

1 st Semester			
GEN-3101		Islamic Studies	Credit Hrs. 2(2-0)
Week	Lecture No.	Topic	Activity
Week 1	Lecture 1	• قرآن پاک کا تعارف، فضائل، اعجاز	
	Lecture 2	• قرآن پاک کا نزول قرآن، جمع و تدوین	
Week 2	Lecture 3	• علوم قرآن: علم تفسیر، ماخذ تفسیر	
	Lecture 4	• علم اسباب نزول، علم ناسخ و منسوخ	
Week 3	Lecture 5	• سورہ حجرات آیت (01 تا 09)	
	Lecture 6	• سورہ حجرات آیت (10 تا 18)	
Week 4	Lecture 7	• سنت و حدیث کا تعارف: معنی و مفہوم، اقسام	Assignment#01
	Lecture 8	• تاریخ تدوین حدیث	
Week 5	Lecture 9	• سنت کی آئینی حیثیت	
	Lecture 10	• منتخب متون احادیث کا مطالعہ: حدیث نمبر 1-05	
Week 6	Lecture 11	• منتخب متون احادیث کا مطالعہ: حدیث نمبر 5-10	Quiz # 01
	Lecture 12	• منتخب متون احادیث کا مطالعہ: حدیث نمبر 10-15	
Week 7	Lecture 13	□ منتخب متون احادیث کا مطالعہ: حدیث نمبر 20-15	
	Lecture 14	□ پیدائش سے بعثت تک نبی کریم ﷺ کی زندگی کے اہم واقعات	
Week 8	Midterm		
Week 09	Lecture 15	□ نبی پاک ﷺ کی مکی زندگی کے اہم واقعات	
	Lecture 16	□ نبی پاک ﷺ کی مدنی زندگی کے اہم واقعات	Assignment# 02

Week 10	Lecture 17	□ خلافت راشدہ (حضرت ابو بکر صدیق رضی اللہ عنہ و حضرت عمر رضی اللہ عنہ کے دور کی اہم خصوصیات	
	Lecture 18	□ خلافت راشدہ (حضرت عثمان رضی اللہ عنہ و حضرت علی رضی اللہ عنہ کے دور کی اہم خصوصیات	
Week 11	Lecture 19	□ عقائد: ایمانیات ثلاثہ (ایمان باللہ، ایمان بالرسالت اور ایمان بالآخرت) (الف)	Quiz # 02
	Lecture 20	عقائد: ایمانیات ثلاثہ (ایمان باللہ، ایمان بالرسالت اور ایمان بالآخرت) (ب)	
Week 12	Lecture 21	□ فقہ کا تعارف: پس منظر	
	Lecture 22	فقہی مسالک کا تعارف	
Week 13	Lecture 23	□ نماز: اہمیت، طریقہ نماز، مسائل نماز (الف)	
	Lecture 24	□ نماز: اہمیت، طریقہ نماز، مسائل نماز (ب)	
Week 14	Lecture 25	□ روزہ: اہمیت، مسائل روزہ	
	Lecture 26	□ زکوٰۃ: اہمیت، مسائل زکوٰۃ	
Week 15	Lecture 27	□ حج اور عمرہ: اہمیت، طریقہ کار، مسائل (الف)	
	Lecture 28	□ حج اور عمرہ: اہمیت، طریقہ کار، مسائل (ب)	
Week 16	Lecture 29	□ جہاد: اہمیت، مقاصد جہاد، اداب جہاد (الف)	
	Lecture 30	□ جہاد: اہمیت، مقاصد جہاد، اداب جہاد (ب)	
Week 17	Terminal Examination		

GEN-3102		Functional English	Credit Hrs. 3(3-0)
Week	Lecture	Topics	Activity
Week 1	Lecture 1	Introduction To Grammar: Role of Grammar in Communication, Course Overview	
	Lecture 2	Sentence Elements: Subject, Verb, Object, Complement, Predicate, Sentence Agreement	
	Lecture 3	Parts of Speech: Noun, Pronoun, Verb, Adjective, Adverb, Conjunction, Interjection, Preposition Noun: Proper Noun, Common Noun, Abstract Noun, Concrete Noun, Collective Noun, Compound Noun, Countable Noun, Uncountable Noun	
Week 2	Lecture 1	Pronoun: Personal Pronoun, Possessive Pronoun, Indefinite Pronoun, Relative Pronoun, Intensive Pronoun, Demonstrative Pronoun, Interrogative Pronoun, Reflexive Pronoun	
	Lecture 2	Adjective: Descriptive, Demonstrative, Possessive, Interrogative, Indefinite, Compound Adjectives, Adjectives of Number or Adjectives Of Quantity (Definite Numeral Adjectives, Indefinite Numeral Adjectives, Distributive Numeral Adjectives) Verb: Action Verb, Compound Verb, Transitive and Intransitive Verb, Auxiliary Verb, Modal Verb, Phrasal Verb, Regular, Irregular Verbs	
	Lecture 3	Adverb: Adverb of Manner, Adverb of Time, Adverb of Place Prepositions: Types of Preposition (Functional Types: Preposition of Time, Preposition of Place, Preposition of Direction/Movement) Types of Preposition (on the Basis of Structure): Double Prepositions, Compound Prepositions, Participle Prepositions, Phrase Prepositions	
Week 3	Lecture 1	Conjunction: Coordinating Conjunction, Correlative Conjunction, Subordinating Conjunction	
	Lecture 2	Interjection: Emotive Interjection, Volitive Interjection, Cognitive Interjection	
	Lecture 3	Articles: Definite and Indefinite, Usage Rules, Exceptions Parts of Speech: Practice- Identification, Correction Exercises	
Week 4	Lecture 1	Sentence Structure: Sentence Basics (Simple, Negative, Interrogative); Types By Structure: Simple, Compound, Complex, Compound-Complex; Types by Function: Declarative, Interrogative, Imperative, Exclamatory	Assignment#1

