1. **Title of Degree Program: BS in Geography**

2. **Program Learning Objectives:**

Geography is the study of earth, its structure, features, inhabitants and man environment interaction. The BS Geography programme helps students to study and investigate earth and related phenomena. After
completion of their degree, students will be able to understand the recent perspectives of Geography including man environment relationship, spatial variations resulting from physical and human activities and relationship of Geography with other disciplines of allied sciences. Students will be able to gain current knowledge and practical skills through theory, practical and field excursions.

3. **Program Structure:**

Duration	Minimum 4-Years (8-Semesters), Maximum 6-Years (12-Semesters)
Admission Requirements:	At least 45% marks in HSSC (Part I/II) or DAE (First & Second Year)
Degree Completion Requirements:	Students are required to study 124 credit hours and pass all courses of BS program for the completion of this degree as notified below securing a minimum CGPA 2.5 out of 4.00 to obtain degree after 8 semesters.

4. **General Education (Gen Ed) Requirements: (Mandatory/Core Curses):**

5.

The minimum requirement for Gen Ed is 30 credits hours and will be offered in first four semesters only.

Sr. No.	Semester	Course Code	Course Title	Credit Hours	Prerequisite
1.	2	URCG-5112	Fables, Wisdom and EPICS	2(2-0)	Nil
2.	4	URCG-5114	Basic Science	3(2-1)	Nil
3.	2	URCG-5116	Science of Society-I	2(2-0)	Nil
4.	1	URCG-5118	Functional English	3(3-0)	Nil
5.	3	URCG-5119	Expository Writing	3(3-0)	Nil
6.	2	URCG-5120	Exploring Quantitative Skills	3(3-0)	Nil
7.	3	URCG-5121	Tools for Quantitative Reasoning	3(3-0)	Nil
8.	1	URCG-5105 URCG-5126	Islamic Studies (OR) Religious Education/Ethics	2(2-0)	Nil
9.	3	URCG-5122	Ideology and Constitution of Pakistan	2(2-0)	Nil
10.	1	URCG-5123	Applications of Information and Communication Technologies (ICT)	3(2-1)	Nil
11.	4	URCG-5124	Entrepreneurship	2(2-0)	Nil
12.	4	URCG-5125	Civics and Community Engagement	2(2-0)	Nil
13.	1-8	URCG-5111	Translation of Holy Quran	NC	Nil
14.	2	URCG-5127	Seerat of the Holy Prophet (SAW)	1(1-0)	Nil
			GE Courses Credit Hours Total	31	

6. **Single Major Courses:**

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	GEOG-5101	Fundamentals of Geography	3(3-0)	Nil
2.	GEOG-5102	Physical Geography	3(3-0)	Nil
3.	GEOG-5103	Human Geography	3(3-0)	Nil
4.	GEOG-5104	Map Work	3(2-1)	Nil

5.	GEOG-5105	History and Development of Geographic Thought	3(3-0)	Nil
6.	GEOG-5106	Surveying	3(1-2)	Nil
7.	GEOG-5107	Regional Concepts	3(3-0)	Nil
8.	GEOG-5108	Geomorphology	3(3-0)	Nil
9.	GEOG-5109	Climatology	3(3-0)	Nil
10.	GEOG-5110	Economic Geography	3(3-0)	Nil
11.	GEOG-5111	Quantitative Methods In Geography	3(3-0)	Nil
12.	GEOG-5112	Principles of Cartography	3(1-2)	Nil
13.	GEOG-6113	Geographical Information System	3(2-1)	Nil
14.	GEOG-6114	Oceanography	3(3-0)	Nil
15.	GEOG-6115	Remote Sensing	3(2-1)	Nil
16.	GEOG-6116	Research Methods	3(3-0)	Nil
17.	GEOG-6117	Population Geography	3(3-0)	Nil
18.	GEOG-6118	Environmental Geography	3(3-0)	Nil
19.	GEOG-6119	Urban Geography	3(3-0)	Nil
20.	GEOG- 6120	Digital Image Processing	3(2-1)	Nil
21.	GEOG-6121	Geography of Pakistan	3(3-0)	Nil
22.	*GEOG-61--	Elective Course-I	3(3-0)	Nil
23.	*GEOG-61--	Elective Course-II	3(3-0)	Nil
24.	*GEOG-61--	Elective Course-III	3(3-0)	Nil
25.	*GEOG-61--	Elective Course-IV	3(3-0)	Nil
26.	GEOG-6170	South Asia	3(3-0)	Nil
Major Courses Credit Hours Total			**78**	

*as notified by the chairman from list A.

6. Interdisciplinary/Allied courses: minimum 12 credit hours:

Interdisciplinary/Allied courses will be offered after 4th semester

1.	-----	**Interdisciplinary/Allied course-I	3(3-0)	Nil
2.	-----	**Interdisciplinary/Allied course-II	3(3-0)	Nil
3.	-----	**Interdisciplinary/Allied course-III	3(3-0)	Nil
4.	-----	**Interdisciplinary/Allied course-IV	3(3-0)	Nil
Interdisciplinary Courses Credit Hours Total			**12**	

**as notified by the Chairman from list B.

7. Field experience/internship: Minimum 03 credit hours:

Lasting 6-8 weeks and ideally scheduled during summer breaks after 4th semester.

1.	***GEOG-61--	Field experience	3(0-3)	Nil

***as notified by the Chairman from list C.

8. Capstone project: Minimum 03 credit hours:

1.	GEOG-6191	Capstone Project	3(3-0)	Nil

List A: Elective Courses:-

- GEOG-6122 Cultural Geography
- GEOG -6123 Natural Hazards & Disaster Management
- GEOG-6124 Geography of Manufacturing
- GEOG-6125 Hydro Geography
- GEOG-6126 Medical Geography
- GEOG-6127 Political Geography
- GEOG-6128 Regional Planning & Development
- GEOG -6129 Climate Change Studies
- GEOG-6130 Agricultural Geography
- GEOG-6131 Conservation of Resources

List B: Interdisciplinary/ Allied Courses:-

- GEOL-5101 Introduction to Geology
- URCM-5107 Mathematics I
- URCM-5108 Mathematics II
- ENVR- 5104 Environmental Geology
- CHEM-5101 Physical Chemistry
- CHEM-5102 Inorganic Chemistry
- ECON-5112 Introduction to Economics
- PHYS- 5101 Mechanics
- PSYC- 5101 Introduction to Psychology
- SOCI- 5101 General Sociology I
- STAT-5121 Introduction to Statistics
- ULAW-5130 Introduction to Basic Law
- INTR -5101 Introduction to international Relation
- POLS-5101 Introduction to Political Science

List C. Field Survey and Project Report

The students shall carry out field survey on any one of the following fields:

- GEOG-6181 Demographic Survey
- GEOG-6182 Hydrological Survey
- GEOG-6183 Industrial Survey
- GEOG-6184 Land Use Survey
- GEOG-6185 Landforms Survey
- GEOG-6186 Soil Survey
- GEOG-6187 Urban Survey
- GEOG- 6188 EIA (Environmental Impact Assessment)

Each student shall be required to collect data/information pertaining to his/her topic in a selected area/region, tabulate the data and write report on it.

Scheme of Studies

BS in Geography

Semester-I

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-1	URCG-5118	Functional English	3(3-0)	Nil
GE-2	URCG-5105 URCG-5126	Islamic Studies (OR) Religious Education/Ethics	2(2-0)	Nil
GE-3	URCG-5123	Applications of Information and Communication Technologies (ICT)	3(2-1)	Nil
Major-1	GEOG-5101	Fundamentals of Geography	3(3-0)	Nil
Major-2	GEOG-5102	Physical Geography	3(3-0)	Nil
Major-3	GEOG-5103	Human Geography	3(3-0)	Nil

Semester Total Credit Hours: 17

Semester-II

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-4	URCG-5112	Fables, Wisdom and EPICS	2(2-0)	Nil
GE-5	URCG-5116	Science of Society-I	2(2-0)	Nil
GE-6	URCG-5120	Exploring Quantitative Skills	3(3-0)	Nil
GE-7	URCG-5127	Seerat of the Holy Prophet (SAW)	1(1-0)	Nil
GE-8	URCG-5111	Translation of Holy Quran-I	NC	Nil
Major-4	GEOG-5104	Map Work	3(2-1)	Nil
Major-5	GEOG-5105	History and Development of Geographic Thought	3(3-0)	Nil
Major-6	GEOG-5106	Surveying	3(1-2)	Nil

Semester Total Credit Hours: 17

Semester-III

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-9	URCG-5119	Expository Writing	3(3-0)	Nil
GE-10	URCG-5121	Tools for Quantitative Reasoning	3(3-0)	Nil
GE-11	URCG-5122	Ideology and Constitution of Pakistan	2(2-0)	Nil
Major-7	GEOG-5107	Regional Concepts	3(3-0)	Nil
Major-8	GEOG-5108	Geomorphology	3(3-0)	Nil
Major-9	GEOG-5109	Climatology	3(3-0)	Nil

Semester Total Credit Hours: 17

Semester-IV

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-8	URCG-5111	Translation of Holy Quran-II	NC	Nil
GE-12	URCG-5114	Basic Science	3(2-1)	Nil
GE-13	URCG-5124	Entrepreneurship	2(2-0)	Nil
GE-14	URCG-5125	Civics and Community Engagement	2(2-0)	Nil
Major-10	GEOG-5110	Economic Geography	3(3-0)	Nil
Major-11	GEOG-5111	Quantitative Methods In Geography	3(3-0)	Nil
Major-12	GEOG-5112	Principles of Cartography	3(1-2)	Nil

Semester Total Credit Hours: 16

Summer Semester (For student exiting program to have Associate Degree)

Category	Course	Course Title	Credit Hours	Pre-Requisite
Compulsory	GEOG-5113	Internship	3(3-0)	Completion of minimum 60 credit hours

Semester-V

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Major-13	GEOG-6113	Geographical Information System	3(2-1)	Nil
ID-1	-----	**Interdisciplinary/Allied course-I	3(3-0)	Nil
ID-2	-----	**Interdisciplinary/Allied course-II	3(3-0)	Nil
ID-3	-----	**Interdisciplinary/Allied course-III	3(3-0)	Nil
ID-4	-----	**Interdisciplinary/Allied course-IV	3(3-0)	Nil

Semester Total Credit Hours: 15

Semester-VI

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-8	URCG-5111	Translation of Holy Quran-III	NC	Nil
Major-14	GEOG-6114	Oceanography	3(3-0)	Nil
Major-15	GEOG-6115	Remote Sensing	3(2-1)	Nil
Major-16	GEOG-6116	Research Methods	3(3-0)	Nil
Major-17	GEOG-6117	Population Geography	3(3-0)	Nil
Major-18	GEOG-6118	Environmental Geography	3(3-0)	Nil

Semester Total Credit Hours: 15

Semester-VII

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Major-19	GEOG-6170 -	South Asia	3(3-0)	Nil
Major-20	GEOG-6119	Urban Geography	3(3-0)	Nil
Major-21	GEOG- 6120	Digital Image Processing	3(2-1)	Nil
Major-22	*GEOG-61--	Elective Course-I	3(3-0)	Nil
Major-23	*GEOG-61--	Elective Course-II	3(3-0)	Nil

Semester Total Credit Hours: 15

Semester-VIII

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-8	URCG-5111	Translation of Holy Quran-IV	NC	Nil
Major-24	GEOG-6121	Geography of Pakistan	3(3-0)	Nil
Major-25	*GEOG-61--	Elective Course-III	3(3-0)	Nil
Major-26	*GEOG-61--	Elective Course-IV	3(3-0)	Nil
Compulsory	***GEOG-61--	Field experience	3(0-3)	Nil
Compulsory	GEOG-6191	Capstone Project	3(3-0)	Nil

Semester Total Credit Hours: 12

Degree Program Total: 124

URCG-5118	Functional English	3(3-0)

Course Brief:

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.

Course Learning Objectives:

The course will 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.

Course 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

URCG-5105	Islamic Studies (Compulsory)	2(2-0)

Course Brief:

Introductory/compulsory foundation course

Islamic Studies engages in the study of Islam as a textual tradition inscribed in the fundamental sources of Islam; Qur'an 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 bases of Islam in fields that include Qur'anic studies, Hadith and Seerah of Prophet Muhammad (PBUH), Islamic philosophy, and Islamic law, culture and theology through the textual study of Qur'an and Sunnah.

Course Learning Objectives

- To make students understand the relevance and pragmatic significance of Islam in their lives.
- To make learners comprehend the true spirit of Islam with reference to modern world.
- To generate a sense of Islamic principles as a code of living that guarantee the effective solutions to the current challenges of being.
- To provide Basic information about Islamic Studies
- To enhance understanding of the students regarding Islamic Civilization
- To improve Students skill to perform prayers and other worships
- To enhance the skill of the students for understanding of issues related to faith and religious life.

Course Contents

Introduction to Qur'anic Studies

1) Basic Concepts of Qur'an
2) History of Quran
3) Uloom-ul- Quran

مطالعہ قرآن (تعارف قرآن ، 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)

Introduction to Sunnah

1) Introduction of Hadith
2) Legal Status of Hadith
3) History of the compilation of Hadith
4) Kinds of Hadith

حدیث کا تعارف، حدیث کی دینی حیثیت، حفاظت و تدوین حدیث، حدیث کی اقسام

متن، حدیث:]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.کتا ب وسنت گمراہی سے بچنے کا ذریعہ ہیں4- ارکان اسلام 5- اسلام ، ایمان ، احسان اور قیامت کی نشانیاں، 6-بچوں کی نماز کی تلقین 7- دین کا گہرا فہم اللہ کی خاص عنایت ہے 8- حصول علم، تلاوتِ قرآن اور عمل کی اہمیت و فضیلت، 9 -روز محشر کا محاسبہ، 10- حقوق اللہ کے ساتھ ساتھ حقوق العباد کا لحاظ رکھنا بھی لازم ہے11- حسن خلق کی عظمت اور فحش و بد گوئی کی مذمت 12- دنیا و آخرت 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

1) Sirah of the Prohet
2) Importance of the Study of Sirah
3) Character building method of the Prophet

(سیرت النبیﷺ(مطالعہ سیرت کی ضرورت و اہمیت ، تعمیر،سیرت و شخصیت کا نبوی منہاج اور عملی نمونے ، اقامت دین کا نبوی طریق کار، اقامتِ دین بعہدِ 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 و حکمتیں)

Islamic Culture & Civilization
1) Basic Concepts of Islamic Culture & Civilization
2) Historical Development of Islamic Culture & Civilization
3) Characteristics of Islamic Culture & Civilization
4) Islamic Culture & Civilization and Contemporary Issues

4. اسلامی تہذیب و تمدن (اسلامی تہذیب کا مفہوم، اسلامی کے عوامل و عناصر، اسلامی تہذیب کی خصوصیات، ، اسلامی تہذیب ، 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، نام ور مسلمان سائنسدان)

Pre-Requisite: Nil

Recommended Books

1) Hameed ullah Muhammad, —Emergence of Islam‖ , IRI, Islamabad
2) Hameed ullah Muhammad, —Muslim Conduct of State
3) Hameed ullah Muhammad, _Introduction to Islam
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

URCG-5126	ETHICS	2(2-0)

Course Brief:

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

URCG-5123	Applications of Information Communication Technologies (ICT)	3 (2-1)

Course Brief:

The course introduces students to information and communication technologies and their application in the workplace. Objectives include basic understanding of computer software, hardware, and associated technologies. How computers can be used in the workplace, how communications systems can help boost productivity, and how the Internet technologies can influence the workplace.

Course Learning Objectives:

Students will get basic understanding of computer software, hardware, and associated technologies. They will also learn how computers are used in the workplace, how communications systems can help to boost productivity, and how the Internet technologies can influence the workplace.

Course Contents:

1. Introduction, Overview of Information Technology.
2. Hardware: Computer Systems & Components, Storage Devices.
3. Software: Operating Systems, Programming and Application Software.
4. Databases and Information Systems Networks.
5. File Processing Versus Database Management Systems.
6. Data Communication and Networks.
7. Physical Transmission Media & Wireless Transmission Media.
8. Applications of smart phone and usage.
9. The Internet, Browsers and Search Engines.
10. Websites and their types.
11. Email Collaborative Computing and Social Networking.
12. E-Commerce.
13. IT Security and other issues.
14. Cyber Laws and Ethics of using Social media.
15. Use of Microsoft Office tools (Word, Power Point, Excel) or other similar tools depending on the operating system.
16. Other IT tools/software specific to field of study of the students if any.

Recommended Texts:

1. Discovering Computers 2022: Digital Technology, Data and Devices by Misty E. Vermaat, Susan L. sebok; 17^{th} edition.

Suggested Readings:

1. Computing Essentials 2021 by Timothy J. O'Leary and Linda I. O'Leary, McGraw Hill Higher Education; 26^{th} edition.
2. Computers: Understanding Technology by Fuller, Floyd; Larson, Brian: edition 2018.

GEOG- 5101	Fundamentals of Geography	3(3-0)

Course Brief:

This course is graduate-level course to expose students with the founding principles of Geography and geographical knowledge. A systematic descriptive introduction to the diverse elements of landscape including geomorphic, climatic, and biotic elements, human settlement and land-use patterns; cartographic approaches to the analysis of selected processes of landscape change.

Course Learning Objectives:

This course provides an opportunity for understanding part of the complex physical and biological environment in which human beings live. The nature and processes of geo-system and its constituent parts: atmosphere, lithosphere, hydrosphere and biosphere; structure and composition of the atmosphere: atmospheric circulation, weather and climate, energy transmission, spatial variation of energy inputs and energy budget; structure and composition of the earth: tectonics and related processes; hydrological cycle and its components: precipitation, evapotranspiration, groundwater, surface water and the oceans; vegetation zones of the world: world soils, ecosystems, biomes, energy and matter flows.

Course Contents:

1. Introduction, Definitions, scope and branches of Geography
2. Roots of the discipline and basic geographic concepts
3. Themes and traditions of Geography
4. Tools of Geography, The Universe, Galaxies and solar system
5. The Earth as a planet, Celestial positions, its shape and size
6. Rotation, revolution and related phenomena
7. Spheres of the earth, Lithosphere, Atmosphere, Hydrosphere
8. Biosphere
9. Man-environment interaction
10. Population
11. Major Economic activities
12. Settlements
13. Pollution

Lab. Work

1. Comprehension of atlases
2. Map reading skills, location of places
3. Features and relevant work related to topics of the theoretical section.

Recommended Texts

1. Arbogast, A. F. (2007).*Discovering physical geography*. London: John Wiley and Sons.
2. Christopherson, R. W. (2009).*Geo systems: an introduction to physical geography*. New Jersey: Pearson Prentice Hall.

Suggested Readings

1. De Blij, H. J and Muller, P. O. (1996).*Physical geography of the global environment*. London: John Wiley and Sons.
2. Strahler, A. (2013).*Introduction to physical geography*. New Jersey: John Wiley & Sons.

GEOG - 5102	Physical Geography	3(3-0)

Course Brief:

This course provides an opportunity for understanding part of the complex physical and biological environment in which human beings live. It introduces basic processes that influence the characteristics and spatial relationships of climate, water cycle and vegetation. The first part of the course examines the interactions of solar energy with the Earth's atmosphere and surface, and how atmospheric circulation, precipitation, and weather systems are generated. The second part of the course covers the cycling of water and other Earth resources within the living zone - the biosphere. It focuses on how these cycles, together with the flows of energy, influence the nature and distribution of ecosystems and vegetation.

Course Learning Objectives:

This course provides patterns of human activities that are in response to and have an effect upon environmental processes, and are asked to observe and interpret aspects of their local environment in light of what they have learned.

