9	1,2
2	Analyze concepts related to memory hierarchy and memory access.	2	C4	4	8,9	3
3		3	C3			
	Analyze the applications of Microprocessor based Systems	2	C 3	4	8,9	3
Lab						
1	Perform experiment according to given demonstration and draw valid conclusions	4	P3	2,8	9	5
2	Utilize appropriate simulation tool.	5	P3	2,6	9	3,5
3		10	A3			
4	Express individual and team working skills in the performance of given task	8	A 3	9	5.10	10
	Execute a project of application of embedded system	11	P 4	8	9.13	11,12,13

Course Outline:

Microprocessor Systems

- Bus structure
- DMA and interrupts
- Microprocessor Architecture
- Memory and I/O ports
- Addressing modes
- Instruction set
- Microprocessor programming techniques
- Microcontrollers.
- Memory system design: CPU read/write timing, RAM and ROM

Interfacing

- Interfacing requirements

- Address decoding and interfacing dynamic RAM
- Serial, Parallel, Programmed and interrupt driven I/O
- Direct memory access and peripheral controllers
- Programmable peripheral interface
- Universe synchronous/asynchronous receiver/transmitter and programmable interrupt controller
- Data communication standards

Lab Work Outline:

Learn to read datasheets/manuals in order to develop practical applications. Assembly and C language based microcontroller interfacing for interrupt and data based applications involving LED/ LCD, GPIO ports, communication ports, A/D, and D/A interfacing. Example project can be input voltage based speed control of DC Motor / stepper motor using PWM.

Reference books:

1. Muhammad Ali Mazidi, Rolin D. McKinlay, and Danny Causey, "*PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18*",1st ed, USA: Prentice Hall 2007.
2. Frank Vahid and Tony D. Givargis, "*Embedded System Design: A Unified Hardware/Software Introduction*", New Jersey, USA: John Wiley & Sons 2001.
3. Muhammad Ali Mazidi, Sarmad Naimi, and Sepehr Naimi, "*The AVR Microcontroller and Embedded Systems: Using Assembly and C*" 1st ed, UK: Pearson 2010
4. Embedded Systems: Introduction to Arm® Cortex TM-M Microcontrollers (Volume 1), by Jonathan W. Valvano, 5 th Edition, CreateSpace Independent Publishing Platform, 2012

Occupational Health and Safety (CSE1104)

Contact Hours		Credit Hours	
Theory	16	Theory	1
Practical	0	Practical	0
Total	16	Total	1

Course Learning Objectives:

In this course students will acquire knowledge of safe work practices applicable to office, industry, and construction settings. Additionally, they will learn how to identify, prevent, and address issues related to occupational safety and health, not only within professional environments but also in domestic settings.

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Identify hazards in the home, laboratory and workplace that pose a danger or threat to their safety or health, or that of others.	1	C1	1	9	1,2
2	Control unsafe or unhealthy hazards and propose methods to eliminate the hazard.	6	C2	1	3,13,15	6,7
3	Present a coherent analysis of a potential safety or health hazard both verbally and in writing citing the Occupational Health and Safety regulations and other supported legislation.	1	C2	1	9	1,2
4	Demonstrate a comprehension of the changes created by WHMIS and OSHA legislation in everyday life.	6	C3	1	11,13,15	6,7

Course Outline:

1. **Health and Safety Foundations**

- Nature and scope of health and safety
- Reasons/benefits and barriers for good practices of health and safety
- Legal framework and OHS Management System

2. **Fostering a Safety Culture**

- Four principles of safety- RAMP (Recognize, Assess, Minimize, Prepare)
- Re-thinking safety-learning from incidents
- Safety ethics and rules
- Roles and responsibilities towards safety
- Building positive attitude towards safety
- Safety cultures in academic institutions

3. **Recognizing and Communicating Hazards**

- Hazards and Risk
- Types of hazards: Physical (mechanical and non-mechanical), Chemical

- (Toxic and biological agents), electrical, fire, construction, heat and Temperature, noise and vibration, falling and lifting etc.
- Learning the language of safety: Signs, symbols and labels Finding Hazard Information Material safety data sheets
- Safety data sheets and the GHS (Globally Harmonized Systems)

4. **Accidents & Their Effect on Industry**

- Costs of accidents
- Time lost.
- Work injuries, parts of the body injured on the job
- Chemical burn injuries
- Construction injuries
- Fire injuries

5. **Assessing and Minimizing the Risks from Hazards**

- Risk Concept and Terminology
- Risk assessment procedure
- Risk Metric's
- Risk Estimation and Acceptability Criteria
- Principles of risk prevention
- Selection and implementation of appropriate Risk controls
- Hierarchy of controls

6. **Preparing for Emergency Response Procedures**

- Fire
- Chemical Spill
- First Aid
- Safety Drills / Trainings: Firefighting, Evacuation in case of emergency

7. **Stress and Safety at Work Environment**

- Workplace stress and sources
- Human reaction to workplace stress
- Measurement of workplace stress
- Shift work, stress and safety
- Improving safety by reducing stress

- Stress in safety managers
- Stress and workers compensation

8. **Incident Investigation**

- Importance of investigation
- Recording and reporting
- Techniques of investigation
- Monitoring
- Review
- Auditing Health and Safety

Recommended Books:

1. The A-Z of Health and Safety by Jeremy Stranks, 2006.
2. The Manager's Guide to Health & Safety at Work by Jeremy Stranks. 8th edition, 2006.
3. Occupational Safety and Health Law Handbook by Ogletree, Deakins, Nash, Smoak and Stewarts, second edition, 2008.