	Lecture 2	Tenses: Present, Past and Future Tense: Rules and Exercises	
	Lecture 3	Voice: Active and Passive: Introduction, Definition of Voice, Transformation Rules for all Tenses, Passive of Imperatives	
Week 5	Lecture 1	Voice Practice: Conversion Exercises, Correcting Passive Misuse	
	Lecture 2	Unified Sentences in English: Definition, Coherence, Unity, Logical Flow	
	Lecture 3	Unified Sentences (Continued): Use Of Transitional Devices, Maintaining Paragraph Unity	
Week 6	Lecture 1	Phrases: Introduction, Structure and Types: Noun, Verb, Adjective, Adverb, Prepositional Phrases Phrase Practice: Usage in Writing, Combining Phrases	Quiz #1
	Lecture 2	Clauses: Introduction Difference between Clause and Phrase	
	Lecture 3	Types of Clause: Independent Clause, Dependent Clause Types Of Dependent Clauses: Noun, Adjective, Adverb Clauses with Examples	
Week 7	Lecture 1	Punctuation (Basics): Full Stop, Comma, Question Mark, Exclamation Mark	
	Lecture 2	Advanced Punctuation: Semicolon, Colon, Apostrophe, Quotation Marks, Parentheses	
	Lecture 3	Advanced Punctuation (Continued): Brackets, Braces, Dash, Hyphen, Ellipsis	
Week 8	Midterm		
Week 9	Lecture 1	Spelling Rules: Common Spelling Rules (E.G., -le/-ei, Silent Letters, Homophones), Doubling Consonants, Silent Letters (Kn, Wr, Gh)	
	Lecture 2	Spelling Rules (Continued): Suffixes (-Ing, -Ed, -Able), Confusing Pairs (Their/There/They Are, Affect/Effect)	Assignment#2
	Lecture 3	Reading Comprehension: Definition, Levels of Comprehension, Principles/Rules of Comprehension	
Week 10	Lecture 1	Reading Comprehension (Continued): Literal, Inferential	
	Lecture 2	Reading Comprehension (Continued): Evaluative Reading; Skimming and Scanning Techniques	
	Lecture 3	Comprehension Practice: Exercises On Reading between and Beyond the Lines, Answering Questions	
Week 11	Lecture 1	Discussion Skills: Introduction and Importance	

	Lecture 2	Discussion Skills (Continued): Strategies-Turn-Taking, Active Listening, Using Transitions, Asking Clarifying Questions, Agreeing/Disagreeing Politely	Quiz #2
	Lecture 3	Discussion Practice-Topics: Narrating Past Events, Comparing Ideas, Expressing Opinions	
Week 12	Lecture 1	Listening Skills: Introduction, Types of Listening: Active, Reflective, Critical, Appreciative, Empathetic; Common Listening Barriers	
	Lecture 2	Listening Practice: Note-Taking, Summarizing Audio/Video Clips, Identifying Key Ideas	
	Lecture 3	Listening Practice: Listening to Documentaries for Main Ideas	
Week 13	Lecture 1	Translation Skills: Introduction Types of Translation: Literal, Contextual, Idiomatic, Communicative	
	Lecture 2	Translation Skill: Basic Rules for Urdu to English Translation and Sentence Structure	
	Lecture 3	Translation Practice: Urdu To English Sentence and Paragraph Translation	
Week 14	Lecture 1	Paragraph Writing: Introduction, Parts of a Paragraph: Topic Sentence, Supporting Details, Coherence, Conclusion	
	Lecture 2	Paragraph Practice: Descriptive, Narrative, Argumentative Paragraphs with Transitions	
	Lecture 3	Presentation Skills: Introduction, Types of Presentations: Informative, Persuasive, Demonstrative	
Week 15	Lecture 1	Types of Presentations (Continued): Motivational, Instructional, Impromptu	
	Lecture 2	Structure and Tips For Effective Presentations	
	Lecture 3	Presentation Techniques: Verbal/Non-Verbal Communication, Visual Aids	
Week 16	Lecture 1	Presentation Techniques (Continued): Slide Design, Tone, Pace	
	Lecture 2	Student Presentations (Prepared): Delivering Informative or Persuasive Talks with Feedback	
	Lecture 3	Student Presentations (Impromptu): On-The-Spot Speaking, Timing, Confidence-Building	
Week 17		Terminal Examination	

GEN-3103 Introduction to Environmental Science Credit Hrs. 3(2-1)		
Week	Topics	Assignment/Quiz
Week 1	1. The human environment: The litho, bio, and hydro spheres,	
Week 2	the nature and composition of natural waters,	
Week 3	2. Pollution: definition, classification, and impact on habitats	
Week 4	i. Air pollution: Sources and effects of various pollutants (inorganic, organic),	Assignment#1
Week 5	ii. control, and remediation	
Week 6	iii. . Photochemical smog, Smog,	Quiz #1
Week 7	iv. Acid rain: 1. Theory of acid rain, 2. Adverse effects of acid rain. Chlorofluorocarbons and their effects.	
Week 8	Midterm	
Week 9	v. Water pollution: Major sources of water pollution and its impact.	Assignment#2
Week 10	vi. Prevention, control remediation, Heavy metal pollution. Tanneries. Hospital waste, Treatments of sewage, sludge, and polluted waters.	
Week 11	Soil pollution: major sources of soil pollution and its impact. Prevention, control remediation. Noise pollution.	Quiz #2
Week 12	Sources of Noise pollution, remedies of noise pollution	
Week 13	3. Ozone layer: Formation	
Week 14	Mechanism of depletion Effects of ozone depletion	
Week 15	Greenhouse effect: causes,	
Week 16	impacts	
Week 16	Terminal Examination	

MATH-3104 Basic Mathematics		Credit Hrs. 3(3-0)
Week	Teaching Activities	Assignment /Quiz
01	Relations and functions Domain and range of functions	
02	Types of functions: linear, quadratic, polynomial, exponential, logarithmic, trigonometric	
03	Graphs of basic functions Definition and types of matrices	
04	Matrix operations (addition, subtraction, multiplication) Determinants and their properties	Assignment #1
05	Inverse of a matrix and solution of linear equations using matrices General form of a quadratic equation	
06	Nature of roots and discriminant Solution of quadratic equations	Quiz #1
07	Graphical and algebraic solution of inequalities Trigonometric ratios and identities	
08	Midterm	
09	Graphs of trigonometric functions Trigonometric equations	Assignment #2
10	Inverse trigonometric functions Applications of trigonometry in solving triangles	
11	Concept of limit and continuity	Quiz #2
12	Differentiation of algebraic and trigonometric functions	
13	Applications of derivatives (tangent, normal, maxima, minima, rate of change)	
14	Basic integration and area under a curve, Straight lines: slope, intercepts, angle between lines	
15	Circle: standard equation, center, and radius	
16	Parabola and ellipse (basic introduction) Distance between two points and the section formula	
17	Terminal	