Course Contents:

1. Definition, scope and major branches
2. Realms of the physical environment
3. Lithosphere
4. Internal structure of earth
5. Rocks–origin, formation and types: Igneous, Sedimentary and Metamorphic Rocks
6. Plate tectonics, mountain building forces.
7. Geomorphic processes – endogenic and exogenic processes and their resultant landforms
8. Earthquakes and volcanic activity, folding and faulting
9. Weathering, mass wasting, cycle of erosion, erosion and deposition
10. Landforms produced by running water, ground water, wind and glaciers
11. Atmosphere
12. Composition and structure of atmosphere
13. Atmospheric temperature and pressure, global circulation
14. Atmospheric moisture and precipitation
15. Air masses and fronts
16. Cyclones and other disturbances
17. Hydrosphere
18. Hydrological cycle
19. Ocean composition, temperature and salinity of ocean water
20. Movements of the ocean water; waves, currents and tides
21. Biosphere

Recommended Texts:

1. Strahler, A. (2013).*Introduction to physical geography*.New York: John Wiley & Sons.
2. Thornbury, W. D. (2004).*Principles of geomorphology*. New Jersey: John Willy &Sons.

Suggested Readings:

1. Strahlar, A. N., &Strahlar, A. H. (2004).*Physical environment.*New York: John Wiley & Sons.
2. Stringer, E. T. (2004).*Modern physical geography*.New York: John Wiley & Sons.

GEOG– 5103	Human Geography	3(3-0)

Course Brief:

This course provides an introduction to Human Geography. The major thrust is on the study of human societies in their relation to the habitat or environment. Dealing with the spatial distribution of societies, human geography covers a very wide field or its scope is enormous. It embraces the study of human races; the growth, distribution and density of populations of the various parts of the world, their demographic attributes and migration patterns; and physical and cultural differences between human groups and economic activities.

Course Learning Objective:

This course covers the relationship between man and his natural environment, and the way in which his activities are distributed. Human geography also takes into account the mosaic of culture, language, religion, customs and traditions; types and patterns of rural settlements, the site, size, growth and functions of urban settlements, and the functional classification of towns. The study of spatial distribution of economic activities, industries, trade, and modes of transportations and communications as influenced by the physical environment are also the important topics of human geography.

Course Contents:

1. Introduction
2. Definition, scope and branches
3. Basic approaches
4. Population and its characteristics and population distribution
5. Population structure and composition
6. Population dynamics (fertility, mortality, migration etc.)
7. Economic activities
8. Agriculture, mining, forestry, animal husbandry and poultry
9. Industries: cottage, light and heavy
10. Trade, transport and services
11. Tourism
12. Settlements
13. Theories of human settlement
14. Types of settlements

Recommended Texts:

1. Ahmed, Q. S. (2001).*Fundamentals of human geography*. Karachi: Royal Book Company.
2. Becker, A. & Secker. (2002).*Human geography: culture, society, and space.*, New Jersey: John Wiley and Sons.

Suggested Readings:

1. Benko, G. & Shorhmay. (2004). *Human geography: a history for the 21st century.* London: Hodder Arnold.
2. Blij, H. J. D. (2002).*Human geography: culture, society, and space*. New Jersey. John Wiley and Sons.
3. Cloke, P. &Crang, P. (2005).*Introducing human geographies*, (2nded.).London: Hodder Arnold.

URCG-5112	Fable, Wisdom and EPICS	2(2-0)

Course Brief:

The course will enable students to explore human experiences, cultivate an appreciation of the past, enrich their capacity to participate in the life of their times, and enable an engagement with other cultures and civilizations, both ancient and modern. But independently of any specific application, the study of these subjects teaches understanding and delight in the highest achievements of humanity.

Course Learning Objective:

This course includes fables, wisdom literature and epic, will enable the learners to explore and understand the classic tradition in literature. Development of personal virtue, a deep Sufi ethic and an unwavering concern for the permanent over the fleeting and the ephemeral are some of the key themes explored in the contents that will develop an intimate connection between literature and life.

Course Contents:

1. **Fables**
   The Fables of Bidpai The
   Lion and the Bull The
   Ring-dove
   The Owls and the Crows Selected
   poem from Bang-i-Dara
2. **Gulistan-e- Sa'di**
   Ten ḥikāyāt from John T. Platts, *The Gulistan*
3. **Epic**
   THE SHĀHNĀMA OF FIRDAUSI

Recommended Texts:

1. John T. P. (1876). *The Gulistan; or, Rose Garden of Shaikh Muslihu'd- Dīn Sa'dī of Shīrāz*. London: Wm. II. Allen.
2. Chishti, Y.S. (1991). *Sharaḥ-i bāng-i darā.* Lāhaur: Maktaba-i taʿmīr-i insāniyat

Suggested Readings:

1. Thackston, W. (2000). A Millennium of Classical Persian Poetry. Maryland: Ibex Publishers.
2. Wood, R. (2013). Kalila and Dimna: Fables of Conflict and Intrigue. United Kingdom: Medina Publishing, Limited.

URCG-5116	Science of Society-I	2 (2-0)

Course Brief:

This course will introduce students with the subject matter of social science, its scope, nature and ways of looking at social phenomenon. It will make the participants acquaintance with the foundations of modern society, state, law, knowledge and selfhood. While retaining a focus on Pakistani state and society, students will encounter theoretical concepts and methods from numerous social science disciplines, including sociology, politics, economics anthropology and psychology and make them learn to think theoretically by drawing on examples and case studies from our own social context. Students will be introduced to the works of prominent social theorists from both western and non-western contexts. Instruction will include the use of written texts, audio-visual aids and field visits.

Course Learning Objectives:

The course has following outcomes:

- Introduce student with the nature of human social behavior and foundations of human group life
- Analyze the reciprocal relationship between individuals and society.
- Make student aware with the nature of societies existing in modern world
- Make students familiar with the philosophy of knowledge of social sciences
- Introduce students with the works of prominent theories explain human group behavior
- Help students to understand the foundations of society including culture, socialization, politics and economy
- Introduce students with various dimensions of social inequalities with reference to gender, race, ethnicity and religion
- Make them aware about the understanding of various themes pertains to social science in local context
- Help them recognize the difference between objective identification of empirical facts, and subjective formulation of opinionated arguments

Course Contents:

1. **Introduction to Social Sciences**
   - Social world, Human Social behavior, Foundations of society
   - Evolution of Social sciences
   - Philosophy of Science
   - Scope and nature of social sciences
   - Modernity and social sciences
   - Branches of social science: Sociology, Anthropology, Political Science, Economics

Society and Community, Historical evolution of Society

- Types of Societies
- Foraging society, Horticultural society, Pastoralist society
- Agrarian societies, Industrial society, Postindustrial society

2. **Philosophy of Knowledge in social Science and social inquiry**
   - Understanding social phenomenon
   - Alternative ways of knowing
   - Science as a source to explore social reality
   - Objectivity, Value-Free research
   - Positivism vs Interpretivism
   - Qualitative vs Quantitative
3. **Culture and Society**
   - Idea of Culture, Assumptions of Culture
   - Types, Components, Civilization and culture
   - Individual and culture. Cultural Ethnocentrism, Cultural Relativism
   - Outlook of Pakistani culture
   - Global Flows of culture, Homogeneity, Heterogeneity
4. **Social Stratification and Social inequality**

- Dimensions of inequality, Social class
- Gender, Race, Religion, Ethnicity, Caste
- Patterns of social stratification in Pakistan
- Class, caste system in agrarian society
- Ascription vs Achievement, Meritocracy
- Global stratification in modern world, Global patterns of inequality

5. Personality, Self and Socialization

- Concept of self, Personality
- Nature vs Nurture, Biological vs Social
- Development of Personality
- Socialization as a process, Agents of socialization
- Socialization and self/group identity

6. Gender and Power

- Understanding Gender
- Social construction of Patriarchy
- Feminism in Historical context, Gender Debates
- Gender and Development
- Gender issues in Pakistani society, Women Participation in politics, economy and education
- Toward a gender sensitive society, Gender mainstreaming

Pakistan: State, Society, Economy and Polity

- Colonialism, colonial legacy, National identity
- Transformation in Pakistani society: Traditionalism vs Modernism
- Economy, Informality of Economy, Modern economy and Pakistan
- Political Economy, Sociology of Economy

Recommended Texts:

1. Giddens, A. (2018). Sociology (11th ed.). UK: Polity Press.
2. Henslin, J. M. (2018). Essentials of Sociology: A Down-to-Earth Approach.(18th Edition) Pearson Publisher.
3. Macionis, J. J. (2016). Sociology (16th ed.). New Jersey: Prentice-Hall.
4. Qadeer, M. (2006) Pakistan - Social and Cultural Transformation in a Muslim Nation.

Suggested Readings:

1. Smelser, N.J. and Swedburg, R., The Handbook of Economic Sociology, Chapter 1 'Introducing Economic Sociology', Princeton University Press, Princeton.
2. Systems of Stratification | Boundless Sociology (no date). Available at: https://courses.lumenlearning.com/boundless-sociology/chapter/systems-of-stratification/
3. Jalal, A. (ed.) (1995) 'The colonial legacy in India and Pakistan', in Democracy and Authoritarianism in South Asia: A Comparative and Historical Perspective. Cambridge: Cambridge University Press (Contemporary South Asia)
4. Zaidi, S. A. (2015) Issues in Pakistan's Economy: A Political Economy Perspective. Oxford University Press. Chapter 26
5. Akhtar, A. S. (2017) The Politics of Common Sense: State, Society and Culture in Pakistan. Cambridge: Cambridge University Press.

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

Course Brief:

Since ancient times, numbers, quantification, statistics and mathematics has played a central role in scientific and technological development. In the 21st century, Quantitative Reasoning (QR) skills are essential for life as they help to better understand socio-economic, political, health, education, and many other issues, an individual now faces in daily life.

Course Learning Objectives:

This course will help the students to apply QR methods in their daily life and professional activities. This course will also change student's attitude about statistics and mathematics. It will not only polish their QR skills, but also enhance their abilities to apply these skills.

Course Contents:

1. Introduction to quantitative reasoning
2. Overview of contributions of Mathematicians and Statisticians especially Muslim scholars.
3. Types of standard numbers
4. Proportions, rates, ratio and percentages
5. Odds and odds ratio
6. Scale of measurements
7. Number sequence and series
8. Unit analysis as a problem-solving tool
9. Data handling (small and large)
10. Data errors, absolute and relative and their applications
11. Descriptive statistics
12. Rules of counting: multiplication rule, factorial, permutation and combination
13. Probability and its application in real life
14. A graphical perspective through Venn Diagram
15. Financial indicator analysis, and money management (profit, loss, simple and compound interest)
16. Practical scenarios involving algebraic expressions: linear and quadratic

Recommended Texts:

1. Akar, G. K., Zembat, İ. Ö., Arslan, S., & Thompson, P. W. (2023). *Quantitative Reasoning in Mathematics and Science Education*. 1st Ed., Springer, USA.
2. Peck, R., Olsen, C., & Devore, J. L. (2015). *Introduction to statistics and data analysis*. 5th Ed., Brooks Cole, USA.
3. Devlin, K. J. (2012). *Introduction to mathematical thinking*. Palo Alto, CA: Keith Devlin.

Suggested Readings:

1. Triola, M. F., Goodman, W. M., Law, R., & Labute, G. (2006). *Elementary statistics*. Reading, MA: Pearson/Addison-Wesley.
2. Blitzer, R., & White, J. (2005). *Thinking mathematically*. Pearson Prentice Hall.

Seerat of the Holy Prophet مطالعہ سیرت النبی صلی اللہ علیہ وسلم

Course Code URCG-5127

Title	Description
Semester	
Nature of Course	
No. of C.Hrs.	1(1-0)
Total Teaching weeks	18
Objectives of the Course	۱۔ طلباء کو مطالعہ سیرۃ طیبہ کی ضرورت واہمیت 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 کو عہد نبوی کی معاشرت، سیاست، معیشت سے آگاہ کرنا

Course Description

S.No.	Title	Description
1	حضور صلی اللہ علیہ وسلم کے ابتدائی حالاتِ زندگی	۱۔ حضور صلی اللہ علیہ وسلم کا خاندانی حسب ونسب 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
4	بعثت نبوی	۱۔ مدنی عہد میں دعوت اسلام
5	خصائص النبیؐ	آپؐ بطور پیغامبر امن
6	خصائص النبیؐ	بحثیت استاد و معلم
7	خصائص النبیؐ	بحثیت تاجر
8	خصائص النبیؐ	بحثیت سربراہ ریاست
9	خصائص النبیؐ	ذاتی محاسن اور عالمگیر اثرات

ناموس رسالت		
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	مولانا شبلی نعمانی، سید سلمان ندوی	سیرۃ النبی صلی اللہ علیہ وسلم
3	قاضی محمد سلیمان سلمان منصور پوری	رحمۃ للعالمین
4	مولانا سید ابوالحسن علی ندوی	نبی رحمت صلی اللہ علیہ وسلم
5	ڈاکٹر یسین مظہر صدیقی	عہد نبوی کا نظام حکومت
6	ڈاکٹر خالد علوی	انسان کامل

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	مولانا عبدالرؤف داناپوری	اصح السیر

URCG-5111	Translation of the Holy Quran – I	Non-Credit

Topic	Details
Semester/Level	In some discipline 1st semester and in some discipline 2nd Semester/ ADP Program 1st Year
Course Code	URCG-5111
Course Title	Translation of the Holy Quran – I
Credit Hours	Non-Credit
Objectives	• To familiarize the students to keys and fundamentals of recitation of the holy Quran. • To develop the skill of the students of recitation the last revelation. • Students will learn the basic Arabic grammar in a practical way. • To develop an eagerness among the students to explore the last divine Book.
Course Contents:	• تیسواں پارہ - ناظرہ مع تجوید • بنیادی عربی گرامر اسم اور اسکے متعلقات : اسم فاعل ،مفعول ،تفضیل ،مبالغہ فعل اور اسکی اقسام : ماضی ،مضارع ،امر ، نہی حرف اور اسکی اقسام : حروف علت ،حروف جارہ ،مشبہ بالفعل
Memorization:	تیسویں پارے کی آخری بیس سورتیں (حفظ مع ترجمہ)

GEOG -5104	Map Work	3(2-1)

Course Brief:

A unique aspect of geography is that it exposes students to a wide range of techniques for helping to understand human and environmental patterns and processes. Mapmaking is the study and practice of making representations of the Earth on a flat surface.

Course Learning Objectives:

This study includes everything from the gathering, evaluation and processing of source data, through the intellectual and graphical design of the map, to the drawing and reproduction of the final document. As such, it is a unique mixture of science, art and technology and calls for a variety of in-depth knowledge and skills on the part of the cartographer.

Course Contents:

1. Maps
2. Elements and types
3. Principles and methods of map making
4. Reading and reproduction
5. Scale: types and their use
6. Grid reference and indexation,
7. Map projections
8. Cylindrical
9. Conical
10. Zenithal
11. Construction, characteristics, and uses
12. Enlargement and reduction of maps
13. A study of the Survey of Pakistan maps
14. Physical and cultural features to be described and interpreted
15. Interpretation of weather maps of Pakistan

Recommended Texts:

1. Singh, G. (2009). *Map work and practical geography*. New Delhi: Vikas Publishing House Pvt. Ltd.
2. Singh, L. &Raghu,N. S. (2000) *Map work and practical geography*. New Delhi: Kalyanipublishers.

Suggested Readings:

1. Khan, M. Z. A. (1998). *Text Book of Practical Geography*. Delhi: Concept Publishing Company.
2. Bygott, J. (1952). *An introduction to mapwork and practical geography*. London: University Tutorial Press.
3. Bygott, J. (1955). *Mapwork and practical geography*. London: University Tutorial Press.

GEOG - 5105	History and Development of Geographic Thought	3(3-0)

Course Brief:

This course surveys the major traditions of geographic thought from the early 20th century to the present. Attending to both 'human' and 'physical' perspectives in the discipline - as well as those that blur the lines between the social and natural sciences - we will explore the changing, contested nature of geographic knowledge in terms of its situated, historical contexts and its numerous reformulations in contemporary practice.

Course Learning Objectives:

This course provides students with the background for understanding their research in terms of the philosophies and methods, and the convergences and departures that constitute the intellectual history of the discipline in general, and Geography at Madison in particular.

Course Contents:

1. Nature of Geography
2. Evolution of Geography
3. Pre-classical and classical periods: ancient Geography
4. Medieval Geography: Muslim contributions, European contributions.
5. Modern Geography: Humboldt and Ritter, Geography from the middle of the 20th century, Dichotomies-physical and human, systematic and regional. Quantitative Revolution, Geo-informatics and Ecology.
6. Established traditions: Earth science, area study, spatial organization, man-land, system analysis and cartographic science.
7. Man-environment interaction themes: Environmental Determinism, Possibilism, Probabilism, Cognitive Behaviourism, World views on man-environment relationship.
8. Development of Nomothetic traditions: facts, concepts, hypotheses and paradigms, Ideographic vs. Nomothetic.
9. Philosophical framework: Positivism: Pragmatism, Phenomenology
10. Evolution of modern tools and models in geography
11. Development of geography in Pakistan

Recommended Texts:

1. Dikshit R.K. (1998). *Geographical thought*. Upper Saddle River: Prentice Hall.
2. Ahmad, K.S. (2000). *Geography through the Ages.* Karachi:PGR.

Suggested Readings:

1. Ayhew, S. (2008). *Geography*. London: Harmonds Worth.
2. Mitchel, B. (2000). *Geography and resources analysis*. New York: Norton & Company.
3. Tim, U. (1992). *The place of geography*. London: Longman.

GEOG- 5106	Surveying	3(1-2)

Course Brief:

Surveying is the science of measuring and recording distances, angles, heights and sizes on the earth's surface to obtain data from which accurate plans and maps is made. It is the art and science of determining the position of natural and artificial features on, above the earth's surface or establishing such point and representing this information on paper plans, as figures, tables or computer based map. The basic concerns regarding a survey are spaces and locations within them. Survey essentially takes note of specific point locations for later reference. Surveying has been essential elements in the planning and execution of nearly every form of construction.

Course Learning Objectives:

One of the main functions of surveying is to acquire data on the shape and position of features on the ground, and to somehow delineate this information on maps, plans and drawings so as to make this data useful for other observers/users. These maps and plans can range from simple drawings in terms of sketches through to plans and maps, all based on some fundamentals of graphical communication

Course Contents:

1. Introduction
2. Instrumental survey and records
3. Surveying using the following instruments
4. Chain survey
5. Plane Table
6. Prismatic Compass
7. Determination of heights and slopes with Abney Level
8. Contouring by Indian Clinometer

Recommended Texts:

1. Singh, G. (2009). *Map work and practical geography*. New Delhi: Vikas Publishing House Pvt. Ltd.
2. Singh, L. & Raghu, N. S. (2000) *Map work and practical geography*. New Delhi: Kalyani publishers.

Suggested Readings:

1. Khan, M. Z. A. (1998). *Text Book of Practical Geography*. Delhi: Concept Publishing Company.
2. Bygott, J. (1952). *An introduction to mapwork and practical geography*. London: University Tutorial Press.
3. Bygott, J. (1955). *Mapwork and practical geography*. London: University Tutorial Press.

URCG- 5119	Expository Writing	3 (3-0)

Course Brief:

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.

Course Learning Objectives:

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.

Course 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 freewriting
    - 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.