Functional English (URCG-5118)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	0	Practical	0
Total	48	Total	3

The course aims at providing understanding of a writer's goal of writing (i.e. clear, organized and effective content and to use that understanding and awareness for academic reading and writing. The objectives of the course are to make the students acquire and master the grammatical academic writing skills. The course would enable the students to develop argumentative writing techniques. The students would be able to logically add specific details on the topics such as facts, examples and statistical or numerical values. The course will also provide insight to convey the knowledge and ideas in an objective and persuasive manner. Furthermore, the course will also enhance the students' understanding of ethical considerations in writing academic assignments and topics including citation, plagiarism, formatting and referencing the sources as well as the technical aspects involved in referencing.

Contents

1. Developing Analytical Skills

2. Transitional devices (word, phrase and expressions)
3. Development of ideas in writing
4. Reading Comprehension
5. Precis Writing
6. Developing argument
7. Sentence structure: Accuracy, variation, appropriateness, and conciseness
8. Appropriate use of active and passive voice
9. Organization and Structure of a Paragraph
10. Organization and structure of Essay
11. Types of Essays

Recommended Texts

1. Bailey, S. (2011). Academic writing: A handbook for international students (3rd ed.). New York: Routledge.
2. Eastwood, J. (2011). A Basic English grammar. Oxford: Oxford University Press.
3. Swales, J. M., & Feak, C. B. (2012). Academic writing for graduate students: Essential tasks and skills (3rd ed.). Ann Arbor: The University of Michigan Press.
4. Swan, M. (2018). Practical English usage (8th ed.). Oxford: Oxford University Press.

Suggested Readings

1. Biber, D., Johansson, S., Leech, G., Conrad, S., Finegan, E., & Quirk, R. (1999). Longman grammar of spoken and written English. Harlow Essex: MIT Press.
2. Cresswell, G. (2004). Writing for academic success. London: SAGE.
3. Johnson-Sheehan, R. (2019). Writing today. Don Mills: Pearson.
4. Silvia, P. J. (2019). How to write a lot: A practical guide to productive academic writing. Washington: American Psychological Association
5. Thomson, A. J., & Martinet, A. V. (1986). A Practical English Grammar. Oxford: Oxford University Press

Expository Writing (URCG-5119)

Contact Hours		Credit Hours	
Theory	48	Theory	3
Practical	0	Practical	0
Total	48	Total	3

This course prepares undergraduates to become successful writers and readers of English. The course helps students develop their fundamental language skills with a focus on writing so that they can gain the confidence to communicate in oral and written English outside the classroom. The course is divided into five units and takes a Project-based Learning approach. Unit themes target the

development of 21st century skills and focus on self-reflection and active community engagement. The course completion will enable the students to develop communication skills as reflective and self-directed learners. They will be able to intellectually engage with different stages of writing process, and develop analytical and problem-solving skills to address various community-specific challenges.

Contents

1. Self-Reflection
   - Introduction to the basics of the writing process
   - Introduction to the steps of essay writing
   - Prewriting activities: Brainstorming, listing, clustering and free writing
   - Practicing Outlining of the essay
2. Personalized Learning
   - Learning Process, Learning Styles, Goal Setting and Learning Plan
3. Oral Presentation
   - Structure and Significance, Content Selection and Slide Presentation. Peer Review
4. Critical Reading Skills
   - Introducing Authentic Reading (Dawn and non-specialist academic books/texts)
   - Reading Strategies and Practice: Skimming, scanning, SQW3R, Annotating, Detailed reading and note-taking, Standard Test Practice: TOEFL and IELTS. Model Review Reports and Annotated Bibliographies
5. Community Engagement
   - Student-led brainstorming on local versus global issues, Identifying research problems
   - Drafting research questions, Drafting interview/survey questions for community research (in English or L1)
   - Engaging students in Critical reading, Presenting interview/ survey information, Field work
   - Writing Community Engagement Project
6. Letter to the Editor
   - Types of letters. Format and purpose of letter to the editor, Steps in writing letter-to-editor

Recommended Texts

1. Bailey, S. (2011). Academic writing: A handbook for international students (3rd ed.). New York: Routledge.
2. Swales, J. M., & Feak, C. B. (2012). Academic writing for graduate students: Essential tasks and skills (3rd ed.). Ann Arbor: The University of Michigan Press.