MATH-3105		Vector Mechanics and Statics	Credit Hrs. 3(3-0)
Weeks	Topic of Lectures	Assignment/Quiz	
1 st	Introduction: Definition of mechanics, Fundamental concepts and principals, System of units, Numerical accuracy.		
2 nd	Forces in a plane, Forces on a particle, Resultant of two forces, Vectors.		
3 rd	Resultant of several concurrent forces, Resolution of a force into components,		
4 th	Rectangular components of a force, Addition of forces, unit vectors.	Assignment#1	
5 th	Equilibrium of a particle, Newton's laws of motion, Problems involving the equilibrium of the particle.		
6 th	Free body diagram, Forces in space and the components of force in rectangular coordinates.	Quiz#1	
7 th	Addition of concurrent forces in space, Equilibrium of a particle in space.		
8 th	Mid Term Examination		
9 th	External and internal forces, Principle of transmissibility, Equivalent forces.	Assignment#2	
10 th	Moment of force about a point, Rectangular components of the moment of a force.		
11 th	Varignon's theorem, Moment of a couple, Equivalent couples, Addition of couples.	Quiz#2	
12 th	Equivalent system of forces, Equivalent system of vectors, Reduction of a system of forces to a wrench.		
13 th	Free body diagram, equilibrium in two dimensions, Numericals.		
14 th	Reactions at supports and connections for a two-dimensional structure, Equilibrium of a rigid body in two dimensions.		
15 th	Statically indeterminate reactions, Partial constraints, Equilibrium of a two-force body.		
16 th	Equilibrium of a three-force body, Equilibrium of a rigid body in three dimensions.		
17 th	Terminal		

PHY-3106		Mechanics and theory of relativity	Credit Hrs. 3(3-0)
Week	Topics		
01	<u>Vector Analysis:</u> Review of Vector in 3 dimensions and fundamental Operations, Direction, Cosines, Spherical polar coordinates		
02	Cylindrical Coordinaties, Vector and scalar triple products, gradient of a scalar		
03	Divergence and curl of a vector, Physical significance of each type, Divergence of a vector, Flux, Curl and line integral (mutual relation), Vector identities, Divergence Theorem		
04	Stoke's Theorem, their derivation, Physical importance and applications to specific cases		Assignment #1
05	<u>Particle Dynamics:</u> Dynamics of uniform, circular motion, the banked curve, Equations of motion, Deriving kinetic equations for $x(t)$, $v(t)$ via integration, Constant and variable forces, normal forces and contact forces, special examples.		
06	Time dependent forces, obtaining $x(t)$, $v(t)$ for this case using integration method, Effect of drag forces on motion, Applying Newton's Laws to obtain $v(t)$ for the case of motion with time dependent (Integration approach) drag (viscous) forces, terminal velocity.		Quiz #1
07	Projectile motion with and without air resistance, non inertial frames and Pseudo forces, Qualitative discussion to develop understanding		
08	MID TERM		
09	Calculation of pseudo forces for simple cases (linearly accelerated reference frames), Centrifugal force as an example of pseudo force, Coriolis force		
10	<u>Work, Power and Energy:</u>		

	Work done by a constant force, work done by a variable force (1-2 dimension), (Essentially a review of grade-XII concepts via integration technique to calculate work done (e.g. in vibration of a spring obeying Hooke's Law)	
11	Obtaining general expression for work done (2-dimensional case) and applying to simple cases e.g. pulling a mass at the end of a fixed string against gravity, Work energy theorem, General proof of work energy theorem: Qualitative review of work energy theorem	
12	Derivation using integral calculus, Basic formulae and applications, Power, Energy changes with respect to observers in different inertial frames, Conservation of Energy in 1, 2, and 3 dimensional conservative systems	
13	Conservative and non-conservative forces: Conservation of energy in a system of particles, Law of conservation of total energy of an isolated system.	
14	<u>Special Theory of Relativity:</u> Inertial and non-inertial frame, Postulates of Relativity, The Lorentz Transformation, Derivation, Assumptions on which inverse transformation is derived, Consequences of Lorentz transformation	
15	Relativity of time, Relativity of length, Relativity of mass, Transformation of velocity, variation of mass with velocity mass energy relation and its importance, relativistic momentum and Relativistic energy, (Lorentz invariants)	
16	Collisions: Elastic Collisions, Conservation of momentum during collision in one and two dimensions. Inelastic collision, Collisions in centre of Mass reference frame (One and two dimensions), Simple applications, Obtaining velocities in C.M. frame.	
17	Terminal	

UOQ-3108		Understanding of Quran		Credit Hrs.1(1-0)
Week	Units	Lesson	Assignments/home Task	Linguistic Rules
1	1	1-6	پڑھے گئے اسباق کے قرآنی الفاظ کا معنی لکھیں	معرفہ، مذکر مؤنث
	1	9-14	پڑھے گئے اسباق کے قرآنی الفاظ کا معنی لکھیں	جمع کی دو اقسام ، نکرہ اور و کا معنی
2	1	15-17	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ہذا، ہذہ ذالک ، تلک
	1	18-19 and revision of unit 1	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	لام تاکید ، اسم تفضیل
3	2	1-3	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ان ، لام کئی اور فی کی بحث
	2	4-6	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	حروف جار علی ، من ، الی
4	2	7-9	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	حروف جار "ب" ، لام نافیہ ، لام نفی جنس ، ما نافیہ اور الا
	2	10-13 and Revision of Unit 2 Assignment	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ان ، کان ، حروف النداء
5	Unit 3	1-2	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	صفت ، موصوف
	3	3-5	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	مضاف ، مضاف الیہ
6	3	6-7	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	مضاف ، مضاف الیہ
	3	8-10 And revision of Unit 3 Quiz	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	اسم فاعل ، اسم مفعول اور مثنی
7	Unit 4	1-2	پڑھے گئے اسباق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ضمیر ہو منفصل ، ؤ ضمیر متصل