URCG-5121	Tools for Quantitative Reasoning	3(3-0)

Course Brief:

This course is based on quantitative reasoning 1 course. It will enhance the quantitative reasoning skills learned in quantitative reasoning 1 course. Students will be introduced to more tools necessary for quantitative reasoning skills to live in the fast paced 21st century. Students will be introduced to importance of statistical and mathematical skills in different professional settings, social and natural sciences. These quantitative reasoning skills will help students to better participate in national and international issues like political and health issues.

Course Learning Objectives:

This course will prepare the students to apply quantitative reasoning tools more efficiently in their professional and daily life activities. This course will help them to better understand the information in form of numeric, graphs, tables, and functions.

Course Contents:

1. Types of data and its graphical representation (Histogram, Stem and Leaf display, Box Plot, Scatter diagram, Historigam, Bar chart, etc)
2. Solving practical problems using linear and exponential models
3. Population growth models
4. Analytical approach to solve simultaneous equations
5. Inequalities and their application
6. Comparing quantities using analytical tools
7. Logical reasoning and their application in modern age
8. Logical reasoning and decision making
9. Data tendencies via measure of location
10. Variability and Measure of dispersion
11. Measuring relationships via Regression analysis and correlation
12. Statistical inference: sampling techniques, estimation techniques and hypothesis testing for decision and policy making

Recommended Texts:

1. Akar, G. K., Zembat, İ. Ö., Arslan, S., & Thompson, P. W. (2023). *Quantitative Reasoning in Mathematics and Science Education*. 1st Ed., Springer, USA.
2. Sharma, A. K. (2005). *Text book of elementary statistics*. Discovery Publishing House.
3. Blitzer, R. (2014). *Precalculus*, 5th Ed.. Pearson Education, Limited. New York

Suggested Readings:

1. Gupta, S. C., & Kapoor, V. K. (2020). *Fundamentals of mathematical statistics*. 12th Ed, Sultan Chand & Sons.
2. Aufmann, R. N., Lockwood, J., Nation, R. D., & Clegg, D. K. (2007). *Mathematical thinking and quantitative reasoning*. Cengage Learning
3. Blitzer, R., & White, J. (2005). *Thinking mathematically*. Pearson Prentice Hall.

URCG-5122	Ideology and Constitution of Pakistan	2(2-0)

Course Brief:

This course focuses on ideological background of Pakistan. The course is designed to give a comprehensive insight about the constitutional developments of Pakistan. Starting from the Government of India Act, 1935 till to date, all important events leading to constitutional developments in Pakistan will be the focus of course. Failure of the constitutional machinery and leading constitutional cases on the subject. Moreover, students will study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Learning Objectives:

This course will cover the entire Constitution of Pakistan 1973. However, emphasis would be on the fundamental rights, the nature of federalism under the constitution, distribution of powers, the rights and various remedies, the
supremacy of parliament and the independence of judiciary

Course Contents:

- **Ideology of Pakistan**
  - Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-e-Azam Muhammad Ali Jinnah.
  - Two Nation Theory and Factors leading to Muslim separatism.
- **Constitutional Developments**
  - Salient Feature of the Government of India Act 1935
  - Salient Feature of Indian Independence Act 1947 Objectives
  - Resolution
  - Salient Feature of the 1956 Constitution
  - Developments leading to the abrogation of Constitution of 1956 Salient
  - features of the 1962 Constitution
  - Causes of failure of the Constitution of 1962
  - Comparative study of significant features of the Constitution of 1956, 1962 and 1973
- **Fundamental rights**
- **Principles of policy**
- **Federation of Pakistan**
  - President Parliament
  - The Federal Government
- **Provinces**
  - Governors
  - Provincial Assemblies
  - The Provincial Government
- **The Judicature**
  - Supreme Court
  - High Courts
  - Federal Shariat Courts
  - Supreme Judicial Council
  - Administrative Courts and tribunals
- **Islamic Provisions in Constitution**
- **Significant Amendments of Constitution of Pakistan 1973**

Recommended Texts:

1. Constitutional and Political History of Pakistan by Hamid Khan

2. Mahmood, Shaukat and Shaukat, Nadeem. Constitution of the Islamic Republic of Pakistan, 3rd re edn. Lahore: Legal Research Centre, 1996.

Suggested Readings:

1. Munir, Muhammad. Constitution of the Islamic Republic of Pakistan: Being a Commentary on the Constitution of Pakistan, 1973. Lahore, Law Pub., 1975.
2. Rizvi, Syed Shabbar Raza. Constitutional Law of Pakistan: Text, Case Law and Analytical Commentary. 2nd re edn. Lahore: Vanguard, 2005.
3. The Text of the Constitution of the Islamic Republic of Pakistan, 1973 (as amended).
4. Fundamental Laws of Pakistan by A.K. Brohi

GEOG -5107	Regional Concepts	3(3-0)

Course Brief:

Regional geography is a major branch of geography. It focuses on the interaction of different cultural and natural geo-factors in a specific land or landscape, while its counterpart, systematic geography, concentrates on a specific geo-factors at the global level. By the end of this course, the student will be able to describe what are geography and regional Geography and also major cultural region of the world. It focuses on major physical region and briefly explains major historical events and the impact of these events on World Geography.

Course Learning Objectives:

Students will get an introduction to the main regions of the world in terms of both their uniqueness and similarities. They will thus gain a perspective about social and cultural diversity of the world. Students will learn the relationships between the global, the regional and the local, particularly how places are inserted in regional and global processes. Students will be exposed to historical, economic, cultural, social and physical characteristics of regions, notably how they came to be, their main role and function and how they are changing. Students will see how human activities and the regional environment interact, particularly how societies reflect their regional environment.

Course Contents:

1. Introduction to Regional Concepts
2. Scope, Status, and the significance of the regional approach, Regional approach and its evolution
3. Criteria for dividing world into regions
4. Physical Attributes: Location, Physiography, Climate, Soils, Hydrology and Natural Vegetation
5. Economic attributes: Human Resources, Mineral and Power resources, Agriculture, Industry, Communication and Trade
6. Types of Regions
7. Physical Regions, Economic Regions, Political Regions, Cultural Regions
8. Special Purpose Regions
9. Major Regions of the world
10. Role of the Region in Global Development

Lab. Work

Identification and delimitation of different types of regions on maps

Recommended Texts:

1. Bradshaw, M. & White, G. W. (2007). *Contemporary world regional geography: global connections, local voices*.Boston: McGraw-Hill.
2. Deblij, H. J. D & Muller, P. O. (2011). *The world today: concepts and regions in geography*. New York : John Wiley & Sons.

Suggested Readings:

1. Hobbs, J. (2010). *Fundamentals of world regional*. Boston: Cole Cengage learning.
2. Knox, P. L. & Marston, S. A. (2003). *Places and regions in global context: human* geography. New Jersey: Prentice Hall.
3. James. & Preston, E. (2000). *One world divided*. New Jersey: Prentice Hall.

GEOG -5108	Geomorphology	3(3-0)

Course Brief:

Geomorphology is the study of landforms, their processes, form and sediments at the surface of the Earth (and sometimes on other planets). Study includes looking at landscapes to work out how the earth surface processes, such as air, water and ice, can mold the landscape. Landforms are produced by erosion or deposition, as rock and sediment is worn away by these earth-surface processes and transported and deposited to different localities. The different climatic environments produce different suites of landforms. The landforms of deserts, such as sand dunes and ergs, are a world apart from the glacial and periglacial features found in polar and sub-polar regions. So geomorphology is a diverse discipline.

Course Learning Objectives:

The basic geomorphologic principles can be applied to all environments, Geomorphologists tend to specialize in one or two areas, such Aeolian (desert) geomorphology, glacial and periglacial geomorphology, volcanic and tectonic geomorphology, and even planetary geomorphology. Most research is multi-disciplinary, combining the knowledge and perspectives from two contrasting disciplines, combining with subjects as diverse as ecology, geology, civil engineering, and hydrology and soil science.

Course Contents:

1. Scope and status of geomorphology
2. Introduction to geomorphic concepts/principles
3. Factors of landform development; structure, process and geological time scale
4. Endogenic Processes
5. Isostasy
6. Diastrophism
7. Continental drift
8. Plate tectonic
9. Volcanism
10. Earthquakes
11. Exogenic Processes
12. Weathering; mass wasting and their types

Recommended Texts:

1. Thompson, G. R., & Turk, J. (1998). *Introduction to physical geology.* Brooks/Cole Publishing Company.
2. Thornbury, W. D. (2004). Principles of geomorphology.New York: John Willy & Sons.

Suggested Readings:

1. Englen O.D.V. (2000). *Geomorphology*.New York: Macmillan.
2. Stringer, E. T. (2004). *Modern physical geography*. New York: John Wiley.

GEOG – 5109	Climatology	3(3-0)

Course Brief:

The course provides an overview of the physical processes responsible for determining global and regional climate. This course gives a general introduction to meteorology and climatology. Meteorology topics include energy balance, moisture and cloud development in the atmosphere, atmospheric dynamics, small and large scale circulations, storms and cyclones, and weather forecasting. Climatology topics include the interaction between the atmosphere and oceans over long time periods, climate classification, and the potential for climatic change. It brings together information from rural communities, indigenous peoples and research workers on how they use agro- biodiversity to cope with climate change.

Course Learning Objectives:

It stimulates communication between agro-biodiversity researchers, users and maintainers. It identifies tools and practices relevant to using agro-biodiversity for coping with climate change and making these widely available. It also promotes awareness of the vital role of agro-biodiversity in adapting to climate change among key audiences, including donors, development agents and the global biodiversity community.

Course Contents:

1. Introduction.
2. Key concepts in climatology and meteorology.
3. Structure and composition of atmosphere.
4. Elements and factors of climate.
5. Insolation and Terrestrial heat budget.
6. Temperature distribution.
7. Humidity and its types; Condensation and their forms, Precipitation, formation and their types.
8. Atmospheric Pressure and global pressure belts.
9. Atmospheric Circulation: (Upper and Lower) air stability and instability, storms; Cyclones (hurricanes, typhoons) and tornadoes
10. Air masses and fronts.
11. Classification of climates; critical study of the Koppen, Miller and Thornthwaite classifications of major climates.
12. Climate variability and climate change: Natural and anthropogenic; Greenhouse gasses; global warming; acid rain, ozone layer depletion El-Niño and La-Niña, impact on precipitation distribution.
13. Climatic regions of Pakistan and their characteristics
14. Climatic data: sources, collection, analysis and presentation. Problems associated with data quality (spatial, temporal).

Recommended Texts:

1. Miller A. (2001). *Climatology*. Haryana: Shubhi Publications.
2. Barry. R. (1998). *Atmosphere, weather and climate*. London: Routledge.

Suggested Readings:

1. Shamshad, K.M. (1988). *The meteorology of Pakistan*. Karachi: Royal Book Co.
2. Strahler, A. N. (1998). *Elements of physical geography*. New York: John Wiley.
3. Diwan A. P. &Arora. D. K. (1995). *Origin of ocean*. New York: John Wiley.

URCG-5111	Translation of the Holy Quran- II	Non-Credit

Topic	Details
Semester/Level	In some discipline 3rd semester and in some discipline 4th Semester/ ADP Program 2nd Year
Course Code	URCG-5111
Course Title	Translation of the Holy Quran – II
Credit Hours	Non-Credit
Objectives	▪ Students will come to know about the real nature, significance and relevance of the Islamic beliefs in light of the text of the Holy Quran. ▪ Students will seek knowledge of translation and transliteration of the Holy Book Quran. ▪ To familiarize the students with the concept of Ibādah (Its significance, scope and relevance) and its types in Islam. ▪ Students will learn literal and idiomatic way of translation of the Holy Book. ▪ Students will learn about the polytheism and its incompatibility in Islam highlighted by the Holy Quran. ▪ To highlight the significance of learning through using all human faculties provided by the almighty Allah and familiarize the students about condemnation of ignorance mentioned in the Quranic text. ▪ To develop Awareness among the students about rights and duties of different circles of society in the light of Holy Quran. ▪ To introduce the students to Quranic Arabic grammar in practical manner.
Course Contents:	○ ایمانیات اور عبادات اللہ پر ایمان ،فرشتوں پر ایمان ،رسولوں پر ایمان ،آسمانی کتابوں پر ایمان یوم آخرت پر ایمان ، تقدیر پر ایمان نماز ،روزہ ،زکوۃ،حج ،جہاد ○ معاشرے کے حقوق • خاندان کی تکوین • حق مہر • رضاعت و حمل • اولاد کو قتل کرنے کے ممانعت • شوہرکی نافرمانی • طلاق • بیوہ کی عدت کے احکام • نکاح کا پیغام بھیجنا • عورت کی وراثت (اس کے شوہر کی طرف سے) • والدین کے حقوق • بیویوں اور اولاد کے بیچ عداوت ○ خاندان کے حقوق • مہمان کی عزت • اجازت طلب کرنے کے اصول • مجلس کے آداب • تعاون اور بھائی چارہ • گروہ بندی • محبت • لوگوں کے درمیان صلح • عفو ودرگزر، غصہ پر قابو اور معاف کرنا • شعوب و قبائل • لوگوں کے بیچ اختلافات • حمایت و نگہبانی
Grammar:	• قرآنی عربی گرامر کے اصول اور انکے اطلاقات (متن قرآنی پر اطلاق سے

	توضیحات)
Details of Chapters and verse Numbers:	▪ منتخب آیات مع ترجمہ وتجوید ▪ البقرہ ((۱۷۷، ۲۳۸، ۳۵، ۲۷۷، ۲۱۹، ۱۱۰، ۳۵، ۱۵۳، ۲۳۷، ۲۰۱، ۲۸۵، ۳۳، ۲۸۵، ۱۵، ۱۲۹، ۲۵۳، ۹۸، ۶۲، ۱۲۶، ۲۸۵، ۲۵۶، ۱۷۷، ۱۳۶، ۱۸۹، ۲۰۰، ۱۸۴، ۱۸۳، ۲۱۸، ۱۵۸، ۲۳۱،۱۹۹، ۲۲۷، ۲۲۶، ۲۳۷، ۲۲۸، ۲۲۹، ۲۳۱، ۲۳۷، ۲۳۵، ۲۳۰ ، ۸۲ ، ۱۸۴، ۲۳۳، ۱۸۲، ۱۶۰، ۸۳) ▪ النساء (۹۵، ۹۲، ۵۹، ۱۳۶، ۶۹، ۸۰، ۱۳، ۶۹، ۸۶،۸۰، ۳۶، ۱۷۶، ۱۲، ۳۵، ۱۲۸، ۳۳، ۱۱، ۳، ۱۷۶، ۲۳، ۲۵، ۱۱، ۱۱، ۱۲۸، ۱۹۱، ۳۵، ۲۰، ۳۵، ۱۹۱، ۶، ۱، ۲۰، ۱، ۱۶، ۱۲۶، ۵۳، ۱۲۸، ۸۱) ▪ الانعام (۲۲، ۱۳۷،۱۳،۹۲، ۱۵۱، ۳۸، ۵۳) ▪ آل عمران (۹۷، ۳۹، ۸۵، ۱۲۵، ۸۳، ۱۳۴، ۱۹،۱) ▪ المائدہ (۵۳، ۲، ۹۲، ۳۹،۱۹، ۸۲، ۲، ۵) ▪ الاعراف (۳۵، ۱۸۹، ۱۸۹) ▪ التوبہ (۲۰، ۷۱،۱۶) ▪ ہود (۱۲) ▪ الزمر (۶) ▪ النور (۵۳، ۲۸،۵۲، ۲۷، ۶۰، ۲۹) ▪ محمد (۳۳) ▪ انفال (۸۲، ۲۰) ▪ الرعد (۳) ▪ الطلاق (۳) ▪ الحج(۵) ▪ ابراہیم ((۳۳،۲۳) ▪ الاسراء (۲۳، ۲۴) ▪ الاحقاف (۱۵) ▪ المومنون (۲۷) ▪ العنکبوت (۲۵،۳۸، ۸) ▪ النحل (۲۲) ▪ لقمان (۱۵،۳، ۱۴) ▪ الاحزاب ((۳۵، ۵۰،۳۸، ۳۹) ▪ الشعراء (۷) ▪ الروم (۲۱) ▪ مریم (۱۴،۲۶) ▪ المجادلہ (۱۲، ۱۱)

URCG-5114	Basic Science	3 (2-1)

Course Brief:

Life, its characteristics, natural science, biology and its branches; Importance of Flora & Fauna in biodiversity; Importance of Natural Compounds in daily life, medicine and human health; Latest developments in natural sciences (Biotechnology); Ecosystem and its components; Environment and its components; Pollutants and their effect on the environment (Greenhouse effect, global warming, acid rains, water pollution and ozone depletions etc); Introduction to micro-organism and its types (bacteria, fungi, viruses)

Practical:

1: Field Survey of Flora & Fauna and their identification

2: Study of herbarium

3: Study of Museum

Recommended Texts.

l. Keddy, P.A. (2017). *Plant ecology origins, processes, consequences.* Cambridge, University Press.

2. Canadell, J.G., Diaz, S., Heldmaier, G., Jackson, R.B., Levia, D.F., Schulze, E.D. & Sommer, U. (2019). *Ecological studies.* Springer.

3. Bhat, S.V., Nagasampagi, B.A. & Sirakumar, M. (2006). Chemistry of Natural Products. Springer Science

4. De, A.K. (2019). *Environmental Chemistry*. New Age International Press

Suggested Books

l. Fath, B. (2018). *Encyclopedia of' ecology.* Elsevier.

2. Ajith, H .. Urmas. P., Pastur, G. M & Iversion L. R. (2018). *Ecosystem services from forest landscpes:* broadsclaes consideration. 1st Edition. Springer International Publishing AG.

3. Xu, R., Ye, Y. & Zhao, W. (2011). *Introduction to Natural Product Chemistry*. CRC Press

4. Tayler, D.J., Green, N.P.O. & Stout, G.W. (1997). *Biological Science* 1&2. Cambridge University Press

5. Tayler, M.R., Simon, E.J., Dickey, D.J. & Hogan, K.A. (2020). *Campbell Biology: Concepts & Connections* (10th Edition). Pearson

URCG-5124	Entrepreneurship	2(2-0)

Course Brief:

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. This 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.

Course 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). S*mall business handbook*. Prentice Hall Press.

URCG-5125	Civics and Community Engagement	2(2-0)

Course Brief:

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.

Course Learning Objectives:

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 the 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 Contents:

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 Texts:

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

Suggested Readings:

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.

GEOG - 5110	Economic Geography	3(3-0)

Course Brief:

This course provides an introduction to economic geography. This course is an introduction to the theories, concepts, methods and data used by geographers to analyze the location of economic activities, the spatial organization of economic systems, the human use of the earth's resources and environmental issues. Topics studied include agriculture, manufacturing, transportation, retailing, urban structure, spatial diffusion and economic development. The course explores processes driving spatial patterns of economic activity at the global, national, regional, and local scales. Topic areas include economic globalization, spatial distribution of industrial sectors, multinational corporations, international trade, regional economic development, and illegal economic activities.

Course Learning Objectives:

This course looks at the development of the global marketplace in both the developed and the developing world. After the completion of this course student will be able to understand the significance of geographic concepts for socio-economic processes and the dynamics of the world economy, man's resource use and the pressure that population puts on the resource base.

Course Contents:

1. Introduction (Definition ,Scope, Approaches to Study Economic Geography)
2. Branches of Economic Geography
3. Relationship with other Branches of the Geography
4. Producer and Consumer
5. Decision Making
6. Man Against Nature
7. Comparative Advantage
8. Perception
9. Evolution of world economic systems: Medieval feudal economics, economic impacts of colonialism. Modern world economic systems
10. Concept of natural resources and reserves
11. Human resource and its development
12. Classification of economic activities

Recommended Texts:

1. Aoyama, Y., James T. M. & Susan H. (2012). *Key concepts in economic geography*. Singapore: SAGE.
2. Boyee, R. R. (2000). *The basic of economic geography*. New York: Holt, Rinehart & Winston.