Suggested Readings

1. Cresswell, G. (2004). Writing for academic success. London: SAGE.
2. Johnson-Sheehan. R. (2019). Writing today. Don Mills: Pearson.
3. Silvia, P. J. (2019). How to write a lot: A practical guide to productive academic writing. Washington: American Psychological Association.

General Education Cluster: Quantitative Reasoning

URCG-5120 **Exploring Quantitative Skills** **3(3-0)**

This is an introductory-level undergraduate course that focuses on the fundamentals related to the quantitative concepts and analysis. The course is designed to familiarize students with the basic concepts of mathematics and statistics and to develop students' abilities to analyze and interpret quantitative information. Through a combination of theoretical concepts and practical exercises, this course will also enable students cultivate their quantitative literacy and problem solving skills while effectively expanding their academic horizon and breadth of knowledge of their specific major / field of study.

Course Learning Outcomes

By the end of this course, students shall have:

1. Fundamental numerical literacy to enable them work with numbers, understand their meaning and present data accurately;
2. Understanding of fundamental mathematical and statistical concepts;
3. Basic ability to interpret data presented in various formats including but not limited to tables, graphs, charts, and equations etc.

Contents

1. Numerical Literacy:
    i. Numbers system and basic arithmetic operations;
    ii. Units and their conversions, dimensions, area, perimeter and volume;
    iii. Rates, ratios, proportions and percentages;
    iv. Types and sources of data;
    v. Measurement scales;
    vi. Tabular and graphical presentation of data;
    vii. Quantitative reasoning exercises using number knowledge.

2. Fundamental mathematical concepts:
    i. Basics of geometry (lines, angles, circles, polygons etc.);
    ii. Sets and their operations;
    iii. Relations, functions, and their graphs;
    iv. Exponents, factoring and simplifying algebraic expressions;
    v. Algebraic and graphical solutions of linear and quadratic equations and inequalities;
    vi. Quantitative reasoning exercises using fundamental mathematical concepts.

3. Fundamental Statistical Concepts:
    i. Population and sample;
    ii. Measures of central tendency, dispersion and data interpretation;
    iii. Rules of counting (multiplicative, permutation and combination);
    iv. Basic probability theory;
    v. Introduction to random variables and their probability distributions;
    vi. Quantitative reasoning exercises using fundamental statistical concepts.

Recommended Texts

1. Sevilla, A., & Somers, K. (2012). *Quantitative reasoning: tools for today's informed citizen*. New Jersey, John Wiley & Sons.
2. Burzynski, D., & Ellis, W. (2008). *Fundamentals of mathematics*. USA. Saunders College Publishing.

Suggested Readings

1. Zaslow, E. (2020). *Quantitative reasoning: thinking in numbers*. Cambridge, Cambridge University Press.
2. de Mesquita, E. B., & Fowler, A. (2021). *Thinking clearly with data: A guide to quantitative reasoning and analysis*. New Jersey, Princeton University Press.
3. Bennett, J., & Briggs, W. (2019). *Using & understanding mathematics: a quantitative reasoning approach*. Pearson.
4. Rosen, K. H., & Krithivasan, K. (2012). *Discrete mathematics and its applications* (Vol. 6). New York: McGraw-Hill.
5. Chatfield, C. (2018). *Statistics for technology: a course in applied statistics*. Routledge.
6. Lock, R. H., Lock, P. F., Morgan, K. L., Lock, E. F., & Lock, D. F. (2020). *Statistics: Unlocking the power of data*. New Jersey, John Wiley & Sons.

Islamic Studies/Ethics (URCG-5105/ URCG-5126)

Contact Hours		Credit Hours	
Theory	32	Theory	2
Practical	0	Practical	0
Total	32	Total	2

Islamic Studies (URCG-5105)

Introductory/compulsory foundation course

Islamic Studies engages in the study of Islam as a textual tradition inscribed in the fundamental sources of Islam; Qur'aan and Hadith, history and particular cultural contexts. The area seeks to provide an introduction to and a specialization in Islam through a large variety of expressions (literary, poetic, social, and political) and through a variety of methods (literary criticism, hermeneutics, history, sociology, and anthropology). It offers opportunities to get fully introductory foundational basis of Islam in fields that include Qur'aanic studies, Hadith and Seerah of Prophet Muhammad (PBUH), Islamic philosophy, and Islamic law, culture and theology through the textual study of Qur'aan and Sunnah.

- To make students understand the relevance and pragmatic significance of Islam in theirlives.
- To make learners comprehend the true spirit of Islam with reference to modernworld.
- To generate a sense of Islamic principles as a code of living that guarantee the effective solutions to the current challenges ofbeing.
- To provide Basic information about IslamicStudies
- To enhance understanding of the students regarding IslamicCivilization
- To improve Students skill to perform prayers and otherworships
- To enhance the skill of the students for understanding the issues related to faith and religious life.