	4	3-4	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	حروف جار ، ضمیر متصل
	4	5-8	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ضمیر منفصل انت ، ضمیر متصل "ک" مرکب اضافی اور ضمیر متصل
8	MID TERM			
9	4	9-12	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ضمیر منفصل ہی ، ضمیر متصل ہا
	4	13-16 Assignment	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ضمیر منفصل انا ، ضمیر متصل ی
10	4	17 and revision of unit 4	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	حال
	Unit 5	1-2	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	جمع مذکر سالم ، جمع مذکر سالم المسبوق بحرف الجر
11	5	3-4	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	جمع مذکر سالم المسبوق بالاضافة
	5	5-6 Quiz	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ضمیر ہم منفصل و متصل
12	5	7-8	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	اضافت اور حروف جار
	5	9-11	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ضمیر منفصل انتم اور متصل کم
13	5	12-14	پڑھے گئے ابساق کے قرآنی الفاظ ، قطعے اور جملوں کا ترجمہ لکھیں	ضمیر منفصل نحن ، متصل نا
	5	15-16	پڑھے گئے ابساق کے جملوں اور آیات کا ترجمہ لکھیں	حروف جار کو اضافت کے ساتھ ملانا
14	5	17-18	پڑھے گئے ابساق کے جملوں اور آیات کا ترجمہ لکھیں	اسما اشارہ ہؤلاء ، اولئک
	5	19-23	پڑھے گئے ابساق کے جملوں اور آیات کا ترجمہ لکھیں	ما/الا، ان /الا، انما، لیس ، ما ، کان ، (الا،

				الیس ، الیوم ، یومئذ، سبحان ، مابینہما ، قل ، اذن ، بئس ، نعم ، کلا ، ما ادراک، حسب ، اعلم ، مصیر ، دینا(تمیز)
15	5	Revision unit 5		
	6	1-3	پڑھے گئے اسباق کے جملوں اور آیات کا ترجمہ لکھیں	فعل مضارع، جملہ فعلیہ ، فعل مضارع، صیغہ مفرد
16	6	4-5	پڑھے گئے اسباق کے جملوں اور آیات کا ترجمہ لکھیں	فعل مضارع ، صیغہ مفرد یعلم
	6	6	پڑھے گئے اسباق کے جملوں اور آیات کا ترجمہ لکھیں	فعل مضارع صیغہ جمع یعملون
		Terminal		

3rd Semester

GEN-4301 Application of Information and Communication Technology Credit Hrs. 3(2-1)			
Week	Topics (Theory)	Practical Work	Assignment/ Quiz
Week 1	Introduction to ICT, Scope, and Components (hardware, software, networks, cloud storage)	Basic computer usage, file management (creating folders, naming conventions)	
Week 2	ICT in Daily Life: Use in education, business, governance, healthcare, etc.	Cloud storage: Google Drive, Dropbox, OneDrive – uploading, organizing, and sharing files	
Week 3	Emerging technologies and future trends	Web exploration: Effective searching using Google, Bing (search operators, filters)	
Week 4	Formal Communication Tools: Gmail, Outlook & Netiquette	Send professional emails, attach files, apply formatting, set auto-reply	Assignment #1
Week 5	MS Word: Basics, formatting, document creation	Hands-on with MS Word: Create letter, resume, formatted report	
Week 6	MS Excel: Data entry, formulas, functions, charts	Hands-on with MS Excel: Budget sheet, formulas, basic chart creation	Quiz #1
Week 7	MS PowerPoint: Slide design, presentation techniques	Create a presentation on ICT tools in education (insert media, animations)	
Week 8	Midterm		
Week 9	Google Workspace: Docs, Sheets, Slides overview	Create a document using Google Docs, collaborate in real-time	Assignment#2
Week 10	Evernote & OneNote: Note-taking and organization tools	Use OneNote/Evernote to create categorized notes, to-do lists	
Week 11	Video Conferencing Tools: Zoom, Meet, Teams	Setup a meeting, share screen, chat, use breakout rooms	Quiz #2
Week 12	LMS and Online Education: Moodle, Google Classroom, Coursera	Practice logging in, submitting assignments, participating in discussion forums	
Week 13	ICT in Health: Fitness apps and Telemedicine	Explore Google Fit or Samsung Health; simulate booking on Sehat Kahani	
Week 14	Online Banking & E-Commerce	Simulate wallet setup (JazzCash), explore Daraz.pk features	
Week 15	Digital Citizenship, Cyberbullying, Intellectual Property	Group discussion & case study on online harassment and plagiarism	
Week 16	Ethics in ICT, Content Authenticity, and Misinformation	Final practical assessment: Document + presentation + cloud storage submission	
Week 17	Terminal Examination		

GEN-4302 Quantitative Reasoning-II Credit Hrs. 3(3-0)		
Week	Topics	Assignment/Quiz
Week 1	<ul style="list-style-type: none"> • Introduction to logic; importance of logical reasoning 	
Week 2	<ul style="list-style-type: none"> • Inductive, deductive, and abductive reasoning approaches 	
Week 3	<ul style="list-style-type: none"> • Propositions, arguments (valid and invalid) 	
Week 4	<ul style="list-style-type: none"> • Logical connectives, truth tables 	Assignment#1
Week 5	<ul style="list-style-type: none"> • Propositional equivalences and logical fallacies 	
Week 6	<ul style="list-style-type: none"> • Venn diagrams; predicates and quantifiers; reasoning exercises 	Quiz #1
Week 7	<ul style="list-style-type: none"> • Introduction to deterministic models 	
Week 8	<ul style="list-style-type: none"> • Midterm 	
Week 9	<ul style="list-style-type: none"> • Using linear functions for real-world modeling 	Assignment#2
Week 10	<ul style="list-style-type: none"> • Modeling with systems of linear equations and solutions 	
Week 11	<ul style="list-style-type: none"> • Elementary introduction to derivatives in modeling 	Quiz #2
Week 12	<ul style="list-style-type: none"> • Linear growth and decay models • Exponential growth and decay models 	
Week 13	<ul style="list-style-type: none"> • Introduction to probabilistic models; bivariate analysis and scatter plots 	
Week 14	<ul style="list-style-type: none"> • Simple linear regression model and correlation analysis 	
Week 15	<ul style="list-style-type: none"> • Basics of estimation and confidence intervals • Hypothesis testing: z-test and t-test basics 	
Week 16	<ul style="list-style-type: none"> • Statistical inference in decision making 	
Week 17	<ul style="list-style-type: none"> • Terminal Examination 	