Suggested Readings:

1. Khan, F.K. (1998). *An introduction to economic geography*. Karachi: Oxford Publishers.
2. Knox, P & Agnew, J. (2008). *The geography of the world economy*. London: Edward Arnold.
3. Alnwick, H. (2012). *A geography of commodities*. London: Harrap.

GEOG - 5111	Quantitative Methods in Geography	3(3-0)

Course Brief:

To train students in collection, analysis, interpretation and presentation of quantitative spatial data and to enable them to organize and conduct independent research. To use database software for the analysis of both Spatial and Temporal data. Quantitative techniques are the techniques that are concerned with collection, organization, presentation, analysis and interpretation of data.

Course Learning Objectives:

The quantitative techniques in geography are a recent development. The hard numbers behind any good research project are called quantitative data. Quantitative data is the language of science. It uses mathematical models, theories, and hypotheses. Quantitative data and qualitative data, in which you observe the non-numerical qualities of your subject, go hand-in-hand.

Course Contents:

1. Introduction
2. Quantitative revolution and its impact on Geography
3. Parametric and non-parametric statistics
4. Nature of geographical data and measurement scales.
5. Data summarizing techniques
6. Theory of central tendency
7. Dispersion
8. Variability.
9. Time Series: graphs, growth and decline, index numbers, logarithmic scales, trends and fluctuations
10. Components of time series.
11. Methods of drawing trend lines for linear and exponential series scatter diagrams
12. Standard errors and probability, correlation and regression.
13. Quantitative models in Geography

Lab. Work

1. Introduction to EPI-Info SPSS E-view, MS Excel, MiniTab and other relevant software database for quantitative analysis.

Recommended Texts:

1. Haring, L. L. (2002). *Introduction to scientific geographic Research*. Oxford: ECB.
2. Levin, J. (2006). *Elementary statistics in social research.*New Delhi: Pearson.

Suggested Readings:

1. Matthew, H. & Foster, I. (2001). *Geographical data. sources, presentation and analysis.*London: Oxford University Press.
2. Mckillup, S. & Melinda, D. D. (2010). *Geostatistics explained*. Cambridge: Cambridge University Press.
3. Walford, N. (2011). *Practical statistics for geographers and earth Science*. Singapore: Wiley-Blackwell.

GEOG -5112	Principles of Cartography	3(1-2)

Course Brief:

Cartography or mapmaking is the study and practice of making representations of the Earth on a flat surface. The discipline of cartography combines science, aesthetics, and technical ability to create a balanced and readable representation that is capable of communicating information effectively and quickly.

Course Learning Objectives:

Cartography is a complex, an ever-changing field, but at the center of it is the map-making process. Viewed in the broadest sense, this process includes everything from the gathering, evaluation and processing of source data, through the intellectual and graphical design of the map, to the drawing and reproduction of the final document. As such, it is a unique mixture of science, art and technology and calls for a variety of in-depth knowledge and skills on the part of the cartographer.

Course Contents:

1. Evolution of Cartography
2. Basic geodesy, spherical, ellipsoidal and geoidal earth, geographical and planer.
3. Coordinates, properties of the graticule and geodetic position.
4. Map projections: Major types, merits and demerits of commonly used map projections.
5. Map Datum
6. Symbolization, symbol types and graphic variables
7. The symbolization problems, symbolizing graphic features.
8. Lettering principles.
9. Mapping statistical surfaces
10. Thematic map, choropleth, dot map, isolines, area cartograms.
11. Principles of cartographic design, general design problems; design of map symbols
12. Basic procedure and designing of the thematic maps such as topographic, climatic, economic, population, settlements, urban morphology etc.
13. Map production, form of map output, construction material, output options, composing separations, proofing.
14. Introduction to Digital Cartography
15. Terrain data (Digital Elevation Model/ Digital Terrain Model)

Recommended Texts:

1. Singh, G. (2009). *Map work and practical geography*.Karachi: Vikas Publishing House Pvt Ltd.
2. Singh. L. & Raghu naadam, S. (2000). *Map work and practical Geography*. New Delhi: kalyani publishers.

Suggested Readings:

1. Ahmad.Z. (1998). *Text book of Practical geography.* Cambridge: Cambridge University Press.
2. Bygott, J. (2000). *An introduction to mapwork and practical geography*. University Tutorial Press.
3. Bygott, J. (2000). *Mapwork and practical geography*. New Delhi:University Tutorial Press.

GEOG -6113	Geographical Information System	3(2-1)

Course Brief:

The course aims to equip students with an understanding of GIS, evolution and applications of spatial data. In this class, students will be introduced to the study and design of maps, primarily through the application of a specialized computer mapping software program known as a Geographic Information System (GIS). GIS is a map-based computer decision support system that allows for the investigation of geographic data relationships. People that are trained in GIS are in high demand today, both in government and private industry.

Course Learning Objectives:

This study will focus primarily on GIS-based mapmaking techniques, including map design, symbology, map coordinates and georeferencing systems. Students will cover many important aspects of mapmaking, including map data collection and processing, field methods and GPS, cartographic communication, topographic map reading and analysis, and qualitative and quantitative mapping techniques.

Course Contents:

1. Introduction
   Definitions, key components, functional subsystem, Raster data model, vector data model, attribute model, Data acquisition techniques, data sources, data capturing techniques and procedures, data visualization of spatial data, layers, projections and transformation and datum.
2. Map design
   Symbols to portray points, lines, polygons and volumes,graphic variables, visual hierarchy, Data classification graphic approach, mathematical approach.
3. Spatial analysis
   Neighborhood functions, network, and overlayanalysis, buffering, spatial data quality, components of data quality, micro level components, macro level components, usage components, sources of errors, accuracy and resolution and uncertainty.
4. GIS Applications

Recommended Texts:

1. Chang, K.. (2006). *Introduction to geographic information systems*.Boston: McGraw-Hill Higher Education .
2. Demers, M.N. (2002). *Fundamentals of geographic information systems*. New York: John Wiley & Sons.

Suggested Readings:

1. Yeung., Lo, C.P. &Lal, A.K. (2003).*Concepts and techniques of geographic information system.* New Dehli: Prentice Hall.
2. Kiser, J.D., &Paine, D.P., (2003). *Aerial photography and image interpretation*, New York: John Wiley & Sons.
3. Janssen, L. L., &Huurneman, G. (2000). *Principles of remote sensing*: ITC, International Institute for Aerospace Survey and Earth Sciences

STAT-5121	Introduction to Statistics	3(3-0)

Course Brief:

This course is designed for under-graduate level. Statistical analysis is a basic requirement in order toanalyze the phenomenon related to all sectors.

Course Learning Objectives:

This course aims to produce skills related to descriptiveas well as inferential statistical analysis. Use of descriptive, inferential, regression, sampling statisticshas vital importance to analyze and decision making theories related to agriculture, economics andbusiness statistics etc.

Course Contents:

1. Introduction to Statistics: Descriptive and Inferential Statistics,
2. Limitations of Statistics
3. Scope of Statistics
4. Variable, Data, Types of Variable and Data, Scales of Measurements.
5. Display of Data: Tabulation of Data, Graphical Display, Histogram, Bar Charts, Pie Chart,
6. Stem and Leaf Plots.
7. Measures of Central Tendency: Mean Median, Mode, Box Plot, and Application in Real Life.
8. Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Variance and Standard
9. Deviation, Coefficient of Variation, Z-score and their Application.
10. Normal Distribution: Normal Distribution and its Application,
11. Sampling and Sampling Distribution.
12. Estimation:
13. Hypothesis Testing
14. Regression and Regression Analysis: Simple Linear Regression, Multiple Regression, Fitness
15. Model.
16. All the observational analysis will be carried out using MS Excel and SPSS.

Recommended Texts:

1. Chaudhry, S.M. &Kamal,S.(2010). *Introduction to statistical theory*. (Parts I &II). Lahore: IlmiKitabKhana.
2. Walpole,R.E.,Mysters,R.H. & Myers,S.L.(1998). *Probability and statistics for engineers andscientists*. New York: Prentice Hall.

Suggested Readings

1. Mclave, J.T., Benson, P.G.& Snitch.(2005).*Statistics for business & economics*.New Jersey: Prentice Hall.
2. Spiegel, M.R., Schiller, J.L. &Sirinivasan, R.L. (2000) Probability and statistics. New York: McGraw Hill
3. Clark, G. M.,& Cooke, D. (1998). Basic course in statistics. London: Arnold.

ECON-5112	Introduction to Economics	3(3-0)

Course Brief:

The course is designed for beginners with either no formal background or very little acquaintance with economics. It develops the ability to explain core economic terms, concepts, and theories. The objective is to give the students a clear understanding of the basic concepts, tools of analysis, and terminologies used in microeconomics and macroeconomics. Emphasis will be on the use of graphs, diagrams, and numerical tables/schedules for exposition. A country's economy consists of three major economic agents; consumers, firms, and government. Analyzing the choices made by these economic agents is one of the main subjects of microeconomics.

Course Learning Objectives:

Students will learn how the decisions made by economic agents are represented in the market as demand and supply of commodities. Students will also learn about the determinants of macroeconomic conditions (national output, employment, and inflation), aggregate supply and demand, business cycles, public finance, international trade, and monetary and fiscal policy. The teacher is expected to draw examples from the surrounding world to clarify the concepts.

Course Contents:

1. Introduction to economics and preliminaries
2. Theory of consumer behavior
3. Demand, Supply, market equilibrium and elasticities
4. Theory of production
5. Revenue and cost analysis of a firm
6. Theory of Market Structure
7. Firm's Behavior under perfect competition, monopoly, and monopolistic competition
8. Introduction to macroeconomics
9. National income and various concepts of national income
10. Consumption and saving function
11. Investment and its types,
12. Concept of aggregate demand and supply and their equilibrium
13. Concept of multiplier and accelerator
14. Monetary and fiscal policies
15. Inflation and unemployment (PHILLIPS CURVE)
16. Balance of payment problems and remedies
17. Public finance and taxation, debt and expenditure

Recommended Texts:

1. Mankiw, N.G. (2018). *Principles of microeconomics*. Boston: Cengage Learning.
2. Diulio, E. A. & Salvatore, D.(2011). *Schaum's outline of principles of economics*. New York: McGraw-Hill Education.

Suggested Readings:

1. Mankiw, N.G.(2019). *Macroeconomics*.New York: Worth Publishers.
2. Nicholson, W. & Snyder, C.M.(2010). *Intermediate microeconomics and its application*.Mason: Cengage Learning.
3. Froyen, R. T.(2013). *Macroeconomics: theories and policies*. University Chapel Hill: Pearson.

GEOL - 5101	Introduction to Geology	3(3-0)

Course Brief:

This course is designed to acquire the knowledge about the basic concepts of geology. This will help the students to get knowledge about various types of rocks, minerals and the processes of their formation. Geology is the core discipline of the earth sciences and encompasses many different phenomena, including plate tectonics and mountain building, volcanoes and earthquakes, and the long-term evolution of Earth's atmosphere, surface and life.

Course Learning Objectives:

The goal of the Geology undergraduate program is to equip students with the fundamental knowledge of the diverse fields of Geology (encompassing Geomorphology & Surface Processes, Hydrology & Low-Temperature Geochemistry, Sedimentology & Paleoecology, and Tectonics and Solid-Earth Processes). In addition, it is critical that students learn to think like a scientist and to apply the scientific method in their coursework and in their lives. It helps to know the geologic time scale and place important geologic events in a temporal framework.

Course Contents:

1. Introduction and scope of geology; importance and relationship with other sciences;
2. History and philosophy of geology; Earth as a member of the solar system;
3. Earth's origin, age, composition and internal structure;
4. Introduction to plate tectonics, Isostasy; mountain building processes;
5. Earthquakes and volcanoes; weathering and erosion;
6. Introduction, identification and classification of rocks and minerals;
7. Sedimentary, igneous and metamorphic structures;
8. Introduction to fossils in sedimentary rocks;
9. Introduction to folds, faults, joints, cleavage, foliation, lineation and unconformities;
10. Geological Time Scale; Law of Superposition, present is key to the past and Law of Faunal Succession;
11. Concept and techniques of geological dating, relative and absolute dating; evolution of life on earth;
12. Use of Brunton Compass and GPS, etc.

Recommended Texts:

1. Plummer, C. C., Carlson, D. H., &Hammersley, L. (2016). *Physical geology*. New York: McGraw- Hill.
2. Plummer, C. C., McGeary, D., & Carlson, D. H. (2000). *Physical Geology: Earth Revealed*. New York: McGraw-Hill.

Suggested Readings:

1. McGeary, D., Carlson, D. H., & Plummer, C. C. (2011). *Physical geology*. New York: McGraw-Hill.
2. Smith, G., & Pun, A. (2013). *How Does Earth Work? Physical Geology and the Process of Science: Pearson New International Edition*. London: Pearson Higher Education.
3. McClay, K. R. (1999). *The mapping of geological structures*. Hoboken: John Wiley & Sons.

INTR-5101	Introduction to International Relations	3(3-0)

Course Brief:

The study and practice of international relations is interdisciplinary in nature, blending the fields of economics, history, and political science to examine the topics such as human rights, global poverty, the environment, economics, globalization, security, global ethics, and the political environment. Historically, the establishment of treaties between nations served as the earliest form of international relations. International relations allows nations to cooperate with one another, pool resources, and share information as a way to face global issues that go beyond any particular country or region.

Course Learning Objectives:

This course provides a comprehensive introduction to international relations, focusing in particular on its origins and historical evolution, its key concepts, major theoretical frameworks, main actors and institutions, the global architecture of power, and its dynamic nature in the process of globalization. More specifically, this course introduces concepts of power, statecraft, diplomacy, foreign policy, political economy and international security, and examines the evolution of international relations as a subject.

Course Contents:

1. IR as an Academic Field
2. Realism, Liberalism, Marxism, Social Constructivism
3. Relevance to Current Issues
4. US, Russia and Rise of China
5. Development of the International System
6. History of state development (City State to Empires)
7. Westphalia and Emergence of State system
8. Industrial Revolution and French Revolution
9. World War I & World War II
10. Cold War and Post-Cold War
11. States and Other Actors
12. Sovereignty and Nationalism
13. States, IGOs, TNAs
14. Globalization
15. Foreign Policy
16. Diplomacy
17. International Institutions, United Nations, Security Council, General Assembly
18. UN Agencies, World Bank / IMF
19. Regional organizations: NATO, ASEAN and SAARC etc.

Recommended Texts:

1. Devetak, R., George, J., & Percy, S. (2017). An iintroductionto iinternationalrelations.
2. Cambridge: Cambridge University Press.
3. Baylis, J., Smith, S., & Owens, P. (2004). *The globalization of world politics*.London: Oxford University Press.

Suggested Readings:

1. Jackson, R. and Sørensen, G.(2016). *Introduction to internationalrelations*. London: Oxford University Press.
2. Carlsnaes, W., Carlsnaes, W., Risse-Kappen, T., & Simmons, B. (2013). *Handbook of international relations*. London: SAGE Publications.

URCG-5111	Translation of the Holy Quran - III	Non-Credit

Topic	Details
Semester/Level	In some discipline 5th semester and in some discipline 6th Semester/ BS (5th Semester intake) 1st / 2nd
Course Code	URCG-5111
Course Title	Translation of the Holy Quran - III
Credit Hours	Non-Credit
Objectives	• To introduce ethics and highlight its importance, need and relevance for individual and collective life. • To illuminate the students with the Quranic norms of Morality i.e. truthfulness, patience, gratitude, modesty, forgiving, hospitality etc. • To familiarize the students with immoral values like falsify, arrogance, immodesty, extravagance, backbiting etc. • To inculcate ethical and moral values in our youth. • To develop a balanced dynamic and wholesome personality. • To introduce the students to Quranic Arabic grammar in practical manner.
Course Contents:	○ اخلاق (تعارف،ضرورت واہمیت ،اقسام،معنویت) اخلاق حسنہ : • برائی کو نیکی سے مٹانا • نیکی کے کاموں میں مسابقت • لوگوں کے درمیان صلح • عدل وانصاف • سچائی • ایثار • سلیم قلب • مہمان نوازی • لغویات سے اعراض • عاجزی و انکساری • نگاہ اور آوازکو پست رکھنا • چال میں میانہ روی • شرمگاہوں کی حفاظت • صبر • شکر • امور میں میانہ روی اخلاق سئیہ : • ظلم اور زیادتی • غرور و تکبر • نفسانی خواہشات کی پیروی • بدگمانی • جھوٹ • چغلی اور تہمت • تمسخر اور شیخی خوری • لہو و لعب • برے ناموں سے پکارنا • احسان جتانا اور تکلیف دینا • فضول خرچی اور حد سے بڑھنا • حسد اور تنگ دل • بے پردگی
Grammar:	• قرآنی عربی گرامر کے اصول اور انکے اطلاقات (متن قرآنی پر اطلاق سے توضیحات)

Details of Chapters and verse Numbers:	▪ منتخب آیات مع ترجمہ وتجوید ▪ البقرہ (۱۱۲، ۲۳۵، ۸۳، ۱۸۲، ۱۷۲، ۱۵۲، ۱۷۲، ۵۲، ۱۵۳، ۱۷۷، ۲۵۰، ۱۲۵، ۲۲۲، ۲۷، ۷۷، ۱۸۲، ۱۳۸، ۱۸۷، ۱۰۹، ۲۶۳، ۲۶۳، ۲۶۲، ۲۱۲، ۶۷، ۲۳۱، ۱۰، ۳۳، ۱۲۳، ۲۵۸، ۲۷، ۷۱، ۸۳، ۲۲۶، ۱۹۵، ۷۶) ▪ آل عمران (۱۵۳، ۱۴، ۲۴، ۱۸۵، ۱۳۲، ۱۳۸، ۱۳۳، ۱۳۵، ۱۷، ۲۰۰، ۱۲۵، ۱۳۳، ۱۱۴، ۱۰۳، ۱۰۳، ۲۶، ۷۸، ۱۳۱، ۱۳۷، ۱۵۹) ▪ النساء (۱۳۵، ۲۳، ۲۲، ۱۰۸، ۱۰۷، ۱۰۵، ۵۳، ۲۰، ۲۷، ۱۷۳، ۳۶، ۲۵، ۲۴، ۳۷، ۵۷، ۲۴) ▪ المائدۃ (۵۸، ۵۷، ۹۳، ۱۳، ۶، ۳۱، ۱۹) ▪ النحل (۱۲۶، ۹۰، ۱۰۵، ۱۱۳، ۳۰، ۱۲۶، ۱۲۵) ▪ الرعد (۲۵، ۲۰، ۲۴، ۲۲، ۶) ▪ الاعراف (۳۱، ۶۶، ۵۱، ۱۴۶، ۳۰، ۴، ۲۰، ۱۴۳، ۱۹۹، ۹۵، ۸۱) ▪ القصص (۵۴، ۸۴) ▪ فصلت (۳۴) ▪ الانعام (۳۲، ۷۰، ۷۰، ۱۳۰، ۱۵۵، ۱۶۰) ▪ النمل (۹۰، ۳۶) ▪ الحج (۳۰، ۵۸، ۶۰، ۸۸، ۷۷) ▪ الحجرات (۹، ۱۱، ۶، ۱۱، ۳، ۱۲، ۱۵، ۱۰) ▪ الاحزاب (۲۳، ۵۰، ۵۸، ۵۸، ۵۲، ۵۵، ۵۹، ۳۵، ۲۴، ۳۵) ▪ الحشر (۹) ▪ طہ (۷۲) ▪ الانعام (۱۶۴، ۱۴۱، ۱۱۶، ۱۵۱، ۶۳، ۱۲۷) ▪ ق (۳۴) ▪ الانفال (۲۷، ۳۶، ۶۱) ▪ الفتح (۱۵) ▪ یونس (۱۰، ۱۹، ۱۲، ۶۶، ۲۲، ۲۲) ▪ الفرقان (۶۳، ۲۱، ۶۷، ۶۳) ▪ النور (۲۳، ۶، ۴، ۳۰، ۳۱، ۳۳، ۳۳، ۶۱، ۳۱، ۲۲) ▪ لقمان (۶، ۳۳، ۱۹، ۳۲، ۱۸) ▪ الاسرا ء(۳۷، ۱۱۰، ۵، ۳۷) ▪ المزمل (۱۸) ▪ المدثر (۶، ۴) ▪ المدثر (۷۴) ▪ فاطر (۳۲) ▪ الفتح (۲۹) ▪ البلد (۱۷) ▪ الزمر (۳، ۱۰) ▪ الحجر (۸۵) ▪ النجم (۳۱) ▪ الرحمٰن (۶۰) ▪ ھود (۸، ۱۰۲، ۳) ▪ الکہف (۲، ۵۶) ▪ الشوری (۳۷) ▪ غافر (۲۸، ۲۷) ▪ الحدید (۲۰، ۲۰) ▪ مریم (۵۹) ▪ النازعات (۳۱) ▪ التوبہ (۶۵، ۶۴، ۷۷) ▪ الھمزہ (۱)

GEOG - 6114	Oceanography	3(3-0)

Course Brief:

It describes knowledge about world's oceans their distribution, and its resources. To produce the students with the applicable knowledge about existence of oceans, formation of ocean floors, their distribution and effects of climate and ocean resource management. It may identify the impact of basic and applied knowledge of oceanography, to impart skills on the ocean distribution, existence of oceans, and availability of resources in oceans.