Contents

1.Introduction to Qur'aanic Studies — تعارف قرآن مجید

1) Basic Concepts of Qur'aan — قرآن مجید کا بنیادی تعارف

2) History of the compilation of Qur'aa — تاریخ جمع وتدوین قرآن مجید

3) Uloom-ul-Qur'aan — علوم القرآن

مطالعہ قرآن (تعارف قرآن مجید، منتخب آیات کا ترجمہ و تفسیر: سورۃ البقرہ آیات 1-5، 284-286؛ سورۃ الحجرات آیات 1-18؛ سورۃ الفرقان آیات 63-77؛ سورۃ المومنون آیات 1-11؛ سورۃ الاحزاب آیات 6، 21، 32- 33، 40، 56- 59؛ سورۃ الانعام آیات 151-153؛ سورۃ الصف آیات 1- 14؛ الحشر آیات 18- 20؛ آل عمران آیات 190- 192؛ النحل آیات 12-14؛ لقمن آیت 20، حم السجدہ آیت 53

2. Introduction to Hadith — تعارف حدیث

1) Legal Status of Hadith — حدیث کی قانونی حیثیت

2) History of the compilation of Hadith — تاریخ جمع وتدوین حدیث

3) Classifications of Hadith — حدیث کی اقسام

Chairman
Department of Islamic Studies
University of Sargodha

متن، حدیث: 1 درج ذیل موضوعات پر احادیث کا مطالعہ

1۔اعمال کا اجر نیت پر منحصر ہے۔2۔بہترین انسان قرآن کا طالب علم اور اس کا معلم ہے۔3۔کتاب وسنت گمراہی سے بچنے کا ذریعہ ہیں 4۔ارکان اسلام 5۔اسلام، ایمان، احسان اور قیامت کی نشانیاں، 6۔بچوں کو نماز کی تلقین 7۔دین کا گہرا فہم اللہ کی خاص عنایت ہے 8۔حصول علم، تلاوتِ قرآن اور عمل کی اہمیت وفضیلت، 9۔روز محشر میں ہونے والا محاسبہ، 10۔حقوق اللہ کے ساتھ ساتھ حقوق العباد کا لحاظ رکھنا بھی لازم ہے 11۔حسن خلق کی عظمت اور فحش وبدگوئی کی مذمت 12۔دنیا وآخرت کی بھلائی کی ضامن چار چیزیں، 13۔ہلاک کر دینے والی سات چیزیں، 14۔بے عمل مبلغ کا عبرت ناک انجام 15۔ہر شخص نگران ہے اور ہر شخص مسئول

3. Sirah of the Prophet (PBUH)	سیرت النبی ﷺ
1. Significance of Seerah Studies	مطالعہ سیرت کی ضرورت واہمیت
2. Prophetic principles of Character building	تعمیر سیرت وشخصیت کا نبوی منہاج

اقامت دین کا نبوی طریق کار، اقامت دین بعہد خلافت راشدہ، میثاق مدینہ، خطبہ حجۃ الوداع، اخلاقی تعلیمات، تشکیل اجتماعیت اور اسوہ حسنہ، قرآن مجید میں سیرت سرور عالم کا بیان، غزواتِ نبوی ﷺ کے مقاصد وحکمتیں

4. Islamic Culture & Civilization	اسلامی تہذیب وتمدن
1) Basic Concepts of Islamic Civilization	اسلامی تہذیب کا مفہوم
2) Historical evaluation of Islamic Civilization	اسلامی تہذیب کا تاریخی ارتقاء
3) Salient feature of Islamic Civilization	اسلامی تہذیب کی نمایاں خصوصیات
4) Islamic Civilization and ContemporaryIssues	اسلامی تہذیب وتمدن اور معاصر مسائل

اسلامی تہذیب کے عوامل وعناصر، اسلامی تہذیب کے علمی، معاشرتی اور سماجی اثرات، تہذیبوں کے تصادم کے نظریے کا تنقیدی جائزہ، تہذیبی تصادم کے اثرات و نتائج، طبعی، حیاتیاتی اور معاشرتی علوم میں مسلمانوں کا کردار، نامور مسلمان سائنسدان

Pre-Requisite: Nil

Recommended Books

1) Hameed ullahMuhammad, —Emergence ofIslam ,IRI,Islamabad
2) Hameed ullah Muhammad, —Muslim Conduct ofState
3) Hameed ullah Muhammad, _Introduction tolslam
4) Ahmad Hasan, —Principles of Islamic Jurisprudence, Islamic Research Institute, International Islamic University, Islamabad (1993)
5) Dr.Muhammad Zia-ul-Haq,—Introduction to Al Sharia Al Islamia, Allama Iqbal Open University, Islamabad(2001)
6) Dr. Muhammad Shahbaz Manj, Teleeemat-e- Islam

Ethics (URCG-5126)