GEN-4303 Civics and Community Enagagement		Credit Hrs. 2(2-0)
Week	Topics (Theory)	Assignment/Quiz
Week 1	1. Civics and Citizenship: <ul style="list-style-type: none"> • Concepts of civics, citizenship, and civic engagement. • Foundations of modern society and citizenship. 	
Week 2	<ul style="list-style-type: none"> • Types of citizenship: active, participatory, digital, etc. 2. State, Government and Civil Society: <ul style="list-style-type: none"> • Structure and functions of government in Pakistan. 	
Week 3	<ul style="list-style-type: none"> • The relationship between democracy and civil society. • Right to vote and importance of political participation and representation. 	
Week 4	3. Rights and Responsibilities: <ul style="list-style-type: none"> • Overview of fundamental rights and liberties of citizens under Constitution of Pakistan 1973. • Civic responsibilities and duties. 	Assignment#1
Week 5	<ul style="list-style-type: none"> • Ethical considerations in civic engagement (accountability, non-violence, peaceful dialogue, civility, etc.) 4 Community Engagement: <ul style="list-style-type: none"> • Concept, nature and characteristics of community. • Community development and social cohesion. 	
Week 6	<ul style="list-style-type: none"> • Approaches to effective community engagement. • Case studies of successful community driven initiatives 	Quiz #1
Week 7	Midterm Exam	
Week 8	5 Advocacy and Activism: <ul style="list-style-type: none"> ▪ Public discourse and public opinion. 	
Week 9	<ul style="list-style-type: none"> ▪ Role of advocacy in addressing social issues. ▪ Social action movements 	Assignment#2
Week 10	6 Digital Citizenship and Technology: <ul style="list-style-type: none"> ▪ The use of digital platforms for civic engagement. 	
Week 11	<ul style="list-style-type: none"> • Cyber ethics and responsible use of social media. 	Quiz #2
Week 12	<ul style="list-style-type: none"> • Digital divides and disparities (access, usage, socioeconomic, geographic, etc.) and their impacts on citizenship 	
Week 13	7 Diversity, Inclusion and Social Justice: <ul style="list-style-type: none"> • Understanding diversity in society (ethnic, cultural, economic, political etc.). 	

Week 14	<ul style="list-style-type: none">• Youth, women and minorities' engagement in social development.	
Week 15	<ul style="list-style-type: none">• Addressing social inequalities and injustices in Pakistan.	
Week 16	<ul style="list-style-type: none">• Promoting inclusive citizenship and equal rights for societal harmony and peaceful co- existence.	
Week17	Terminal Examination	

MATH-4304		Calculus-III	Credit Hrs. 3(3-0)
Week	Topics	Assignment/Qui	
Week 1	Sequences, Monotone Sequences		
Week 2	Infinite Series, Convergence Tests		
Week 3	The Comparison, Ratio, and Root Tests		
Week 4	Alternating Series, Absolute and Conditional Convergence	Assignment #1	
Week 5	Maclaurin and Taylor Polynomials		
Week 6	Maclaurin and Taylor Series; Power Series	Quiz #1	
Week 7	Convergence of Taylor Series, Modeling with Taylor Series		
Week 8	Midterm Examination		
Week 9	Parametric Equations, Tangent Lines and Arc Length for Curves	Assignment#2	
Week 10	Polar Coordinates, Tangent Lines, Arc Length, and Area for Polar Curves		
Week 11	Conic Sections, Rotation of Axes, Second-Degree Equations	Quiz #2	
Week 12	Rectangular Coordinates in 3-Space, Spheres, Cylindrical Surfaces, Parametric Equations of Lines, Planes in 3-Space, Quadric Surfaces		
Week 13	Functions of Two or More Variables, Limits and Continuity		
Week 14	Partial Derivatives, Differentiability, Differentials, and Local Linearity The Chain Rule		
Week 15	Directional Derivatives and Gradients, Tangent Planes and Normal Vectors, Maxima and Minima of Functions of Two Variables, Lagrange Multipliers		
Week 16	Cylindrical and Spherical Coordinates, Double Integrals, Double Integrals over Nonrectangular Regions, Double Integrals in Polar Coordinates, Surface Area, Parametric Surfaces, Triple Integrals, Change of Variables in Multiple Integrals, Jacobians		
Week 17	Terminal Examination		

MATH-4305 Numerical Analysis-I		Credit Hrs. 3(3-0)
Week	Topics	Assignment/Quiz
Week 1	Introduction to Numerical Analysis: Overview of numerical methods and their significance	
Week 2	Sources of error in numerical computations, Root Finding and Nonlinear Equations: Bisection method	
Week 3	False position method, Newton-Raphson method	
Week 4	Secant method, Fixed point iteration method, Convergence and stopping criteria	Assignment#1
Week 5	Interpolation and Polynomial Approximation: Lagrange interpolation	
Week 6	Interpolation and Polynomial Approximation: Newton's divided-difference interpolation	Quiz #1
Week 7	Interpolation and Polynomial Approximation: Hermit interpolation, Polynomial interpolation error	
Week 8	Midterm	
Week 9	Numerical Differentiation, and Integration: Forward, backward, and central difference approximations	Assignment#2
Week 10	Numerical Differentiation, and Integration: Forward, backward, and central difference approximations	
Week 11	Numerical integration: trapezoidal rule, Simpson's rule	Quiz #2
Week 12	Error analysis for differentiation and integration, Systems of Linear Equations: Gaussian elimination methods	
Week 13	Systems of Linear Equations: Gauss Jordan method, matrix inversion	
Week 14	Systems of Linear Equations: LU decomposition,	
Week 15	Iterative methods: Jacobi, Gauss-Seidel, SOR.	
Week 16	Review and Final Assessment	
Week 17	Terminal Examination	