Course Learning Objectives:

This study focus on the spatial distribution of oceans and their effects Land, Ocean and atmosphere relationship, to study ocean currents, variability, and Mechanism. It will also discuss the law of sea and country rights for associated oceans and seas. It will discuss the ocean habitat to study the ocean resources and law of ocean territory.

Course Contents:

1. Introduction
2. Origin of oceans and seas
3. Major water masses and their distribution.
4. Morphology of the ocean basins.
5. Ocean floor deposits.
6. Their characteristics and classification.
7. Temperature, salinity and density of ocean water
8. Distribution, causes and effects
9. Oceanic circulation: waves, currents and tides, their nature, causes, effects and impact on environment.
10. Special phenomena: tropical storms; Tsunami.
11. Oceanography of Arabian Sea with special reference to Exclusive Economic Zone.

Lab. Work

Drawing features of the Ocean floor, mapping of the ocean currents, tides and associated phenomena.

Recommended Texts:

1. Douglas A. Segar. (1998). *Ocean sciences.*Boston: Wadsworth publishing Company.
2. Barnes, H. (2000). *Apparatus & methods of oceanography*. London: George Allen &Unwin Ltd.

Suggested Readings:

1. Duxbury, A.B & Duxbury, A.C. (1994). *An introduction to the world oceans.* Oxford: WMC Brown Publishers.
2. King, C.A.M. (2000). *Oceanography for geographers*. London: Edward Arnold Publishers, Ltd.
3. Pinet, P.R. (2002). *Invitation to oceanography.* London: Jones & Bartlett Publishers.

GEOG -6115	Remote Sensing	3(2-1)

Course Brief:

It describes about knowledge of Remote Sensing (RS) and its practical implementation. To produce students, that has applicable knowledge about basic tools of GIS. The course aims to equip students with an understanding of GIS, evolution and applications of spatial data through Geo-spatial technologies. Remote sensing is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance from the targeted area. Special cameras collect remotely sensed images of the Earth, which help researchers "sense" things about the Earth.

Course Learning Objectives:

This study introduces knowledge of recording earth's surface features from space-borne platforms and different ways in which images can be analyzed. It will enable students to develop an understanding of common remote sensing products such as, earth resources satellite images, aerial photographs etc to develop a comprehension regarding ground-truthing aided by GPS.

Course Contents:

1. Introduction
2. History and Development
3. Concepts and Foundation of Remote Sensing and Electromagnetic spectrum
4. Visible Spectrum, Colour Theory
5. Atmospheric Attenuation
6. Types of Remote Sensing Systems
7. Type of Sensors
8. RBV, MSS, TM,HRV, HRPT/APT/AVHRR, MODIS (Terra and Aqua) non-imaging systems (RADAR)
9. Types of Satellites
10. Telecommunication, Spy, Scientific etc.)
11. Platforms (Orbits)
12. Ground Receiving Stations (Reception of Data)
13. Image Processing
14. Global Positioning System (GPS)
15. Applications of Remote Sensing
16. Remote Sensing in Pakistan: Potential and Prospects.

Recommended Texts:

1. ITC (2004). *Principles of remote sensing.*Netherlands: ITC Educational Textbook Series.
2. Campbell, J. B. &Wynne, R. H. (2011). *Introduction to remote sensing*. New York: Guilford Press.

Suggested Readings:

1. Iliffe, J. & Lott, R. (2008). *Datums and Map Projections for remote sensing, GIS, and Surveying* (2nd ed.). Manchester: Whittles Publishing.
2. Jensen, J. (2005). *Introductory remote sensing*: *Principles and Concepts*.New York: Freeman & Co.
3. Jensen, J. R. (2011). *Remote sensing of the environment: an earth resource perspective*. New Jersey: Prentice Hall.

GEOG- 6116	Research Methods	3(3-0)

Course Brief:

The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not been discovered as yet. Each research study has its own specific purpose, we may think of research objectives are: to create awareness among students regarding basics of geographical research.

Course Learning Objectives:

To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies); To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as descriptive research studies); To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as diagnostic research studies); To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies).

Course Contents:

1. Introduction Research approaches
2. Research paradigms in Geography
3. Types of research: historical research, qualitative/descriptive research, quantitative/experimental research
4. Research design; research topic, formulation and statement of a problem, research questions, research hypotheses, research objectives, research plan
5. Literature review; Literature sources: Journals (types) Books, Monographs and web sources
6. Data collection, universe and sampling: primary and secondary data, sources of data
7. Selection of a sample and measuring instruments, basic considerations in sampling, size of sample, geo-statistical
8. considerations, Sampling units and design; points, traverses, random sampling, stratified sampling, systematic sampling
9. Field Techniques
10. Data analysis and interpretation: pre-analysis considerations,
11. Preparing data for analysis: use of the descriptive statistics and quantitative methods.
12. Data presentation
13. Research report writing; Proposal and Synopsis writing
14. Bibliography and references

Recommended Texts:

1. Therese, L. B. (1999). *Doing social research*. Boston: McGraw Hill.
2. Nicholas J. Clifford & Gill V. (2003). *Key methods in geography*.London:Sye Publications.

Suggested Readings:

1. Keith Hoggart, Loretta Lees & Anna Davies (2002). *Researching human geography.* London: Arnold Publishers.
2. Dr. K. L. Narasimha Murthy (1992). *Research in geography: a survey*1st Ed.; Ashish Publishing House, New Delhi.
3. John W. Best & James V. Kahn, (2003). *Research in education*. New Dehli: Printice Hall Private Ltd.

GEOG – 6117	Population Geography	3(3-0)

Course Brief:

This course introduces population geography to advanced undergraduate students, and graduate students. We will examine how and why aspects of population have been understood as 'problems' in different and times. he syllabus coverts the major concepts and basic tools of demography; key geographical and historical processes of population change such as fertility, mortality and migration; and the socio-economic, political, and environmental causes and consequences of population dynamics in different world regions and over time. The population dynamics are discussed in a way that incorporates economic, political, cultural and environmental issues.

Course Learning Objectives:

To develop this critical geographic approach to population issues, we will places examine trends in population, population patterns at several scales (global, national, urban) and the population processes (fertility, mortality, migration) that create them. Further, we will investigate how population processes are shaped by, and engender, larger processes of political, environmental, urban, economic, and cultural change.

Course Contents:

1. Introduction
2. Population theories
3. Sources and methods of population data collection and associated problems
4. Population distribution
5. Density
6. Urban and rural population
7. Population composition
8. Gender composition
9. Age structure, marital status, families and households, languages, religions, ethnic groups etc.
10. Population dynamics
11. Patterns of fecundity and fertility
12. Morbidity and mortality
13. Migration and its types
14. Demographic transition
15. Population growth and change
16. Population Projections

Lab. Work

Consultation of the Population Census of Pakistan and representation of population data on maps.

Recommended Texts:

1. Newbold, K. B. (2017). *Population geography: tools and issues*. Toronto: Rowman& Littlefield.
2. Ardagh, M. (2013).*Textbook of population geography.*New Delhi: Random Exports.

Suggested Readings:

1. John. I. C. (1997). *Population geography*.Toronto: Rowman& Littlefield.
2. Majid, H. (1994). *Population geography.*Karachi: Anmol Publications
3. Polunin, N. (1998). *Population and global security.*Cambridge: Cambridge University Press.

GEOG- 6118	Environmental Geography	3(3-0)

Course Brief:

Environmental Geography, one of the most traditional parts of the discipline of Geography, encompasses natural science, social science, and humanistic understandings of the Earth's environment. Environmental Geographers study the complex relationships between humans and the natural environment over time and through space.

Course Learning Objectives:

This course will provide a historical, geographical, and humanistic foundation for understanding the environment and the plethora of environmental issues that confront us at the beginning of this century. It is a major aim of this course to produce environmentally aware students and to equip them with skills to enable them to become future decision-makers on environmental matters in whatever field they wish to pursue in the future. By studying this course students will be able to recognize what the issues are, and to view them from a geographic perspective. They will recognize the responsibilities they have in relation to other people, the environment, and sustainability, and there will be opportunities to initiate personal action.

Course Contents:

1. Evolution of Environmental Studies in Geography
2. Comparative Advantage of Geography
3. Concept of environmental management
4. Environment and Man interaction, Ecosystem, natural resources
5. Important Cycles
6. Population explosion, The human impact on the environment
7. Environmental hazards, Types of Hazards
8. Major Environmental hazards and Problems in Pakistan: Floods, Earthquake, Tsunami, Cyclones, Landslides, Droughts, Deforestation and Desertification
9. Water-logging and Salinity
10. Soil Erosion
11. Global Warming and ozone depletion
12. Environmental Pollution , Waste Management, Control and Mitigation Measures, Technology, awareness, Legislation, Ethics
13. Pakistan Environmental Act
14. National Conservation Strategy
15. National Environmental Quality Standard

Recommended Texts:

1. Arms, K. (2001). *Environmental science*. Philadelphia: Asunders College Publishing.
2. Basak, A. (2009). *Environmental studies.*New Delhi: Pearson.

Suggested Readings:

1. otkin, D. B. & Edward A. K. (2012). *Environmental science*.Hoboken: John Wiley & Sons.
2. Burton, I. R., W. Kates& Gilbert. F. W. (2000). *The environment as hazard.*Karachi. Oxford University Press.
3. Cunningham, W. P. (2007). *Environmental science: a global concern*. Boston: McGraw-Hill Higher Education.

GEOG -6170	South Asia	3(3-0)

Course Brief:

South Asia, which contains nearly a quarter of the world's people, refers to the countries comprising the South Asian subcontinent: Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka, Maldives, and sometimes. The purpose to understand of the concentration is to provide cross-cultural interdisciplinary understanding of a complex civilization that is both ancient and modern, and of great significance in the contemporary world. In this course, interdisciplinary in scope, we will explore connections among religion, literature, social organization, and film in the formation of cultures in South Asia.

Course Learning Objectives:

This course will introduce representative themes and debates from a range of temporal, geographical, and social locations in South Asia and invite attention to their impact on the rest of the world.

Course Contents:

1. Introduction and History of South Asia
2. Geo-political importance of south Asia
3. Mountain of South Asia
4. Plains
5. Deserts
6. River and Lakes
7. Coastal area
8. Plateau
9. Religion
10. Language
11. Culture
12. Agriculture (Irrigation system and crops)
13. Industries
14. Poverty of Gender
15. Forest Distribution
16. Minerals
17. Climate

Recommended Texts:

1. Clothey, F. W. (2007). *Religion in India: A historical introduction*. New York: Routledge.
2. Yogendra, K., & Malik, A. (2009). *Government and politics in South Asia*(6th Ed.). Boulder: Col.Westview Press.

Suggested Readings:

1. McCloud, D. G. (2018). *Southeast Asia: tradition and modernity in the contemporary world*.New York: Routledge.
2. Fred W. (2007).*Clothey, religion in India: a historical introduction.*Glasgow: Blacker & Sons Ltd.
3. Yogendra, K., & Malik, A. (2009). *Government and politics in South Asia*. Boulder: Col. Westview Press.

GEOG -6119	Urban Geography	3(3-0)

Course Brief:

This course explores the setting in which more than half of the world's people live--the city. Cities are the largest human artifacts, but how do they emerge and evolve? What are the similarities and differences between cities? Why is the Central Business District of some cities thriving while others decline? These and many other questions are examined by urban geographers. This course will explore and analyze the various aspects, concepts and approaches of urban geography. The course will cover topics such as historic and contemporary urban development; spatial dimensions of the city; social and economic patterns; images of the city; inequality and the development of urban built environment.Throughout history, cities have been the centers of economic, political, and cultural life. Further, many of the critical issues of our time--social polarization, economic restructuring, environmental degradation, and poverty--are concentrated in urban areas.

Course Learning Objectives:

This course explores the relationships among cities in a global urban system as well as the internal spatial arrangement of cities. It asks questions about how people structure the spaces of cities as well as about how people's lives are affected by the ways cities are structured.

Course Contents:

1. Origin of towns.
2. Site and situation concept.
3. Process of urbanization in the world.
4. Urban function, economic base of urban centers.
5. Formal and functional classification of towns
6. Towns as central place
7. Urban hinterland.
8. Urban structure-different theories
9. Hierarchy of settlements-city size distribution
10. Rank size Rule
11. Law of primate city.
12. Urban expansion, metropolitan decentralization
13. Rural urban fringe-urban social life.

Recommended Texts:

1. Pacione, M. (2013). *Urban geography: A global perspective*. London: Routledge.
2. Wheeler, J. O., & Holloway, S. R. (2004). *Urban geography*. Hoboken: John Wiley & Sons Inc.

Suggested Readings:

1. Douglas, I., Goode, D., Houck, M., & Wang, R. (Eds.). (2010). *Handbook of urban ecology*. London: Routledge.
2. Mayer H.M. & Kohn C.F. (2000). *Readings in urban geography*. Chicago: University of Chicago Press.
3. Smailes, A.E. (2000).*The geography of towns*. London: Hutchinson and Co.

GEOG -6120	Digital Image Processing	3(2-1)

Course Brief:

It describes knowledge about knowledge about Digital Image processing (DIP) and its practical implementation. To produce students, that has applicable knowledge about basic tools of image processing and sensor's system. The course aims to equip students with overview of digital image processing including visual perception, image formation, spatial transformations, image enhancement, color image representation and processing, edge detection, image segmentation, and morphological image processing. Since 1964 the advent of large-scale digital computers and the space program have made digital image processing one of the most rapidly growing fields in electrical engineering.

Course Learning Objectives:

Image processing has found much more wide applications not only in the space program, but also in the areas such as medicine, biology, industrial automation, astronomy, law enforcement, defense, intelligence. With the progress made in multimedia these days, digital image processing finds more wide applications. It has become an indispensable part of our digital age.

Course Contents:

1. Multispectral, Thermal and Heperspectral Scanning
2. Satellite Systems
3. Digital Image Processing and Image Enhancement
4. Introduction, Image Rectification and Restoration, Image Enhancement, Contrast Manipulation
5. Spatial Feature Manipulation, Multi-Image Manipulation
6. Image Classification
7. Data Merging and GIS Integration
8. Geometric Image Correction, Spectral Image Enhancement, Spatial Image Enhancement - Operations in Spatial Domain, Spatial Image Enhancement - Operations in Frequency Domain
9. Image Classification – Supervised and Unsupervised Classification
10. Image Classification - Object Oriented Classification
11. Microwave Sensing
12. Application of Remote Sensing
    Land Cover Mapping, Land use change monitoring, Urban expansion Mapping, Environmental Monitoring, Cadastral Mapping

Recommended Texts:

1. Lilles T. M. & Kiefer, R. W. (2004).*Remote sensing and image interpretation.*New York: John Wiley & Sons.
2. Campbell, J. B. &Wynne, R. H. (2011).*Introduction to remote sensing*. New York: Guilford Press.

Suggested Readings:

1. Lo, C. P. (2000).*Applied remote sensing*. Essex: Longman.
2. ITC (2004).*Principles of remote sensing.*ITC Educational Textbook Series.Enschede, The Netherlands.
3. Muralikrishna, I. V. (1992).*Remote sensing applications and geographic information systems.* New Delhi: McGraw Hill.