Contents

1. Meaning and Scope of Ethics.
2. Relation of Ethics with:
   a) Religion

b) Science
c) Law

3. Historical Development of Morality:
   a) Instinctive Moral Life.
   b) Customary Morality.
   c) Reflective Morality.
4. Moral Theories:
   a) Hedonism (Mill)
   b) Intuitionism (Butler)
   c) Kant's Moral Theory.
5. Moral Ethics and Society.
   a) Freedom and Responsibility.
   b) Tolerance
   c) Justice
   d) Punishment (Theories of Punishment)
6. Moral Teachings of Major Religions:
   a) Judaism
   b) Christianity
   c) Islam
7. Professional Ethics:
   a) Medical Ethics
   b) Ethics of Students
   c) Ethics of Teachers
   d) Business Ethics

REFERENCE BOOKS:

1. William Lille. An Introduction to Ethics., London Methuen & Co. latest edition.
2. Titus, H.H. Ethics for Today. New York: American Book, latest edition.
3. Hill, Thomas. Ethics in Theory and Practice. N.Y. Thomas Y. Crowel, latest edition
4. Ameer Ali, S. The Ethics of Islam. Culcutta: Noor Library Publishers, latest edition
5. Donaldson, D.M. Studies in Muslim Ethics. London: latest edition. 6. Sayeed, S.M.A.(Tr.) Ta'aruf-e-Akhlaqiat. Karachi: BCC&T, Karachi University of

Communication Skills (HU2201)

Contact Hours		Credit Hours	
Theory	32	Theory	2
Practical	0	Practical	0

Total	32	Total	2

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Show the necessary level of courtesy in oral and written business communication	7	A3	9	5,10,16	8
2	Prepare various types of effective business messages	9	C3	1,9	5.10,16	10
3	Demonstrate presentation skills in academic and professional settings	11	A3	1	9.13	11,12

Course Outline:

Writing Skills

- Vocabulary Building
- Writing Skills: Essays and Letters
- Common Writing Errors
- Purposeful Writing

Reading Skills

- Skimming and Scanning
- Critical Reading
- Reading for Understanding
- Techniques and strategies to develop sound vocabulary.

Listening Skills

- Introduction to Communication Process
- Seven Cs of Communication
- Types of Listening
- Listening for Comprehension

Speaking Skills

- Verbal and Non-Verbal Communication
- Basics of Presentation Skills
- Presentation Strategies and public speaking skills.
- Use of Audio-Visual Aids

- Basics of Group Communication
- Listening Skills
- Communicate effectively in job interviews.

Recommended Books

1. A. J. Thomson and A. V. Martinet. "*Practical English Grammar*"4th ed. England: Oxford University Press, 1986
2. A. J. Thomson and A. V. Martinet. "*Practical English Grammar Exercises 1*" 3rded,.England:Oxford University Press. 1986
3. Khaled Mohamed Al Maskari, "*A Practical Guide to Business Writing: Writing in English for Non-Native Speakers*" New Jersey, USA: Wiley, 2012
4. Marie- Chrisitine Boutin, Suzanne Brinand and Francoise Grellet "*Writing: Intermediate*", 4th ed,England:Oxford University Press. 1993
5. Jane Straus, "*The blue book of Grammar and Punctuation*". 11th Edition, New Jersey, USA: Wiley, 2014
6. Anchor in English-II (Lesson 1-5), A SPELT Publication.
7. Christopher Fry, "Summary Writing (Book-I)", Oxfore University Press
8. College Essays by John Langlan
9. Barron's TOFFL iBT Edition
10. Communication Skills for Engineers by Sunita Marshal and C. Murali Krishna
11. Writing for Computer Science by Justin Zobel Research Methodologies – A step by step guide for beginners, Ranjit Kumar.

Engineering Economics (HU3101)

Contact Hours		Credit Hours	
Theory	32	Theory	2
Practical	0	Practical	0
Total	32	Total	2

Course Learning Objective:

This course explores the critical intersection of engineering and economics, emphasizing the pivotal role engineers play in business and strategic decision- making for large-scale projects.

Participants delve into fundamental economic principles and learn to navigate complex economic landscapes inherent in engineering endeavors.

Course Learning Outcomes:

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

No.	CLO	PLO	Learning Level	WKA	SDGA	EC
1	Describe the fundamentals of engineering economics	6	C2	1,7	8,2	6,7
2	Analyze economic feasibility of investment alternatives	7	C4	9	5.10,16	8
3		9				
	Solve problems related to linear programming and depreciation	10	C3	2,5	9,1	9

Course outline:

Engineering economics decision

- Role of engineers in business
- Economic decisions v/s design decisions
- Large scale engineering projects and types of strategic economic decisions
- Fundamental principles of engineering economics

Interest Rate and Economic Equivalence

- Interest: The Cost of Money
- Economic Equivalence
- Development of Formulas for Equivalence Calculation
- Unconventional Equivalence Calculations

Understanding Money and Its Management

- Nominal and Effective Interest Rates
- Equivalence Calculations with Effective Interest Rates and with Continuous Payments
- Changing Interest Rates
- Debt Management
- Investing in Financial Assets