PHY-4306		Waves & Oscillation, Thermodynamics	Credit Hrs. 3(3-0)
Week	Teaching Activities	Assignment/Quiz	
01	Simple harmonic motion (SHM), Obtaining and solving the basic equations of motion $x(t)$, $v(t)$, $a(t)$		
02	Longitudinal and transverse Oscillations, and Energy considerations in SHM. Application of SHM, Torsional oscillator, Physical pendulum, simple pendulum,		
03	SHM, and uniform circular motion, Combinations of harmonic motions, Lissajous patterns		
04	Damped harmonic motion, Equation of damped harmonic motion, Quality factor, discussion of its solution	Assignment #1	
05	Forced oscillations and resonances, the Equation of forced oscillation, Discussion of its solution, Natural frequency, Resonance, Examples of resonance		
06	Mechanical waves, Travelling waves, Phase velocity of traveling waves, Sinusoidal waves, Group speed and dispersion, Wave speed, Mechanical analysis	Quiz #1	
07	Wave equation, Discussion of solution, Power, and intensity in wave motion, Derivation & discussion, Principle of superposition (basic ideas), Interference of waves		
08	Midterm		
09	Standing waves. Phase changes on reflection, Beats Phenomenon, Analytical treatment, Electromagnetic Spectrum, Doppler Effect	Assignment #2	
10	Reflection and Refraction of light waves, Total internal reflection, Plane and Spherical Mirrors		
11	Double slit Interference, Michelson and Fabry- Perot Interferometers	Quiz #2	
12	Review of previous concepts. The first law of thermodynamics and its applications to adiabatic, isothermal, cyclic, and free expansion		
13	Reversible and irreversible processes, the Second Law of thermodynamics, Carnot theorem		

14	Carnot engines. Heat engine, Refrigerators, Calculation of efficiency of heat engines	
15	Thermodynamic temperature scale: Absolute zero: Entropy	
16	Entropy in a reversible process, Entropy in an irreversible process. Entropy & second law. Entropy & probability	
17	Terminal	

5th Semester

PHY-5502		Classical Mechanics	Credit Hrs.3(3-0)
Week	Topics		
1 st	(ELEMENTARY AND VARIATIONAL PRINCIPLES) Brief survey of Newtonian mechanics of single and system of particles		
2 nd	Constraints, D-Alembert's principle,		
3 rd	Lagrange's equation and its applications, Calculus of variation and Hamilton's principle.		
4 th	Calculus of variation and Hamilton's principle, Derivation of Lagrange's equation from Hamilton's principle.		<u>Assignment #1</u>
5 th	(TWO BODY CENTRAL FORCE PROBLEM AND HAMILTON EQUATION OF MOTION) Two-body central force problem and its reduction to the equivalent one-body problem,		
6 th	The equation of motion and solution for one body. The Kepler laws.		<i>Quiz #1</i>
7 th	Laboratory and Centre of mass Co-ordinate systems and their mutual transformation, Rutherford scattering formula, Legendre transformation and Hamilton equation of motion.		
8 th	Midterm		
9 th	Cyclic coordinates, conservation theorems and physical significance of the Hamiltonian for simple cases		<i>Assignment #2</i>
10 th	Physical significance of the Hamiltonian for simple cases. Revisions. Midterms.		
11 th	(CANONICAL TRANSFORMATIONS) The canonical transformation and their examples. The Lagrange's and the Poisson's brackets		Quiz #2
12 th	Liouville's theorem, Small oscillations and normal modes. (THE KINEMATICS OF RIGID BODY MOTION) Rotations in three dimensions, orthogonal transformation,		
13 th	Eulerian angles, Coriolis force. (SPECIAL THEORY OF RELATIVITY) Michelson-Morley experiment, Einstein's postulates of relativity		
15 th	Energy equation of charge particle including electromagnetic potential.		

16 th	Orthogonal transformation in three dimensions, Lorentz transformation as orthogonal transformation.	
17 th	Terminal Examinations	

PHY-5503 METHODS OF MATHEMATICAL PHYSICS-I		Credit Hrs. 3(3-0)
Week	Topics	Assignment/Quiz
Week 1	Advanced vector and Tensor Analysis: Transformation Properties of vectors, vectors differentiation	
Week 2	Scalar and vector fields Gradient Divergence and Curl of vectors	
Week 3	Differentiation with respect to an arbitrary parameters, say time Orthogonal curvilinear Co-ordinates	
Week 4	Representation of operator in cylindrical and spherical polar co-ordinates, vector integration, Line,	Assignment#1
Week 5	Surface and volume integration, Green's theorem,	
Week 6	Stokes theorem, Gauss's theorem	Quiz #1
Week 7	COMPLEX VARIABLES Analytic functions, Types of functions, Type of singularities Branch cut, Branch points,	
Week 8	Midterm	
Week 9	Theorem of Morera, Maximum Modulus Theorem, Cauchy-Rieman Condition,	Assignment#2
Week 10	Taylor and Laurents series,	
Week 11	Complex Integration, Cauchy's Theorem, Cauchy's Integral Formula,	Quiz #2
Week 12	Residue theorem, Examples of Integration.	
Week 13	MATRICES Linear vector spaces, orthogonal system, Linear transformation of Bases and operators,	
Week 14	Matrices (basic definitions), Orthogonal matrices, Hermitian and unitary matrices,	
Week 15	Diagonalisation of matrices,	
Week 16	Solution of eigen value problems.	
Week 17	Terminal Examination	

PHY-5504		Electromagnetic Theory-1	Credit Hrs. 3(3-0)
Week #	Topics		
1 st	Review of Coulomb's law, Electric Field intensity, Electric Potential Gauss's law and its application		
2 nd	Field and potential due to a charge distribution, Electric Dipole		
3 rd	Linear quadrupole and multipole due to charge distribution		
4 th	Coefficient of capacitance and inductance, potential energy of a charge distribution		<u>Assignment 01</u>
5 th	energy density in an electric field, forces on conductors, The electric polarization, Electric displacement D		
6 th	Electric susceptibility, The dielectric coefficient, Calculation of Electrostatic field involving dielectrics		<u>Quiz 01</u>
7 th	Dielectric sphere with a point charge at its center, Calussius Mossotti equation		
8 th	Midterm		
9 th	Potential energy of a charge Distribution in the presence of dielectrics		<u>Assignment 02</u>
10 th	Laplace and Poisson's equation, Boundary conditions, Uniqueness theorem		
11 th	Images for plane and spherical surface, Images in dielectrics, Charge near a semi infinite dielectric, Solution of Laplace's equation for rectangular and spherical systems.		<u>Quiz 02</u>
12 th	Magnetic forces, Magnetic induction, The Biot- Savart law and its applications		
13 th	The Lorentz force on a point charge moving in a magnetic field, parallel plate magnetron, the divergence of the magnetic induction B		
14 th	the vector potential A, Equation of continuity, Divergence of vector potential, The Curl of magnetic Induction		
15 th	The Ampere's circuital law and its applications, Magnetic scalar potential,		
16 th	Magnetic dipole moment of a current loop, Ampere Circuital law and the Scalar potential.		
17 th	Terminal		