URCG-5111	Translation of the Holy Quran - IV	Non-Credit

Topic	Details
Semester/Level	In some discipline 7th semester and in some discipline 8th Semester/ BS (5th Semester intake) 3rd / 4th
Course Code	URCG-5111
Course Title	Translation of the Holy Quran - IV
Credit Hours	Non-Credit
Objectives	• To familiarize the students with commandments of trade and inheritance mentioned in the Quranic text (with the help of Urdu translation). • Students • To introduce the students to scientific facts and miracles of the Holy Quran and Quranic stress on deep study of Allah's explored universe. • To motivate the students for reading and exploring the last Holy Book revealed by Almighty Allah. • Through memorization students will develop their relation with last revelation.
Course Contents:	○ تجارت اور وراثت: • مال کی تقسیم • نادان کا مال • عوام الناس کا مال • عورتوں کا مال • یتیموں کا مال • کفار کا مال • جائز مال • معاہدے • رہن • قرض ○ سائنسی حقائق: • تخلیقِ کائنات • اجرامِ فلکی • شجر و حجر • زمین و آسمان کے اسرار • ہوائیں اور طوفان • بہائم اور مویشی • حشرات الارض • پہاڑ اور سمندر
Grammar :	• قرآنی عربی گرامر کے اصول اور انکے اطلاقات (متن قرآنی پر اطلاق سے توضیحات)
Details of Chapters and verse Numbers:	▪ منتخب آیات مع ترجمہ وتجوید ▪ البقرہ (٢٦١، ٢٢١٥، ٢٦٥، ٢١٩، ٢٦٣، ٢٧٥، ١٨، ٢٦٥، ١٧٧، ٢٦٥، ١٦، ٢٧٥، ٢٨٢، ٢٦٢، ٢٧٣، ٢٧١، ٨٣، ١٧٧، ٢١٥، ٢٧٦، ٢٧٨، ١٦، ٢٧، ٢٢٣، ٢٩، ٢٥٥، ١٦٣، ٢٦٦، ١٦٣، ١٦٣، ٥٠، ٦٠، ١٦٣، ٥٧، ٢١٠، ١٩، ٢٦، ٧١، ٩٢، ٩٣) ▪ آل عمران (١١٧، ١٣٣، ١٣٠، ١٩٠، ٢٧، ٥٩) ▪ النساء (٢٩، ٢، ٢٩، ١٦١) ▪ المائدہ (٨٩، ٩٥، ٧٥، ٦٩، ٦٠) ▪ التوبہ (٩٨، ٢٣، ٦٩، ٢٣، ٢٣، ٦٠، ٣) ▪ الاعراف (١٧٢، ١٨٥، ٥٧، ٥٨، ١٦٣، ١٦٣، ١٦٠، ٣٠، ١٣٣، ١٧٦، ١٦٦) ▪ الرعد (١٧، ٣) ▪ الطور (٣٣) ▪ الانعام (٥٩، ٦٣، ١٣١، ١٣٦، ٣٨) ▪ الانفال (٢٨، ٣٦، ٣١)

▪ الكهف (٥١، ١٠٩، ٣٧، ٣٢، ٣٥، ١٧، ٣٥) ▪ الجاثيه (٥) ▪ فاطر (٢٧، ١٢، ١٣) ▪ العنكبوت (٢٠، ٦٣، ٣١) ▪ الروم (٥٠) ▪ الاسراء (٧٠، ٩٩) ▪ الرعد (٢) ▪ السبا(١٠، ٣، ٢٢) ▪ يونس (٨٨، ١٠١، ٢٣، ٢٣، ٥، ٢٢) ▪ يوسف (٩٣، ١٣) ▪ الفرقان (٦٢، ٥٣) ▪ لقمان (٢٩، ١٦) ▪ طه (١١٣، ٥٣) ▪ النحل (٧٥، ١١، ٦١، ٣٩، ٧٩، ٦٨، ٦٨، ١١٥، ٨، ٨) ▪ النمل (٦٣، ٦٣، ٨٨، ٦٠، ٨٢، ١٦، ١٧، ١٨) ▪ السجده (٢٧) ▪ الحديد (٦) ▪ هود (٣٣، ٦) ▪ يسين (٣٧، ٣١) ▪ الروم (٣٩، ٣٩، ٥٠، ١٩، ٢٣، ٣٦) ▪ فصلت (٣٩، ٣٩) ▪ الحج (٦١، ٦٥، ٢٢، ٧٣) ▪ الحجر (١٩، ٢٢) ▪ الانبياء (٣١، ٣٠، ٣٧) ▪ الزاريات (٣٧) ▪ الزلزله (١) ▪ القصص (٧٦، ٧٩، ٨٠، ٨١، ٨٢) ▪ النور (٣٧، ٢٢، ٢٢، ٣٠، ٣٥، ٣٣) ▪ الجمعه (١١، ٦٢، ١٠، ١١، ٥) ▪ القمر (٧) ▪ الواقعه (٦٩) ▪ الفاطر (٢٠، ١٣) ▪ الملک (١٩) ▪ الصف (١٠) ▪ الجن (١٣) ▪ الشورىٰ (٢٨) ▪ الزخرف (١١) ▪ الفيل (١)	

GEOG - 6121	Geography of Pakistan	3(3-0)

Course Brief:

Pakistan Geography is a vital topic for study because it allows a student to understand the planet in a way that clarifies various global political issues and to see the relationship between people, groups and the physical environment in which they live. Geography gives us information about various types of climates, natural conditions, mineral wealth etc. of the various nations.

Course Learning Objectives:

As the world becomes more interrelated and interdependent through technological advances, it is increasingly important to understand the physical and cultural differences of other places. Studying of Pakistan geography also opens a link to understanding the history of one's own culture, as well as that of others. An understanding of geography also allows one to make smart choices when dealing with issues regarding the relationship of society to the physical environment.

Course Contents:

1. Introduction
2. Geo-strategic position of Pakistan
3. Location and Geographical significance
4. Geo-political Importance
5. Administrative setup
6. Land and Physical Environment:
7. Physiography
8. Climate and climatic regions o Hydrology
9. Soils and vegetation
10. The People
11. Population characteristics: structure, composition and distribution
12. Population Change
13. Urbanization
14. Economy
15. Agriculture (crops and livestock)
16. Irrigation
17. Power and mineral resources
18. Industries
19. Trade
20. Tourism
21. Transport and Communication
22. Major challenges of Pakistan
23. Water, power, security and environmental issues

Recommended Texts:

1. Khan, F. K. (2015). *Geography of Pakistan.*Karachi: Oxford University Press.
2. Ahmad, K. S. (2000). *Geography of Pakistan.* Karachi: Oxford University Press.

Suggested Readings:

1. Burkey, J. S. (1991). *Pakistan the continuing search for nationhood.*Oxford: Western Press Oxford.
2. Davidson, A. P. & Ahmad, M. (2003). *Privatization and the crisis of agricultural extension: the case of pakistan, king's soas studies in development geography.*New Delhi: Ashgate Publishing.

GEOG - 6122	Cultural Geography	3(3-0)

Course Brief:

This course provides an overview of the field of cultural geography. This area of study centers its attention on spatial variations among cultural groups and the special functioning of society, and the changing and multifaceted relationships between people and the environments in which they reside. Students will learn the basic geographical tools and concepts needed to understand the intricacy of spaces and areas and to appreciate the interconnections between their lives and those of people in different parts of the world.

Course Learning Objectives:

This course provides knowledge of and about the creation of places and regions, an understanding of both the interdependence of places and regions in globalizing world, and the major changes that have taken place in global, regional, and local landscapes.

Course Contents:

1. Introduction
2. Definition of Culture & Cultural Geography, Scope of Cultural
3. Geography & its relationship with other Disciplines.
4. Basic themes of cultural geography:
5. Cultural Ecology
6. Cultural Diffusion
7. Cultural Regions/Area
8. Cultural Integration
9. Cultural Landscape.
10. Cultural History:
11. Paleolithic Age: Hunting & Gathering Culture
12. Neolithic Age: Agricultural World Revolution.
13. Industrial Revolution & Urbanization
14. Detailed Study of Stages of Social Cultural Change
15. Geo-Cultural Study of the following: Religion

Recommended Texts:

1. Fouberg, E. H., Murphy, A. B., & De Blij, H. J. (2009). *Human geography: people, place, and culture*.
   New York: John Wiley & Sons.
2. Terry G. J. Lester R. (2000). *Human mosaic.* New York: Harper Collins Publishers.

Suggested Readings:

1. Atkinson, D., Jackson, P., Sibley, D., &Washbourne, N., (2005). *Cultural geography: A critical dictionary of key ideas.* IB Tauris.
2. Anderson, K., Domosh, M., Pile, S., & Thrift, N., (2002). *Handbook of cultural geography*. Singapore:
   Sage.
3. Horton, J., &Kraftl, P., (2013). *Cultural geographies: An introduction*. London: Routledge.

GEOG - 6123	Natural Hazards and Disaster Management	3(3-0)

Course Brief:

This course covers the mitigation concepts, implementation approaches planning and types of Hazards. It is a multidisciplinary research oriented subject for planning and development. This is a course on applied hazard mitigation, but because it is a graduate level course, the focus will not be only on the fundamentals of hazard mitigation but on the fundamentals and their application. Students have had some introduction to hazard mitigation through NHDM. The application aspect of this course addresses the relationship of hazards and their behaviors which cause disasters and how local, state, and federal emergency management agencies can mitigate the potential threats.

Course Learning Objectives:

Hazard mitigation is actually hazards management, much like emergency preparedness, response, and recovery have to with disaster management. Thus, in emergency management we deal with both hazards and disaster management. The approach used in this present course is to address hazards management or the management of hazards so that future disaster impacts will be reduced or eliminated.

Course Contents:

1. The Concept
2. The Nature of the Phenomena
3. Dynamics of Potentially Disastrous Natural Hazards
4. Impact of Natural Hazards and Likely Disasters
5. Scale
6. Risks
7. Vulnerability
8. The Disaster Management Cycle
9. Application of RS, GIS, GPS Tools in the Management of following Natural Hazards / Disasters
10. Flood
11. Earthquake
12. Cyclones
13. Rainfall
14. Efficacy of the Integrated Development Planning and Natural Hazards/ Disasters

Recommended Texts:

1. Bryant, E. (2005). *Natural hazards*. Cambridge: Cambridge University Press.
2. Cochrane, M.A. (2009). *Tropical fire ecology: climate change, land use and ecosystem dynamics.*Springer: Praxis Publishing.

Suggested Readings:

1. Ghosh, G.K. (2006). *Disaster Management*. New Delhi: A.P.H Publishing Corporation.
2. Pirarizy, A.A. (2002). *Environmental Geography and Natural Hazards*. New Delhi: A.P.H Publishing Corporation.
3. Smith, K. (2004). *Environmental Hazards. Assessing Risk and Reducing Disaster*. London: Routledge.

GEOG - 6124	Geography of Manufacturing	3(3-0)

Course Brief:

The term "manufacturing" includes those activities by which man changes the form or nature of raw materials, converting them into more useful products. The course focuses on explanations of factory location, the role of location in corporate strategies and the geographical structure of production systems, including industrial districts. Particular attention is paid to the organizational structure of the economy, especially the dominant role played by multinational firms (MNCs), and the forces that shape the agglomeration and dispersal of activity.These transforming operations are conducted in factories, to which are brought raw materials from various source regions and from which go finished products to diverse market regions.

Course Learning Objectives:

Factories which characterize industrial regions may be interrelated: some may supply semi-finished items to other factories; others may be branch plants; and still others may have a service relationship, such as a power plant, which supplies electrical energy to other factories. A relationship also exists between factories and non-factory elements.

Course Contents:

1. Introduction to Geography of Manufacturing:
2. Definitions and concepts, and organization.
3. Classification of industrial activities.
4. Historical Development of Industrial Activity:
5. From industrial revolution to green paradigm.
6. Modern trends in manufacturing.
7. Industrial Location:
8. Approaches to location dynamics.
9. Location factors.
10. Location models.
11. Location theories.
12. Geographical Analysis of Selected Industries:
13. Light industries (Cotton textiles, sugar industry)
14. Heavy industries (Iron and steel, petro-chemicals, cement)
15. Modern Issues in Manufacturing:
16. Patterns of international production and the industrialization process.
17. De industrialization.
18. Industry and environmental problems.
19. Industrial planning and management.

Recommended Texts:

1. Alexanderson, G. (2000). *Geography of manufacturing*.Englewood Cliffs: Prentice Hall Publications.
2. Altaf, Z. (2000). *Entrepreneurship in the third world risk and uncertainty in industry in Pakistan.*London: Croom Helm, Ltd.

Suggested Readings:

1. Chapman, K. & Walker, D.F. (1991). *Industrial Location*.(2nd ed.).Oxford: Wiley Eastern Ltd.
2. Emery, J.S. & Shaw, J.H. (2000). *Cities and Industries*. Milton: Jacaranda Press.
3. Hayter, R. (2000). *The Dynamics of Industrial Location*.New York: John Wiley & Sons.

GEOG - 6125	Hydro Geography	3(3-0)

Course Brief:

It describes advanced knowledge about Water resources, water resource management, Hydrology, distribution and availability of water. This course provides a basic introduction to hydrologic processes, including fundamentals of hydrology, rainfall-runoff modeling, hydraulic processes (including both pressurized pipe flow and open channel flow), and hydrologic frequency analysis.

Course Learning Objectives:

Hydrologic frequency analysis was applied in the computation of design flows and in the analysis and design of hydraulic systems such as pipe networks and storm water management systems. Computational laboratory sessions (including geographic information systems and simulation models) and experimental laboratory sessions reinforce lectures and provide hands-on learning opportunities. By the end of this course, students should be able to apply standard techniques, computational tools, and data used by engineers in conducting hydrologic analysis.

Course Contents:

1. Introduction
2. Hydrological Cycle and Water Balance: Water Reservoirs, Hydrological Cycle, Water Balance
3. Precipitation and Rainfall
4. Runoff: Factor affecting the Runoff, Runoff Cycle and Phases of Runoff, Measurement of Runoff
5. Ground Water
6. Floods: Causes and Seasonal Distribution of Floods, Flood Protection and Planning, Geographical Distribution of Floods
7. Glacial Water: Glacial Nourishment and Wattage, Glacial Runoff, Glacial Flow, Response of Glacier to Climatic Changes
8. Droughts: Extent and Distribution of Droughts, Drought Severity, Frequency and Duration, Hydrological Relations in Draughts
9. Lakes: Origin and Diversity, Hydrological Cycle and Water Balance Lakes, Geographical Distribution
10. Water Pollution: Classification of Water Pollutants, Extent and Distribution of Water Pollutants, Effects of Water Pollution on Fauna and Flora
11. Quantitative Hydro Geography: Basis Concepts, Areal Aspects of Drainage Basins
12. GIS and RS Application:

Recommended Texts:

1. Raghunath, H. M. (2006). *Hydrology: principles, analysis and design*: New Age International.
2. Ward, R.C. & Robinson, M. (2000). *Principles of hydrology*.London: McGraw Hill.

Suggested Readings:

1. Bittinger, M. W. (2000). *Water resources, use, and management.* Proceedings of a symposium held at Canberra. Edwin S. (Hill, Eds). Cambridge: Cambridge University Press.
2. Meinzer, O.E. (2000). *Hydrology.* New York: McGraw Hill.
3. Chow, V. T. (2000). *A handbook of applied hydrology.* New York: McGraw Hill.

GEOG -6126	Medical Geography	3(3-0)

Course Brief:

Medical geography is an important "new" area of health research that is a hybrid between geography and medicine dealing with the geographic aspects of health and healthcare. Medical geography studies the effects of locale and climate upon health. It aims to improve the understanding of the various factors which affect the health of populations and hence individuals. It is also called health geographics. Focuses on the design of GIS-based models to address health and healthcare issues.

Course Learning Objectives:

Topics include a conceptual framework, landscape epidemiology models, disease diffusion models, health accessibility, human health behavior and location-allocation of health services. Laboratory section provides hands-on experience applying these models with GIS tools.

Course Contents:

1. Introduction to Medical Geography:
2. Definitions, themes, concepts, Nature & scope of Medical Geography
3. The Historical Development of Medical Geography
4. The status of Medical Geography.
5. Factors inflecting the Patterns of Health & Disease:
6. Geographical Factors.
7. Physical Factors / Environmental Factors.
8. Cultural Factors.
9. Socio – Economic & Political Factors.
10. Patterns & Processes of Health & Disease:
11. Spatial variations in health & welfare patterns.
12. Role of Geography in exploring the impacts of diseases.
13. Models in Medical Geography
14. Epidemiological Transition
15. Health & inequalities
16. Inverse care law.
17. Global Patterns of health & Disease.
18. Global Eradication of disease.
19. Progress in Medical Geography:
20. Recent Issues & Developments in Medical Geography.
21. GIS, Remote Sensing & Health studies.
22. Changing Societies & future Health care.
23. Geography, Health care & Planning.

Recommended Texts:

1. Lloyd, J. (2002). *Health &welfare*.London: Holder & Stoughton.
2. Izhar, F. (2004). *Geography & Health: A study in medical Geography.*New Delhi: A.P.H. Publishing Corporation.

Suggested Readings:

1. Leninan, J.& Fletcher, W.W. (2000). *Health & the environment*(1st ed.).Glasgow: Blacker & Sons Ltd.
2. Lloyd, J. (2002). *Health & welfare,* Holder & Stoughton London.

GEOG –6127	Political Geography	3(3-0)

Course Brief:

Political geography is concerned with the study of both the spatially uneven outcomes of political processes and the ways in which political processes are themselves affected by spatial structures. In this course, we will survey Political Geography, a subfield of Human Geography whichfocuses on questions of space and power and the interconnections of geography and politics.All politics are geographical, from the spatial arrangement of local governments to theterritorial basis of international trade. We will explore how politics works with a concern forwhere political impacts occur at a variety of geographical scales (from the international to thelocal) while also considering how geographical factors impact political actions.

Course Learning Objectives:

This studies examine the geography of various formal institutions and practices of politics as well as the informal politics of everyday life within places. In short, we'll explore how political power makes geographies and how, in turn, geography may be said to make politics.

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Course Contents:

1. Nature and objectives of Political Geography, Definition and development of political geographic thought.
2. A critical examination of the following:
3. Concept of environmental relationship in political geography.
4. The concept of geopolitics its development and short-comings
5. National deterministic theories of Germans and French possibilities.
6. State as a Politico-geographic Phenomenon:
7. Concept of the state and its classification. Chief political-geographic characteristics of states.
8. Hierarchy of political area.
9. Frontiers and boundaries: their concepts, functions and classification.
10. Core areas, ecumenical area and capitals.
11. Approaches and forces in the politico geographic study of state:
12. A critical examination of the following approaches:
13. Simple descriptive approach.
14. Historical approach.
15. Morphological approach.

Recommended Texts:

1. Jones, M., Jones, R., Woods, M., Whitehead, M., Dixon, D., & Hannah, M. (2014). *An introduction to political geography: space, place and politics*. London: Routledge.
2. Kruys, B. G. G. (2002). Controlling land borders: A comparison of the United States of America, Germany and South Africa. *Strategic review for southern Africa*, *24*(2), 114.

Suggested Readings:

1. Agnew, J. (1997). *Political geography: a reader.* London: Arnold.
2. Bakis, H. (1995). Communication and Political Geography in a Changing World' *Revue Internationale de Science Politique, 16* (3). 219–311.
3. Williams, N. (2009). *Border Politics: The limits of sovereign power: the limits of sovereign power*. Edinburgh: Edinburgh University Press.

GEOG - 6128	Regional Planning & Development	3(3-0)

Course Brief:

Regional planning deals with the efficient placement of land-use activities, infrastructure, and settlement growth across a larger area of land than an individual city or town. Regional planning is a sub-field of urban planning as it relates land use practices on a broader scale. This course will explore and analyze the various aspects, concepts and approaches of urban geography.

Course Learning Objectives:

The course will cover topics such as historic and contemporary urban development; spatial dimensions of the city; social and economic patterns; images of the city; inequality and the development of urban built environment. It also includes formulating laws that will guide the efficient planning and management of such said regions. Regions require various land uses; protection of farmland, cities, industrial space, transportation hubs and infrastructure, military bases, and wilderness. Regional planning is the science of efficient placement of infrastructure and zoning for the sustainable growth of a region.

Course Contents:

1. Principles and Scope of Planning and Development
2. Planning: A Geographer's View, ii. Planning Processes
3. Planning as an Activity
4. Objectives in Planning
5. Objectives of Regional Development Efforts.
6. Implications of Regional Development:
7. Defining Regions, ii Regional Hierarchy and Classification, iii. Regionalism or Administrative Boundaries?, iv. Determining Regional Boundaries, v. Factors contributing to Uniformities and Disparities in Regions, vi.
8. Resources and Planning:
9. The Resource Base.
10. Resource Evaluation.
11. Utilization of Resources for Planning and Development.
12. Urban and Regional Planning:
13. Urban Growth Patterns.
14. Impact of Industrialization.
15. Planning for Cities and City Regions.
16. Rural Planning:
17. Agricultural Planning and Rural Development.

Recommended Texts:

1. Hall, P. (2000). *Urban and regional planning*(2nd ed.). London: Allen &Unwin.
2. Hudson, R. & Lewis J.R. (2000). *Regional planning in Europe*.London: Pion Ltd.

Suggested Readings:

1. Birmingham, W., & Ford, A.G., (2000). *Planning and growth in rich and poor countries.* London: George Allen and Unwin Ltd.
2. Cox, K. R. (2000). *Location and public problems.*Oxford: Basil Black-Well.
3. Frey H. (1999). *Designing the city towards a more sustainable Urban Form.*London: Routledge.