Present-Worth Analysis

- Project Cash Flows

- Initial Project Screening Methods: payback Screening and Discounted Cash Flow Analysis
- Variations of Present-Worth Analysis
- Comparing Mutually Exclusive Alternatives

Annual Equivalent-Worth Analysis

- Annual Equivalent-Worth Criterion
- Capital Costs versus Operating Costs
- Applying Annual-Worth Analysis
- Life-Cycle Cost Analysis
- Design Economics

Rate-of-Return Analysis

- Rate of Return and Methods of Finding It
- Internal Rate-of-Return Criterion
- Mutually Exclusive Alternatives

Cost Concepts Relevant to Decision Making

- General Cost Terms; Classifying Costs for Financial Statements
- Cost Classifications for Predicting Cost Behavior
- Future Costs for Business Decisions
- Estimating Profit from Production

Depreciation and Corporate Taxes

- Asset Depreciation: Economic versus Accounting
- Book and Tax Depreciation Methods (MACRS)
- Depletion
- Income Tax Rate to be used in Economic Analysis
- The Need for cash Flow in Engineering Economic Analysis

Developing Project Cash Flows

- Cost-Benefit Estimation for Engineering Projects
- Developing Cash Flow Statements

Project Risk and Uncertainty

- Origins of Project Risk
- Methods of Describing Project Risk: Sensitivity, Break-Even and Scenario Analysis

Special Topics in Engineering Economics

- Replacement Decisions
- Capital Budgeting Decisions
- Economic Analysis in the Service Sector

Recommended Books:

1. Chan S. Park. *"Contemporary Engineering Economics"*, 6th edition, London, UK: Pearson 2015
2. Donal G. Newnan, Jerome P. Lavelle, Ted G. Eschenbach, *"Engineering Economic Analysis"*, 12th edition, London. UK: Oxford University Press 2015
3. Leland T. Blank and Anthony Tarquin, *"Engineering Economy"*, 6th ed, New York, USA: McGraw-Hill, 2005

Pakistan Studies (URCG-5128)

Contact Hours		Credit Hours	
Theory	32	Theory	2
Practical	0	Practical	0
Total	32	Total	2

This course is designed to provide students with a comprehensive exploration of Pakistan's identity, spanning geographical, historical and cultural dimensions. It delves into the diverse landscape, ancient civilizations, and rich cultural heritage that define Pakistan. Moreover, it examines the socio-cultural and political transformations in Pakistan over time including democratic transitions and military interventions. The aim of this course is to inculcate in students a nuanced understanding of Pakistan's past, present, and potential future trajectories, enabling them to critically evaluate the complex dynamics shaping the nation's development.

Course Learning Outcomes

By the end of this course, student will be able to:

1. Have enhanced knowledge of the geographical, historical and political aspects of Pakistan.
2. Understand the society and cultural of Pakistan.
3. Understand and explain the scio-economics developments in Pakistan.
4. Explore contemporary issues and challenges faced by Pakistan and their implications for the future.

Contents

1. **Introduction to Pakistan:**

- Geographical location and significance.
- Historical background: Ancient civilizations in the region.
- Factors leading to the creation of Pakistan

2. **Political History of Pakistan:**
   - Formative phase
   - Military interventions and democratic transitions.
3. **Geography of Pakistan:**
   - Physiography: Mountains, plains, plateaus, deserts, valleys and coastal areas.
   - River system: Indus river and its tributaries;
   - Climatic regions of Pakistan.
4. **Society and Culture of Pakistan:**
   - Socio- cultural diversity.
   - Language and literature of Pakistan.
5. **Economics Development of Pakistan:**
   - Agriculture and industrial sectors of Pakistan.
   - Economic challenges of Pakistan.
6. **Contemporary Issues:**
   - Foreign relations of Pakistan.
   - Security challenges: terrorism, extremism, regional conflicts.
   - Environmental problems and sustainable development (SDGs).
   - Media and social change.

SUGGESTED READING MATERIALS

1. "Jinnah of Pakistan" by Stanley Wolpert
2. "The sole Spokesman: Jinnah, the Muslim League, and the Demand for Pakistan" by Ayesha Jalal
3. "The struggle for Pakistan" by Ishtiaq Hussain Qureshi
4. "Pakistan, the Formative Phase, 1857-1948" by Khalid B. Sayeed
5. "Pakistan Studies: A Book of Readings" by Sikandar Hayat
6. "Constitutional and Political History of Pakistan" by Hamid Khan
7. "Trek to Pakistan" by Ahmad Saeed and Kh. Mansur Sarwar
8. "Pakistan: A Modern History" by Ian Talbot
9. "Politics in Pakistan: The Nature and Direction of Change" by Khalid B. Sayeed
10. "Physical Geography of Pakistan" by Umar Jahangir
11. "A Geography of Pakistan: Environment, people, and Economy" by Fazle Karim Khan
12. "Pakistan's Foreign Policy: An Historical Analysis" by S.M. Burke
13. "Separatism in East Pakistan" by Rizwan Ullah Kokab
14. "Being Pakistani: Society, Culture and the Arts" by Raza Rumi
15. "Pakistani's Culture Heritage: Socio-Economic and Technological Aspects" edited by Abdul Jabbar Khan
16. "Language and Politics in Pakistan" by Tariq Rahman
17. Sociology" by Horton and Hunt
18. "Pakistan in the Twentieth Century: A Political History" by Lawrence Ziring