PHY-5505		Electronics	Credit Hours: 3(3-0)
Week	Lecture No.	Topic	Activity
		Topic	Activity
	Lecture 1	<ul style="list-style-type: none"> Basic Electrical concepts (Ohm & Kirchof Laws), 	
	Lecture 2	<ul style="list-style-type: none"> Circuit elements (Active & Passive) behaviors, Transformer (introduction) 	
	Lecture 3	<ul style="list-style-type: none"> Branch, Mesh and Node analysis (dc analysis only), 	
Week 2	Lecture 4	<ul style="list-style-type: none"> Wave filters (Low & high) 	
	Lecture 5	<ul style="list-style-type: none"> Circuit Theorems (Thevenin 	
	Lecture 6	<ul style="list-style-type: none"> Norton, Superposition 	
Week 3	Lecture 7	<ul style="list-style-type: none"> Maximum power transfer theorems, DC analysis 	
	Lecture 8	<ul style="list-style-type: none"> PN-Junction Diode, Ideal and Real Behavior and 	
	Lecture 9	<ul style="list-style-type: none"> Characteristics, Junction Capacitance 	
Week 4	Lecture 10	<ul style="list-style-type: none"> Reverse Recovery Time, 	Assignment# 01
	Lecture 11	<ul style="list-style-type: none"> Frequency response, Temperature effect, 	
	Lecture 12	<ul style="list-style-type: none"> Diode as a Rectifier, 	
Week 5	Lecture 13	<ul style="list-style-type: none"> Half wave, Full wave and Bridge Rectifier, Smoothing Circuit, 	
	Lecture 14	<ul style="list-style-type: none"> Diode Clipper and Clampers, Zener diode, voltage regulation. 	
	Lecture 15	<ul style="list-style-type: none"> BJT, Transistor Characteristics 	
Week 6	Lecture 16	<ul style="list-style-type: none"> CBC, CCC, CEC 	Quiz # 01
	Lecture 17	<ul style="list-style-type: none"> Transistor Voltage amplification, 	
	Lecture 18	<ul style="list-style-type: none"> Transistor Biasing, Fixed current Bias, 	
Week 7	Lecture 19	<ul style="list-style-type: none"> Collector-to-Base Bias 	
	Lecture 20	<ul style="list-style-type: none"> Emitter Current Bias, 	
	Lecture 21	<ul style="list-style-type: none"> Temperature Effect 	
Week 8	Mid term		
Week 09	Lecture 22	<ul style="list-style-type: none"> Q-point Operation, 	Assignment# 02
	Lecture 23	<ul style="list-style-type: none"> Graphical analysis, 	
	Lecture 24	<ul style="list-style-type: none"> FET, FET Biasing 	
Week 10	Lecture 25	<ul style="list-style-type: none"> Basic Differential Amplifier 	
	Lecture 26	<ul style="list-style-type: none"> Differential Amplifier circuits, Constant Current Sources, 	
	Lecture 27	<ul style="list-style-type: none"> CMRR, 	
Week 11	Lecture 28	<ul style="list-style-type: none"> Basics of the Operational Amplifier Operational 	Quiz # 02
	Lecture 29	<ul style="list-style-type: none"> Amplifier circuits and specification (Inverting & Non-Inverting), 	

	Lecture 30	<ul style="list-style-type: none"> • application of Operational Amplifier (as summing, comparator, integrated and differentiator). 	
Week 12	Lecture 31	<ul style="list-style-type: none"> • Feedback concepts, Feedback connection types, 	
	Lecture 32	<ul style="list-style-type: none"> • Feedback amplifier, Phase and frequency consideration, 	
	Lecture 33	<ul style="list-style-type: none"> • Oscillator operation, Phase Shift oscillator 	
Week 13	Lecture 34	<ul style="list-style-type: none"> • Phase and frequency consideration, Oscillator operation, Phase Shift 	
	Lecture 35	<ul style="list-style-type: none"> • oscillator Wien Bridge oscillator, 	
	Lecture 36	<ul style="list-style-type: none"> • Hartly oscillator, Amplitude stabilization. 	
Week 14	Lecture 37	<ul style="list-style-type: none"> • Review of number systems, Binary operation 	
	Lecture 38	<ul style="list-style-type: none"> • Digital codes, 	
	Lecture 39	<ul style="list-style-type: none"> • Logic gates, 	
Week 15	Lecture 40	<ul style="list-style-type: none"> • Boolean Algebra, Logic 	
	Lecture 41	<ul style="list-style-type: none"> • expression (SOP,POS), 	
	Lecture 42	<ul style="list-style-type: none"> • Simplifying logic circuits, 	
Week 16	Lecture 43	<ul style="list-style-type: none"> • Monostable and Astable multivibrators. • Designing of combinational logic circuits 	
	Lecture 44	<ul style="list-style-type: none"> • intro. To sequential logic circuits, 	
	Lecture 45	<ul style="list-style-type: none"> • Flip flops (SC, JK, D-Flip flop), 	
Week 17		Terminal Examination	