GEOG6129	Climate Change Studies	3(3-0)

Course Brief:

The purpose of climate change studies is multi-faceted and driven by the urgent need to understand, address, and mitigate the challenges posed by climate change. Climate change studies aim to deepen our understanding of the Earth's climate system and the factors driving climate change. Climate change studies assess the potential impacts of changing climate conditions on various natural and human systems. Climate change studies contribute to the development of adaptation strategies that help societies and ecosystems cope with the impacts of climate change. It also plays a crucial role in identifying and assessing mitigation strategies to reduce greenhouse gas emissions.

Course Learning Objectives:

Climate change studies provide scientific evidence and insights to inform policy development and decision-making processes at all levels, from local to global. Overall, the purpose of climate change studies is to provide knowledge, evidence, and strategies that can inform decision-making, promote sustainable development, and help societies and ecosystems adapt to and mitigate the impacts of climate change.

Course Contents:

1. Introduction
2. Climate systems, Mechanisms of climate change, Paleo-climate
3. Internal Forcing Mechanism, External Forcing Mechanism
4. Melankovitch cycle, Seasonal variation Natural variability of climate
5. Extreme Events Tornadoes and Hurricanes, Thunderstorm Hazard
6. Global warming, Ozone depletion, Green House effect, Carbon Cycle Global Perspective
7. Currents of Pacific, Atlantic,& Indian Oceans, Effects of Currents on Climate change
8. Climatic Regulation Organization and Policies,
9. UNFCCC, IPCC, Assessment reports brief Discussion
10. Weather, Modification and Atmospheric Optics
11. NOAA, WMO, Moisture & precipitation process, Thermohaline, &Atmospheric circulation
12. El-NINO , Global Impact s of EL-NINO
13. Regional patterns of climate variability
14. North Atlantic Oscillation (NAO), Atlantic Multi-decadal Oscillation (AMO)
15. Pacific Decadal Oscillation (PDO), Indian Ocean Dipole (IOD)
16. Madden Julian Oscillation, Arctic and Antarctic Oscillation
17. Latitudinal variation of climate, Measurement of climate
18. Global system of climate change, Global and hemispheric variability
19. Climate Change Impacts in Pakistan, Climate change mitigation
20. Climate change Impacts, Economic, Health, Agriculture

Recommended Texts:

1. Barnes, J., & Dove, M. R. (Eds.). (2015). *Climate cultures: Anthropological perspectives on climate change*. Yale University Press.
2. Marselle, M. R., Stadler, J., Korn, H., Irvine, K. N., & Bonn, A. (2019). *Biodiversity and health in the face of climate change* (p. 481). Springer Nature.

Suggested Readings:

1. Hughes, S., Chu, E. K., & Mason, S. G. (2020). *Climate change and cities*. Oxford: Oxford University Press.
2. Weintrobe, S. (Ed.). (2013). *Engaging with climate change: Psychoanalytic and interdisciplinary perspectives*. Routledge.

GEOG - 6130	Agricultural Geography	3(3-0)

Course Brief:

Agricultural geography is a sub-discipline of human geography concerned with the spatial relationships found between agriculture and humans. Agricultural Geography provides the basic information of various types of the agriculture on the earth surface viz., Subsistence, commercial, horticulture, specialized etc. Agricultural Geography as a sub-discipline of human and economic geography. The geography of human activities is called as 'economic geography' which examines the primary, secondary, tertiary and quaternary activities of man. Man in his primeval stage was a hunter and gather and during the Neolithic period he learned the art of cultivation of crops.

Course Learning Objectives:

Agriculture had been the dominant economic activity in the past and it is still the mainstay of over two-third of the world population. The study of agricultural geography is thus of great social relevance among all the branches of human geography

Course Contents:

1. Introduction to agricultural geography:
2. Nature and scope
3. The origins and development of agriculture
4. Theoretical aspects of geographical location relevant to agriculture
5. Introduction; approaches to the study of agriculture in geography
6. Approaches: commodity, regional, deterministic, systematic
7. factors influencing agricultural patterns:
8. Physical factors: the terrain, climate, soil, water resources
9. Socio-economic factors: technological, population, cultural, infrastructure
10. Land, labour and capital
11. Government and regional policies, models in agricultural geography:
12. The nature and need of models
13. Classification of models
14. Models of agricultural activity, agricultural regions: concepts and techniques:
15. Concept and methodology
16. Techniques: normative, empirical, single element, statistical
17. Methods of agricultural regionalization
18. Data classification and distribution

Recommended Texts:

1. Newbury, P. A. R. (1999). *Agricultural geography*. London: Longman.
2. Shukla, L. (2011). *Readings in agricultural geography*. Jaipur: Scientific Publisher.

Suggested Readings:

1. Laingen, C. & L. Butler, H. (2013). *Agricultural geography*. Oxford Bibliographies. Oxford: Oxford University Press. DOI 10.1093/OBO/9780199874002-006
2. Bowler, I. R. (2002) *The industrialization of Agriculture*. Oxford: Oxford University Press.
3. Singh, J. &Dhillon, S. S. (2000). *Agricultural geography.* New Delhi: McGraw-Hill.

GEOG - 6131	Conservation of Resources	3(3-0)

Course Brief:

Natural resources conservation workers strive to protect natural resources, such as water, soils, minerals, forests and wildlife. Studies in natural resources conservation are multidisciplinary, covering topics in resource management, recreation, development and ecosystems. Conservation includes both the protection and rational use of natural resources.

Course Learning Objectives:

Earth's natural resources are either nonrenewable, such as minerals, oil, gas, and coal, or renewable, such as water, timber, fisheries, and agricultural crops. We need to conserve our Natural Resources because it is the main source of our daily needs. We need to conserve it because they are limited only. And if these resources are abused and harmed, we will have short quantity of sources for food and living. Remember our future generation will need also our Natural Resources.

Course Contents:

1. Scope of the subject; its importance, problems created by the expanding population
2. Advancing technology, increasing standings of living and greater demand for space and goods thereof
3. Relation of subject to other disciplines.
4. Agricultural Resources, Agriculture and man. Types of agriculture, agricultural land use and cropping pattern. Efficiency of agriculture, problems relating to agricultural land. Agricultural regions of the work.
5. Animal Resources: Ranching and pasture, problems of overgrazing, carrying capacity of land, recent changes in ranching brought about by scientific agriculture feedlots and custom feeding, modern range management.
6. Problems of Human Population: Population distribution in different ecosystems, and different societies (with different technical skill), rate of growth of population. Relationship between man, his skills and natural resources. Rural land planning in developed and developing countries. Differences in interpretation of resources. Control of population size, dangers of over population.

Suggested Readings:

1. Bert, R. (2006). *Infrastructure: the social value of shared resources*. New York: Oxford University Press.
2. Dunster, K. (2011). *Dictionary of natural resource management*. Amsterdam: UBC press.

Recommended Texts:

1. Coutts, C. (2016). *Green infrastructure and public health*. London: Routledge.
2. Niles, E. (2003). *Life on earth: An encyclopedia of biodiversity, ecology, and evolution*. California: ABS-CLIO.
3. Burley, J. (2004). *Encyclopedia of forest sciences*. New Delhi: Academic Press.

GEOL - 5101	Introduction to Geology	3(3-0)

Course Brief:

This course is designed to acquire the knowledge about the basic concepts of geology. This will help the students to get knowledge about various types of rocks, minerals and the processes of their formation. Geology is the core discipline of the earth sciences and encompasses many different phenomena, including plate tectonics and mountain building, volcanoes and earthquakes, and the long-term evolution of Earth's atmosphere, surface and life.

Course Learning Objectives:

The goal of the Geology undergraduate program is to equip students with the fundamental knowledge of the diverse fields of Geology (encompassing Geomorphology & Surface Processes, Hydrology & Low-Temperature Geochemistry, Sedimentology & Paleoecology, and Tectonics and Solid-Earth Processes). In addition, it is critical that students learn to think like a scientist and to apply the scientific method in their coursework and in their lives. It helps to know the geologic time scale and place important geologic events in a temporal framework.

Course Contents:

1. Introduction and scope of geology; importance and relationship with other sciences;
2. History and philosophy of geology; Earth as a member of the solar system;
3. Earth's origin, age, composition and internal structure;
4. Introduction to plate tectonics, Isostasy; mountain building processes;
5. Earthquakes and volcanoes; weathering and erosion;
6. Introduction, identification and classification of rocks and minerals;
7. Sedimentary, igneous and metamorphic structures;
8. Introduction to fossils in sedimentary rocks;
9. Introduction to folds, faults, joints, cleavage, foliation, lineation and unconformities;
10. Geological Time Scale; Law of Superposition, present is key to the past and Law of Faunal Succession;
11. Concept and techniques of geological dating, relative and absolute dating; evolution of life on earth;
12. Use of Brunton Compass and GPS, etc.

Recommended Texts:

1. Plummer, C. C., Carlson, D. H., &Hammersley, L. (2016). *Physical geology*. New York: McGraw- Hill.
2. Plummer, C. C., McGeary, D., & Carlson, D. H. (2000). *Physical Geology: Earth Revealed*. New York: McGraw-Hill.

Suggested Readings:

1. McGeary, D., Carlson, D. H., & Plummer, C. C. (2011). *Physical geology*. New York: McGraw-Hill.
2. Smith, G., & Pun, A. (2013). *How Does Earth Work? Physical Geology and the Process of Science: Pearson New International Edition*. London: Pearson Higher Education.
3. McClay, K. R. (1999). *The mapping of geological structures*. Hoboken: John Wiley & Sons.

URCM – 5107	Mathematics I	3(3-0)

Course Brief:

The goal of Mathematics Iis to prepare students for first-year Calculus. Helping students gain proficiency in their understanding and ability to utilize real-valued functions, the primary tool in Calculus, accomplishes this goal. Students are presented a broad set of 'function tools', including a general understanding of function properties together with a 'library' of commonly used functions.

Course Learning Objectives:

It is intended that students become skilled at recognizing the different families of functions and the primary properties that set each apart, are able to apply the general function properties to each type of function, and are able to use the special set of algebraic skills associated with each. Students are also expected to become adept in utilizing and interpreting the results from graphing calculators, as an important investigative tool.

Course Contents:

1. Preliminaries
2. Real-number system
3. cmplex numbers
4. Introduction to sets, set operations, functions, types of functions.
5. MatricesIntroduction to matrices, types, matrix inverse, determinants, system of linear equations, Cramer's rule.
6. Quadratic Equations
7. Solution of quadratic equations, qualitative analysis of roots of a quadratic
8. equations
9. Equations reducible to quadratic equations
10. Cube roots of unity, relation between roots and coefficients of quadratic
11. Equations
12. Sequences and Series
13. Arithmetic progression
14. Geometric progression
15. Harmonic progression
16. Binomial Theorem
17. Introduction to mathematical induction
18. Binomial theorem with rational and irrational indices.
19. Trigonometry
20. Fundamentals of trigonometry
21. Trigonometric identities.

Recommended Texts:

1. Thomas, G. B., & Finney, A. R. *(2005). Calculus.* Reading: Addison-Wesley.
2. Anton, H., Bevens. I., & Davis, S. (2005). *Calculus: A new horizon* (8th ed.). New York: John Wiley.

Suggested Readings:

1. Stewart, J. (1995). *Calculus* (3rd ed.).Pacific Grove, California: Brooks/Cole.
2. Swokowski, E. W. (1983). *Calculus and analytic geometry*. Boston: PWS-Kent Company.
3. Thomas, G. B., & Finney, A. R. (2005). *Calculus* (11th ed.).Reading: Addison-Wesley.

URCM – 5108	Mathematics II	3(3-0)

Course Brief:

Calculus is the mathematical study of continuous change. It has two major branches, differential calculus and integral calculus. Both branches make use of the fundamental notions of convergence of infinite sequences and infinite series to a well-defined limit. Modern calculus is considered to have been developed in 17th century .

Course Learning Objectives:

This course in calculus is a gateway to other, more advanced courses in mathematics devoted to the study of functions and limits, broadly called mathematical analysis. Calculus is used in every branch of the physical sciences, actuarial science, computer science, medicine, demography, and in other fields. It allows one to go from rates of change to the total change or vice versa, and many times in studying a problem we know one and are trying to find the other. This course aims to provide students with the essential concepts of mathematics and how these can be employed for analyzing real data.

Course Contents:

1. Preliminaries
2. Real-number line
3. Functions and their graphs
4. Solution of equations involving absolute values, inequalities.
5. Limits and Continuity
6. Limit of a function
7. Left-hand and right-hand limits
8. Continuity
9. Continuous functions.
10. Derivatives and their Applications
11. Differentiable functions
12. Differentiation of polynomial
13. Rational and transcendental functions, derivatives.
14. Integration and Definite Integrals
15. Techniques of evaluating indefinite integrals
16. Integration by substitution, integration by parts
17. Change of variables in indefinite integrals.

Recommended Texts:

1. Thomas, G. B., & Finney, A. R. *(2005). Calculus.* Reading: Addison-Wesley.
2. Anton, H., Bevens. I., & Davis, S. (2005). *Calculus: A new horizon* (8th ed.). New York: John Wiley.

Suggested Readings:

1. Stewart, J. (1995). *Calculus* (3rd ed.).Pacific Grove, California: Brooks/Cole.
2. Swokowski, E. W. (1983). *Calculus and analytic geometry*. Boston: PWS-Kent Company.
3. Thomas, G. B., & Finney, A. R. (2005). *Calculus* (11th ed.), Reading: Addison-Wesley.

ENVR – 5104	Environmental Geology	3(3-0)

Course Brief:

This course is designed to acquire the knowledge about the role of geology in the environmental degradation. As a discipline, environmental geology deals with using geological knowledge to address interactions between humans and the physical environment: the biosphere, the lithosphere, the hydrosphere, and, to some degree, the atmosphere. Environmental geology is a multidisciplinary subject that covers a broad range of topics, ranging from Earth materials and their use to Earth processes, including natural hazards and their impact on human lives. The environmental effects of exploring Earth resources is also an integral component of the course.

Course Learning Objectives:

This course will help the students to learn how the various geological processes and related human activities are involved in contaminating our ecosystem. managing geological and hydrogeological resources such as fossil fuels, minerals, water (surface and groundwater), and landuse.Studying the earth's surface through the disciplines of geomorphology, and defining and mitigating exposure of natural hazards on humans managing industrial and domestic waste disposal and minimizing or eliminating effects of pollution, and performing associated activities, often involving litigation.

Course Contents:

1. Introduction to environmental geology.
2. Management of natural resources.
3. Air pollution and global climatic changes.
4. Environmental controls for erosion, desertification and coastal degradation.
5. Geological hazards such as floods, landslides and earthquakes.
6. Volcanoes, glaciers and shoreline processes, their remedial measures.
7. Environmental impact of mining, dams, reservoirs, highways, their assessment and controls.
8. Cleaner sources of energy.
9. Industrial pollution, waste disposal,
10. Groundwater contaminations, River Lake and marine pollution and their impact on human health.
11. Geological aspects of human health.
12. Trace elements and health hazards.

LabWork.

1. Sampling and analysis of air, water, soil and rocks.

Recommended Texts:

1. Keller, E.A., Chales E. (1990). .*Environmental geology*. Paris: Merril Publishing Co.
2. Mazore, E. (2000). *Applied Chemical Groundwater Hydrology*. New York: McGraw Hill.

Suggested Readings:

1. Merritts, D., De Wet, A., &Menking, K. (2000). *Environmental Geology: an earth system science approach*. New York: Macmillan.
2. Montgomery, C.W. (2005). .*Environmental geology*. New York: McGraw Hill.

CHEM-5101	Physical Chemistry	3 (3-0)

Course Brief:

This course provides foundation and basic level knowledge of physical chemistry to under graduate students. This foundation course covers introduction of physical chemistry along with its application for learning principles of physico-chemical phenomenon. This offer complementary approaches to the fundamental understanding of chemical systems. Students will acquire knowledge to enable themselves to understand the elementary mathematics, physical state of matter, atomic structure, chemical thermodynamics, kinetic theory of gases, collision theory of reactions, fundamental principles and laws of thermodynamics, chemical equilibria and chemical kinetics and investigate the physical properties of ideal/non-ideal binary solutions. Students will also be able to study the rates of reactions and perform related calculations. Students will also be introduced about basics of electrochemistry.

Course Learning Objectives:

The general goal of learning this physical chemistry course is to obtain a vision of matter-energy relationship in physical and chemical systems. Learning objectives emphasized in this course involve developing an understanding of basic principles of physical chemistry.

Course Contents:

1. Elementary Mathematics: Logarithmic, exponential and trigonometric functions
2. Differentiation of elementary functions, Physical States of Mater
3. Atomic Structure, De Brogile equation, Pauli Exclusion Principle, Hund's Rule.
4. Schrodinger wave equation
5. Dipole moment,Chemical Thermodynamics, First and second law of thermodynamics
6. Chemical Equilibrium, Law of Mass Action and LeChaterlier's Principle.
7. Solutions, composition, ideal and non-ideal solutions, Raoult's law.
8. Chemical Kinetics, change of entropy, Zero, first and second order reaction, Arrhenius equation
9. Electrochemistry, Conductance, dependence of conductance
10. Kohlrausch's law and its applications

Recommended Texts:

1. Atkins, P., Paula, J., & Keeler, J. (2017). *Atkins' physical chemistry.* (11^{th} ed.). UK: Oxford University Press.
2. Kuhn, H., Försterling, H., & Waldeck, D.H. (2009). *Principles of physical chemistry.* (2^{nd} ed.). USA: Wiley Publisher.

Suggested Readings:

1. Akhtar, M.N., & Nabi, G. (2006). *Text book of physical chemistry.* Lahore: Ilmi Kitab Khawna.
2. Das, R.C., & Behera, B. (2003). *Experimental physical chemistry.* Delhi: Tata McGraw Hill.

CHEM-5102	Inorganic Chemistry	3 (3-0)

Course Brief:

This course covers a range of general topics of inorganic chemistry. It will provide a useful supplement to the advanced courses specified in the department. This course aims to enable the students to achieve the advance knowledge about the key introductory concepts of chemical bonding, acid-base chemistry, and properties of the representative and transition elements, as well as using this knowledge for qualitative and quantitative analysis of inorganic compounds during laboratory work. Learning objectives emphasized in CHEM 5102 involve developing an understanding of basic principles of inorganic chemistry.

Course Learning Objectives:

It develop critical thinking skills enabling students to solve chemistry problems that incorporate their cumulative knowledge. Students learned in class to modern chemistry techniques which give them opportunities to upgrade their knowledge about advanced inorganic concepts. The essence of this course is to develop study skills that students need to succeed in university-level chemistry courses and preparation of students for professional positions in chemistry.

Course Contents:

1. Periodic Table and Periodicity of Properties
2. Redox potential, electrochemical series and its applications. Corrosion and electroplating.
3. Acid Base Equilibria: Acids and bases, relative strengths of acids, pH, pKa, pKb.
4. Hard and soft acid and Bases. SHAB Principle and its application.
5. Buffers, types buffer, Preparation, Buffer capacity and applications of buffers.
6. Chemical Bonding, VBT, MOT, VSEPR. Special types of bonds
7. Chemistry of p-Block Elements
8. Production of pure silicon chips for solar energy cells.
9. Chemistry of d-Block Elements Werner's theory, VBT, MOT and CFT
10. Isomerism in coordination compounds.
11. Chelates, Classification and applications
12. Separation Techniques: General introduction and Applications
13. Principle, brief instrumentation(Flame emission, Atomic Absorption, IR and UV/Vis).
14. Metallurgy of Al, Cr and U, fertilizers (Urea and Phosphate fertilizers) Cement and Sugar.