19. "Economic Development of Pakistan" by Ishrat Husain
20. "Issues in Pakistan's Economy" by S. Zaidi

Civics and Community Engagement (URCG-5125)

Contact Hours		Credit Hours	
Theory	32	Theory	2
Practical	0	Practical	0
Total	32	Total	2

Course Description:

The Civics and Community Engagement course is designed to provide students with an understanding of the importance of civic participation, culture and cultural diversity, basic foundations of citizenship, group identities and the role of individuals in creating positive change within their communities. The course aims at developing students' knowledge, skills and attitudes necessary for active and responsible citizenship.

Learning outcomes

After completing this course, students will be able to

- Understand the concepts of civic engagement, community development, and social responsibility.
- Understand rights and responsibilities of citizenship
- Understand cultural diversity in local and global context
- Analyze significance of civic participation in promoting social justice, equity and democracy.
- Examine the historical and contemporary examples of successful civic and community engagement initiatives.
- Identify and assess community needs, assets, and challenges to develop effective strategies for community improvement.
- Explore the ethical implications and dilemmas associated with civic and community engagement.
- Develop practical skills for effective community organizing, advocacy, and leadership.
- Foster intercultural competence and respect for diversity in community engagement efforts.
- Collaborate with community organizations, stakeholders, and fellow students to design and implement community-based projects.
- Reflect on personal growth and learning through self-assessment and critical analysis of community engagement experiences.

Course Content:

Introduction to Civics & Community Engagement

- Overview of the course: Civics & Community Engagement
- Definition and importance of civics
- Key concepts in civics: citizenship, democracy, governance, and the rule of law
- Rights and responsibilities of citizens

Citizenship and Community Engagement

- Introduction to Active Citizenship: Overview of the Ideas. Concepts, Philosophy and Skills
- Approaches and Methodology for Active Citizenship

Identity, Culture, and Social Harmony

- Concept and Development of Identity, Group identities
- Components of Culture, Cultural pluralism, Multiculturalism, Cultural Ethnocentrism, Cultural relativism, Understanding cultural diversity, Globalization and Culture, Social Harmony,
- Religious Diversity (Understanding and affirmation of similarities & differences)
- Understanding Socio-Political Polarization
- Minorities. Social Inclusion, Affirmative actions

Multi-cultural society and inter-cultural dialogue

- Inter-cultural dialogue (bridging the differences, promoting harmony)
- Promoting intergroup contact/ Dialogue
- Significance of diversity and its impact
- Importance and domains of Inter-cultural dialogue

Active Citizen: Locally Active, Globally Connected

- Importance of active citizenship at national and global level
- Understanding community
- Identification of resources (human, natural and others)
- Utilization of resources for development (community participation)
- Strategic planning, for development (community linkages and mobilization)

Human rights, constitutionalism and citizens' responsibilities

- Introduction to Human Rights
- Human rights in constitution of Pakistan
- Public duties and responsibilities
- Constitutionalism and democratic process

Social Institutions, Social Groups, Formal Organizations and Bureaucracy

- Types of Groups, Group identities, Organizations
- Bureaucracy, Weber's model of Bureaucracy
- Role of political parties, interest groups, and non-governmental organizations

Civic Engagement Strategies

- Grassroots organizing and community mobilization
- Advocacy and lobbying for policy change
- Volunteerism and service-learning opportunities

Social issues/Problems of Pakistan

- Overview of major social issues of Pakistani society

Social Action Project

Recommended Books:

1. Kennedy. J. K., & Brunold, A. (2016). Regional context and Citizenship education in Asia and Europe. New Yourk: Routledge, Falmer.
2. Henslin, James M. (2018). Essentials of Sociology: A Down to Earth Approach (13th ed.). New York: Pearson Education
3. Macionis, J. J., & Gerber, M.L. (2020). Sociology. New York: Pearson Education

Reference Books:

1. Glencoe McGraw-Hill. (n.d.). Civics Today: Citizenship, Economics, and Youth.
2. Magleby, D. B., Light, P. C., & Nemacheck, C. L. (2020). Government by the People (16th ed.). Pearson.
3. Sirianni, C., & Friedland, L. (2005). The Civic Renewal Movement: Community-Building and Democracy in the United States. Kettering Foundation Press.
4. Bloemraad, I. (2006). Becoming a Citizen: Incorporating Immigrants and Refugees in the United States and Canada. University of California Press.
5. Kuyek, J. (2007). Community Organizing: Theory and Practice. Fernwood Publishing.
6. DeKieffer, D. E. (2010). The Citizen's Guide to Lobbying Congress. TheCapitol.Net.
7. Rybacki, K. C., & Rybacki, D. J. (2021). Advocacy and Opposition: An Introduction to Argumentation (8th ed.). Routledge.
8. Kretzmann, J. P., & McKnight, J. L. (1993). Building Communities from the Inside Out: A Path Towards Finding and Mobilizing a Community's Assets. ACTA Publications.
9. Patterson, T. E. (2005). Engaging the Public: How Government and the Media Can Reinvigorate American Democracy. Oxford University Press.
10. Love, N. S., & Mattern. M. (2005). Doing Democracy: Activist Art and Cultural Politics. SUNY Press.