PHY-5506		Atomic & Laser Physics	Credit Hrs. 3(3-0)
Week No.	<u>Topics</u>		
1st	<u>ATOMIC STRUCTURE AND ATOMIC SPECTRA</u> Bohr's theory of Atomic structure and atomic spectra, Correction for nuclear motion,		
2nd	Sommerfeld elliptic orbits, relativity correction,		
3rd	and hydrogen fine structure,		
4th	Vector model of the atom, Orbital angular momentum, spin angular momentum,		Assignment 01
5th	total angular momentum, Orbital and spin magnetic moments, magnetic quantum numbers,		
6th	space quantization, coupling scheme (LS and JJ coupling),		Quiz 01
7th	Pauli's exclusion principle, distribution of electrons in an atom, spectral notations,		
8th	Midterm		
9th	Zeeman effect (normal and Anomalous)		Assignment 02
10th	Zeeman effect (normal and Anomalous)		
11th	Spectra of two electrons atom, Inner core electron spectra (X-rays),		Quiz 02
12th	Inner core electron spectra (X-rays), Stark effect.		
13th	<u>QUANTUM THEORY OF RADIATION</u> The failure of classical Physics to describe atomic phenomena, the emission, and absorption of thermal radiation, the classical theory of thermal radiation and its failure,		
14th	<u>QUANTUM THEORY OF RADIATION</u> Plank's quantum theory of thermal radiation. <u>THE WAVES AND THE PARTICLES</u> De-Broglie's hypothesis, diffraction of electrons and neutrons,		
15th	the velocity of the de-Broglie wave, group velocity, and particle velocity. <u>LASER</u> , Interaction of radiation with matter, Black body radiation, Principles of Laser operation, Pumping process,		
16th	Passive optical resonators, CW and transient Laser behavior, Q-Switching, Types of Lasers, Laser detectors, Application of lasers.		
17th	Terminal		

7th Semester

PHY-6702	Quantum Mechanics-II	Credit Hrs. 3(3-0)
Week	Topics	
1-2	QM postulates, operators, bra-ket notation	
3-4	Schrödinger, Heisenberg, Interaction pictures	Assignment #1
5-6	Harmonic oscillator in matrix mechanics	Quiz #1
7	Angular momentum matrices	
8	MIDTERM EXAMS	
9	Zeeman effect, magnetic field	Assignment #2
10	Spin, Pauli matrices, central field	
11	Addition of angular momenta	Quiz #2
12	Spin states of two spin-1/2	
13	Variational Method, Time-independent perturbation theory	
14	Time-dependent perturbation theory	
15	WKB approximation, Partial wave scattering, cross-sections	
16	Born approximation, Coulomb scattering, Identical particles, symmetry	
17	TERMINAL EXAMS	

PHY-6703	Plasma Physics	Credit Hrs. 3(3-0)
Week	Topics	
1	General properties of Plasma; definition of plasma; plasma as the fourth state of matter.	
2	Plasma production; plasma interaction and collision effects; some basic plasma phenomena.	
3	Criteria for the definition of plasma; Macroscopic neutrality in plasma.	
4	Debye shielding; Plasma frequency.	Assignment #1
5	The Motion of a particle in the presence of E and B fields.	
6	Motion in non-uniform B field; Motion in non-uniform E field.	Quiz #1
7	Motion in time-varying E field; Motion in time-varying B field.	
8	MIDTERM EXAMINATION	
9	Introduction; Relations of plasma Physics in ordinary electromagnetics; the fluid equation of motion.	Assignment #2
10	The fluid drifts perpendicular to B field; the fluid drifts parallel to B field.	
11	The plasma approximation.	Quiz #2
12	Electron and ion waves; sound waves; electrostatic ion waves perpendicular to magnetic field.	
13	Lower-hybrid frequency; Electromagnetic waves for unmagnetized plasmas.	
14	Electromagnetic waves for magnetized plasmas; Alfvén waves; magneto-sonic waves.	
15	Introduction to controlled fusion; Basic nuclear fusion reactions; reaction rates	
16	Power rates and power density; radiation losses from plasmas; operational conditions.	
17	TERMINAL EXAMINATIONS	

PHY-6705		SOLID STATE PHYSICS		Credit Hrs: 3(3-0)	
Week	Activity				
1	Energy levels and density of orbital in one dimension, Effect of temperature on the Fermi-Dirac distribution				
2	Free electron gas in three dimensions, Heat capacity of the electron gas, Experimental heat capacity of metals				
3	Electrical conductivity and Ohm's law, Experimental electrical resistivity of metals, Motion in magnetic fields				
4	Hall effect, Thermal conductivity of metals, Ratio of thermal to electrical conductivity, relevant numerical problems			Assignment #1	
5	Nearly free electron model, Origin of the energy gap, Magnitude of the energy gap, Bloch functions, Kronig-penney model, Wave equation of electron in periodic potential				
6	Restatement of the bloch theorem, Crystal momentum of an electron, Solution of the central equation, Empty lattice approximation, The structure of Brillouin zones			Quiz #1	
7	Reduced zone scheme, periodic zone scheme and extended zone scheme,				
8	Midterm				
9	Construction of free electron Fermi surfaces, Formation of energy bands,			Assignment #2	
10	The empty lattice energy bands, Plane wave method, Orthogonalized plane wave method,				
11	Pseudo potential method, The tight binding method, and relevant solved examples			Quiz #2	
12	Cellular and Quantum defect method, Augmented plane wave method				
13	Band gap, Equation of motion, Fuller derivation of $F = nk$ Holes Effective mass,				
14	Physical basis of the effective mass, Effective masses in semiconductors silicon and germanium, Intrinsic carrier concentration,				
15	Mobility in the presence of impurities, p-n junction, Rectification, Solar cell and photovoltaic detectors, Schottky barrier				
16	Comprehensive discussion on the course and practice to numerical problems				
17	Terminal				

PHY-6709 Environmental Physics Credit Hrs. 3(3-0)		
Week No.	<u>Topics</u>	
1 st	Structure and composition of the Atmosphere.	
2 nd	Structure and composition of the Atmosphere.	
3 rd	Solar Radiation and the atmosphere.	
4 th	Winds in the atmosphere.	<u>Assignment 01</u>
5 th	The hydrosphere.	
6 th	The ground (soil).	<u>Quiz 01</u>
7 th	Physical behavior of soil water system.	
8 th	Midterm	
9 th	Soil mechanics.	<u>Assignment 02</u>
10 th	Soil mechanics, Energy and the environment.	
11 th	Energy and the environment.	<u>Quiz 02</u>
12 th	Sound and noise.	
13 th	Atmospheric pollution due to nuclear radiations.	
14 th	Non-radioactive, Atmospheric pollution.	
15 th	climatology and measurements of climate factor.	
16 th	Environmental spectroscopy.	
17 th	Midterm	