Seerat of the Holy Prophet (SAW) (URCG-5127)

Contact Hours		Credit Hours	
Theory	16	Theory	1
Practical	0	Practical	0
Total	16	Total	1

Objectives of the Course	۱.طلباء کو مطالعہ سیرۃ طیبہ کی ضرورت و اہمیت سے آگاہ کرنا ۲۔ تعمیر شخصیت میں مطالعہ سیرۃ طیبہ کے کردار کو واضح کرنا ۳.بعثت نبوی کے موقع پر اقوام عالم کی عمومی صورت حال سے آگاہ کرنا ۴.رسول اکرم صلی اللہ علیہ وسلم کی مکی اور مدنی زندگی کا اس طرح مطالعہ کروانا کہ طلباء ان واقعات سے نتائج کا استنباط کر سکیں ۵۔ طلباء کوعہد نبوی کی معاشرت ، سیاست ، معیشت سے آگاہ کرنا

Course Description

S.No.	Title	Description
1	حضور صلی اللہ علیہ وسلم کے ابتدائی حالات زندگی	۱۔ حضور صلی اللہ علیہ وسلم کا خاندانی حسب و نسب ۲۔ پیدائش اور ابتدائی تربیت ۳۔ لڑکپن اور جوانی کے حالات زندگی
2	بعثت نبوی کے وقت دنیا کے حالات(۱)	۱۔ بعثت نبوی کے وقت اہم تہذیبیں ۲۔ عرب، مصر، حبشہ، بازنطینی، ساسانی
3	بعثت نبوی	۱۔ مکی عہد میں دعوت اسلام

۱۔ مدنی عہد میں دعوت اسلام	بعثت نبوی	4
آپ ؐ بطور پیغامبر امن	خصائص النبیؐ	5
بحثیت استاد و معلم	خصائص النبیؐ	6
بحثیت تاجر	خصائص النبیؐ	7
بحثیت سربراہ ریاست	خصائص النبیؐ	8
ذاتی محاسن اور عالمگیر اثرات	خصائص النبیؐ	9
ناموس رسالتؐ	خصائص النبیؐ	10
غیر مسلموں سے تعلقات	اسوہ حسنہ اور عصر حاضر	11
اسوہ حسنہ کی روشنی میں گھریلو زندگی	اسوہ حسنہ اور عصر حاضر	12
مستشرقین اور مطالعہ سیرت	اسوہ حسنہ اور عصر حاضر	13
وطن سے محبت اور سیرت	اسوہ حسنہ اور عصر حاضر	15
مستشرقین کے اعتراضات اور ان کے جوابات	اسوہ حسنہ اور عصر حاضر	16

نصابی کتب

نمبر شمار	نام مؤلف	نام کتاب
1	ابن ہشام	السیرۃ النبویۃ
2	مولاناشبلی نعمانی ، سید سلمان ندوی	سیرۃ النبی صلی اللہ علیہ وسلم
3	قاضی محمد سلیمان سلمان منصور پوری	رحمۃ اللعالمین
4	مولانا سیدابو الحسن علی ندوی	نبی رحمت صلی اللہ علیہ وسلم
5	ڈاکٹر یسین مظہر صدیقی	عہد نبوی کا نظام حکومت
6	ڈاکٹر خالد علوی	انسان کاملؐ

حوالہ جاتی کتب

نمبر شمار	نام مؤلف	نام کتاب
1	سید ابوالاعلیٰ مودودی	سیرت سرور عالم صلی اللہ علیہ وسلم
2	مولانا صفی الرحمن مبارکپوری	الرحیق المختوم
3	پیر محمد کرم شاہ الازہری	ضیاء النبی صلی اللہ علیہ وسلم
4	ڈاکٹر اکرم الضیاء العمری	السیرۃ النبویۃ الصحیحۃ
5	مولاناعبدالرؤف دانا پوری	اصح السیر

Understanding of Holy Quran/Fehm-e-Quran-I (URCG-5129)

Contact Hours	Credit Hours

Theory	16	Theory	1
Practical	0	Practical	0
Total	16	Total	1

Content as per university.

Understanding of Holy Quran/Fehm-e-Quran-II (URCG-5130)

Contact Hours		Credit Hours	
Theory	16	Theory	1
Practical	0	Practical	0
Total	16	Total	1

Content as per university.