Recommended Texts:

1. Iqbal, M. Z. (2015). *Text book of inorganic chemistry.* Lahore: Ilmi Kitab Khana
2. Lee, J. D. (1996). *Concise inorganic chemistry.* (5^{th} ed.). UK: Chapman and Hall

Suggested Readings:

1. Graham, H., & Man, H. (2000). *Chemistry in context.* (5^{th} ed.). UK: Thomas Nelson Ltd.
2. Philp, M. (1996). Advance chemistry. UK: Cambridge Publishing.

ECON-5112	Introduction to Economics	3(3-0)

Course Brief:

The course is designed for beginners with either no formal background or very little acquaintance with economics. It develops the ability to explain core economic terms, concepts, and theories. The objective is to give the students a clear understanding of the basic concepts, tools of analysis, and terminologies used in microeconomics and macroeconomics. Emphasis will be on the use of graphs, diagrams, and numerical tables/schedules for exposition. A country's economy consists of three major economic agents; consumers, firms, and government. Analyzing the choices made by these economic agents is one of the main subjects of microeconomics.

Course Learning Objectives:

Students will learn how the decisions made by economic agents are represented in the market as demand and supply of commodities. Students will also learn about the determinants of macroeconomic conditions (national output, employment, and inflation), aggregate supply and demand, business cycles, public finance, international trade, and monetary and fiscal policy. The teacher is expected to draw examples from the surrounding world to clarify the concepts.

Course Contents:

1. Introduction to economics and preliminaries
2. Theory of consumer behavior
3. Demand, Supply, market equilibrium and elasticities
4. Theory of production
5. Revenue and cost analysis of a firm
6. Theory of Market Structure
7. Firm's Behavior under perfect competition, monopoly, and monopolistic competition
8. Introduction to macroeconomics
9. National income and various concepts of national income
10. Consumption and saving function
11. Investment and its types,
12. Concept of aggregate demand and supply and their equilibrium
13. Concept of multiplier and accelerator
14. Monetary and fiscal policies
15. Inflation and unemployment (PHILLIPS CURVE)
16. Balance of payment problems and remedies
17. Public finance and taxation, debt and expenditure

Recommended Texts:

1. Mankiw, N.G. (2018). *Principles of microeconomics*. Boston: Cengage Learning.
2. Diulio, E. A. & Salvatore, D.(2011). *Schaum's outline of principles of economics*. New York: McGraw-Hill Education.

Suggested Readings:

1. Mankiw, N.G.(2019). *Macroeconomics*.New York: Worth Publishers.
2. Nicholson, W. & Snyder, C.M.(2010). *Intermediate microeconomics and its application*.Mason: Cengage Learning.
3. Froyen, R. T.(2013). *Macroeconomics: theories and policies*. University Chapel Hill: Pearson.

PHYS-5101	Mechanics	3(3-0)

Course Brief:

Mechanics is all about motion of body. It deals with forces, motion, stress, strain and further to the laws of motion in inertial frames specifically. This course also provides the students a broad understanding of the physical principles of the classical dynamics, to describe mechanical events that involve forces acting on macroscopic objects with quantitative skills, to motivate them to think creatively and critically about scientific problems and experiments (thought as well real-life).

Course Learning Objectives:

Student studying this course will understand classical physics and will also develop the skills to apply principles to the practical life problems. Students are encouraged to share their thinking with teachers and the other students to examine different problem-solving strategies.

Course Contents:

1. Measuring things, displacement, average velocity and speed, acceleration, constant acceleration, free fall acceleration, graphical integration in motion analysis
2. Vectors and their components, adding vectors by components, multiplying vectors
3. Unit vector, vector representation of quantities, projectile motion, uniform circular motion
4. Relative motion in one dimension, relative motion in two dimensions
5. Newton's first and second law, some particular forces, applying newton laws, friction
6. Drag force, uniform circular motion, kinetic energy, work and kinetic energy
7. Work done by gravitational force, work done by a spring force
8. Work done by a general variable force, power, potential energy, conservation of energy
9. Conservation of mechanical energy, work done on a system by an external force
10. Conservation of energy, center of mass, newton's second law for system of particles
11. Linear momentum, collision and impulse, momentum and kinetic energy in collision
12. Elastic collision in one dimension, collisions in one/two dimensions
13. Conservation of linear momentum and system with varying mass
14. Modulus of rigidity by static & dynamic method (maxwell's needle, barton's apparatus)
15. To determine the value of "g" by compound pendulum/kater's pendulum
16. To study the conservation of energy (hook's law)
17. To determine elastic constants by spiral springs
18. To study the laws of vibration of stretched string using sonometer
19. Modulus of rigidity by static & dynamic method (maxwell's needle, barton's apparatus)

Recommended Texts:

1. Halliday, D., Resnick, R. & Walker, J. (2014). *Fundamentals of physics* (10^{th} ed.). New York: Wiley.
2. Halliday, D., Resnick, R. & Krane, K. S. (2003). *Physics* (5^{th} ed.). New York: Wiley.

Suggested Readings:

1. Young, H. D., Freedman, R. A. & Ford, A. L. (2019). *University physics* (15^{th} ed.). New York: Pearson.
2. Serway, R. A. & Jewelt, J. W. (2014). Physics for scientist and engineers (9th ed.). New York: Brooks/Cole.
3. Melissinos, A.C. (2008). *Experiments in modern physics.* New York: Academic press.

PSYC-5101	Introduction to Psychology	3 (3-0)

Course Brief:

This course has been designed to ensure an effective orientation of students towards the discipline of psychology so that they may come to appreciate the diversity of the subject and its pragmatic significance. This course provides anintroduction to the concepts and theories of psychology and to their application to real life situations. Main objectives of the course include to make students familiar with the essentials features of human personality; to inculcate a sense of personal relevance of Psychology as a subject with the potential of gaining better insight into one's own self and others.

Course Learning Objectives

Successful completion of course students will have an introductory knowledge of selected areas of basic psychological enquiry and they will be able to: differentiate between scientific and non-scientific information about human behaviors and mental processes, describe major developments and research methods used in psychology; Explain psychological processes involved in sensation, perception, learning, memory, motivation, emotion, states of consciousness and health; Analyze the variety of factors affecting sensation, perception, consciousness, learning, memory, motivation, emotion, and health; and can apply psychological concepts and principles to situations in everyday life.

Course Contents:

1. Introduction to Psychology: Definition of psychology, Goals of psychology, Major schools of thought in psychology, Major fields of psychology
2. Basic research Methods in Psychology: Survey research, Experimental research, Case study method
3. Biological Basis of Behavior: Brain and nervous system, Structure and function of major brain areas, Neurotransmitters and their functions
4. Sensation and Perception: Difference between sensation and perception, Principles of perception, Role of perception in human cognition
5. Motivation and Emotion: Concept &Theories of motivation and emotion
6. Learning: Definition of Learning, Types of Learning (i) Classical Conditioning (ii) Operant Conditioning, (iii) Observational Learning
7. Memory and Intelligence: Definition and stages of human memory, Types of memory, Concept of intelligence, Basic theories of intelligence

Recommended Texts:

1. Weiten,W. (2017). *Psychology: Themes and variations*. Boston: Cengage Learning.
2. Nolen-Hoeksema, S., &Hilgard, E. R. (2015).*Atkinson and Hilgard's introduction to psychology*(16th ed.).New Dehli: Cengage Learning.

Suggested Readings:

1. Flanagan, C., Berry, D., Jarvis, M., &Liddle, R. (2015). *AQA psychology.*London: Illuminate Publishing - Cheltenham.
2. Coon, D., Mitterer, J. O., & Martini, T. S. (2018*). Introduction to psychology: Gateways to mind and behavior*. Boston: Cengage Learning.

SOCI-5101	General Sociology-I	3 (3-0)

Course Brief:

Sociology is the study of society, patterns of social relationships, social interaction, and culture that surrounds everyday life It is a social science that uses various methods of empirical investigation and critical analysis to develop a body of knowledge about social order and social change. Subject matter can range from micro-level analyses of society to macro-level analyses .The course is designed to introduce the students with basic sociological concepts and to get familiarity with the overall discipline.

Course Learning Objectives:

The focus of the course shall be on basic concepts like scope and significance of Sociology, How Sociology is related as well as distinct from other social sciences. It focuses on the constituent parts of the society i.e. social systems and structures, socio-economic changes and social processes. This will also give an understanding of the Culture, elements of culture and the relationship of culture and personalities. The course will provide due foundation for further studies in the field of sociology.

Course Contents:

1 Introduction to Sociology: The Science of Society, Scope and significance
2 Fields of Sociology: Sociology and other Social Sciences
3 Social interaction and social structure: The Nature and Basis of Social Interaction
4 Social Processes: Social structure Status, Roles, Power and Authority, Role Allocation
5 Culture: Meaning and nature of culture, Elements of culture: Norms, values beliefs, sanctions
6 Culture and Socialization, Transmission of Culture, Cultural Lag, Cultural Variation
7 Cultural Integration, Cultural Evolution, Cultural Pluralism, Culture and personality
8 Socialization & personality: Socialization, Agents of socialization
9 Personality: components of personality
10 Deviance and social control: Deviance and conformity
11 Mechanism and techniques of social control, Agencies of social control
12 Social organization: Definition, meaning and forms, Social groups; Functions of groups
13 Social Institutions: forms, nature and inter-relationship
14 Community: definition and forms (Urban and rural).
15 Social Institutions: Structure and functions of Institutions
16 Family, Religion, Education, Economy and political institution

Recommended Texts:

1 Giddens, A., & Sutton, P. W. (2018). *Sociology* (11th ed), Cambridge: Polity Press.
2 Macionis, J. J. (2016). *Sociology*.New Jersey: Prentice-Hall

Suggested Readings:

1 Andersen, M., & Taylor, H. (2012). *Sociology: the essentials*. Toronto: Nelson Education.
2 Richard, T. S. (2012). *Sociology.* New York. McGraw Hill.
3 Henslin, J. M. (2011). *Sociology: A Down to Earth Approach, Census Update*. Upper Saddle River: Prentice Hall.

STAT-5121	Introduction to Statistics	3(3-0)

Course Brief:

This course is designed for under-graduate level. Statistical analysis is a basic requirement in order toanalyze the phenomenon related to all sectors.

Course Learning Objectives:

This course aims to produce skills related to descriptiveas well as inferential statistical analysis. Use of descriptive, inferential, regression, sampling statisticshas vital importance to analyze and decision making theories related to agriculture, economics andbusiness statistics etc.

Course Contents:

1. Introduction to Statistics: Descriptive and Inferential Statistics,
2. Limitations of Statistics
3. Scope of Statistics
4. Variable, Data, Types of Variable and Data, Scales of Measurements.
5. Display of Data: Tabulation of Data, Graphical Display, Histogram, Bar Charts, Pie Chart,
6. Stem and Leaf Plots.
7. Measures of Central Tendency: Mean Median, Mode, Box Plot, and Application in Real Life.
8. Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Variance and Standard
9. Deviation, Coefficient of Variation, Z-score and their Application.
10. Normal Distribution: Normal Distribution and its Application,
11. Sampling and Sampling Distribution.
12. Estimation:
13. Hypothesis Testing
14. Regression and Regression Analysis: Simple Linear Regression, Multiple Regression, Fitness
15. Model.
16. All the observational analysis will be carried out using MS Excel and SPSS.

Recommended Texts:

1. Chaudhry, S.M. &Kamal,S.(2010). *Introduction to statistical theory*. (Parts I &II). Lahore: IlmiKitabKhana.
2. Walpole,R.E.,Mysters,R.H. & Myers,S.L.(1998). *Probability and statistics for engineers andscientists*. New York: Prentice Hall.

Suggested Readings:

1. Mclave, J.T., Benson, P.G.& Snitch.(2005).*Statistics for business & economics*.New Jersey: Prentice Hall.
2. Spiegel, M.R., Schiller, J.L. &Sirinivasan, R.L. (2000) *Probability and statistics*. New York: McGraw Hill
3. Clark, G. M.,& Cooke, D. (1998). *Basic course in statistics*. London: Arnold.

ULAW-5130	Introduction to Basic Laws	3(3-0)

Course Brief:

This course is designed to educate the students at large, the law, rules, regulations related to daily life. Students should behave and ensure order, predictability and security in some basic fields of life. This course is designed to aware the basic rights and obligations to make the civic.

Course Learning Objectives:

This course will develop basic necessary knowledge, skills and attitude for legal awareness among the students. to enlighten the basic principles and rules regarding basic Fundamental rights of citizens as give by The Constitution of Islamic Republic of Pakistan, Human Rights Laws, Consumer Protection Laws, Environmental Laws and Women Protection Laws in order to gain insight into law and legal system. It will provide basic acquaintance to legal principles and will advance the social justice. Moreover, it will impart light on corners of life that will make the student more vibrant, civilized and law abiding citizens.

Course Contents:

1. The Constitution of Islamic Republic of Pakistan, 1973
2. Fundamental Rights Article 8 to 28
3. Framework for implementation of Fundamental Rights under Article 184 and 199
4. European Convention on Human Rights
5. Universal Declaration of Human Rights 1948
6. Theory and practice of Human Rights in Pakistan
7. The Punjab Consumer Protection Act, 2005
8. The Punjab Consumer Protection Rules, 2009
9. Environmental Laws
10. The Pakistan Environmental Protection Act, 1997
11. The Punjab Environmental Protection Act, 1997
12. Women Protection Laws The Women Protection Act, 2006
13. The Protection Against Harassment of Women at Workplace Act, 2010

Recommended Texts:

1. Emanuel, S. L. (2019). *Constitutional law*. New York: Wolters Kluwer.
2. Adil, Z. H. (2014). *The manual of consumer protection laws in Pakistan*. Lahore: Kashif Law Book House.

Suggested Readings:

1. Brownlie, I., & Goodwin-Gill, G. S. (Eds.). (2010). *Brownile's documents on human rights*. London: Oxford University Press.
2. Salzman, J., & Thompson, B. H. (2003). *Environmental law and policy.* NewYork: Foundation Press.
3. *The Protection Against Harassment of Women at Workplace Act,2010* (As amended up to date)

INTR-5101	Introduction to International Relations	3(3-0)

Course Brief:

The study and practice of international relations is interdisciplinary in nature, blending the fields of economics, history, and political science to examine the topics such as human rights, global poverty, the environment, economics, globalization, security, global ethics, and the political environment. Historically, the establishment of treaties between nations served as the earliest form of international relations. International relations allows nations to cooperate with one another, pool resources, and share information as a way to face global issues that go beyond any particular country or region.

Course Learning Objectives:

This course provides a comprehensive introduction to international relations, focusing in particular on its origins and historical evolution, its key concepts, major theoretical frameworks, main actors and institutions, the global architecture of power, and its dynamic nature in the process of globalization. More specifically, this course introduces concepts of power, statecraft, diplomacy, foreign policy, political economy and international security, and examines the evolution of international relations as a subject.

Course Contents:

1. IR as an Academic Field
2. Realism, Liberalism, Marxism, Social Constructivism
3. Relevance to Current Issues
4. US, Russia and Rise of China
5. Development of the International System
6. History of state development (City State to Empires)
7. Westphalia and Emergence of State system
8. Industrial Revolution and French Revolution
9. World War I & World War II
10. Cold War and Post-Cold War
11. States and Other Actors
12. Sovereignty and Nationalism
13. States, IGOs, TNAs
14. Globalization
15. Foreign Policy
16. Diplomacy
17. International Institutions, United Nations, Security Council, General Assembly
18. UN Agencies, World Bank / IMF
19. Regional organizations: NATO, ASEAN and SAARC etc.

Recommended Texts:

1. Devetak, R., George, J., & Percy, S. (2017). *An iintroductionto iinternationalrelations*. Cambridge: Cambridge University Press.
2. Baylis, J., Smith, S., & Owens, P. (2004). *The globalization of world politics*.London: Oxford University Press.

Suggested Readings:

1. Jackson, R. and Sørensen, G.(2016). *Introduction to internationalrelations*. London: Oxford University Press.
2. Carlsnaes, W., Carlsnaes, W., Risse-Kappen, T., & Simmons, B. (2013). *Handbook of international relations*. London: SAGE Publications.

POLS-5101	Introduction to Political Science	3 (3-0)

Course Brief:

This course offers the student a comprehensive introduction to politics, political institutions and issues. The course has four main objectives for the student to: understand what is meant by politics, explore competing concepts and approaches, learn about how political institutions and processes work, and discuss contemporary political issues in an informed manner. While highlighting the main objectives of national life, the course explains further the socio-economic, political and cultural aspects of Pakistan's endeavours to develop and progress in the contemporary world.

Course Learning Objectives:

This course will be very helpful to expand the understandings of the reader pertaining to the existed contemporary knowledge of the world and to excel his personal capabilities to serve for others. It enhances the skill of students to underpin the understanding about political process, its valuable outcome and how to unleash socio-political activities in our surroundings. It enables the students to understand the political realities about polity.

Course Contents:

1. Definition, Nature, Scope and Relations with Other Social Sciences
2. State; Definitions, Elements, Functions, Difference Between State and Society
3. Types of Power
4. Debates in the Study of Power
5. States: State Formation, Development, and Change
6. States and Nations: Relations and Interactions
7. Constitution: The Highest Law of the Land
8. Approaches to Executive leadership
9. Government;
10. Government Functions
11. Kinds of Governments
12. Presidential and Parliamentary Systems
13. Legislatures: Features, Functions, and Structure
14. Judicial Institutions: Structure and Design
15. Agents of Political Socialization
16. Functions of Political Parties
17. Bureaucracy and Democracy
18. Electoral Systems:
19. Single-Member Districts
20. Proportional Representation

Recommended Texts:

1. Grigsby, E. (2008). *Analyzing politics*. Boston: Cengage Learning.
2. Roskin, M. G., Cord, R. L., Medeiros, J. A., & Jones, W. S. (2016). *Political science: An introduction*. New York: Pearson.

Suggested Readings:

1. Brodie, J., Rein, S., & Smith, M. S. (2013). *Critical concepts: An introduction to politics*. New York: Pearson.
2. Kesselman, M., Krieger, J., & Joseph, W. A. (2018). *Introduction to comparative politics:*
3. *Political challenges and changing agendas.* Boston*:* Cengage Learning.

GEOG-6150	Spatial Analysis in Geomatics	3(2-1)

Course Brief:

This course provides a detailed examination of the common spatial analytical tools used in a Geographical Information Systems environment. Students are given 'hands-on' experience with data extraction techniques, data reduction techniques, data modeling (statisticaland inferential) and data evaluation methodologies.

Course Learning Objectives:

The students are also introduced to image processing in a spatial context. Real world applications provide the mechanism for gaining experience with the analytical techniques detailed above. Spatial analyses are undertaken using mainly ESRI's ArcGIS

Course Contents:

1. Understanding the concept (vector, raster and statistical analysis)
2. Thematic Mapping, Distance Measurements
3. Vector Data Query and Object Selection
4. Buffering
5. Interpolation
6. Density Mapping and Map Overlay
7. Network analysis
8. Topographic Analysis
9. 3D mapping

Recommended Texts:

1. David O' Sullivan and David J. Unwin (2003), "Geographic Information Analysis", JohnWiley & Sons, Inc., Canada. ISBN: 0- 471-2117-1
2. Chang, Krang-tsung (2002), "Introduction to Geographic Information Systems" McGraw Hill.ISBN: 0-07-049552-1
3. David L. Verbyla (2002), "Practical GIS Analysis", Taylor & Francis, London 4. Donald P.Albert & Wilbert M. Gesler (2000), "Spatial Analysis, GIS and Remote Sensing Application inHealth Sciences" Ann Arbor Press, Michigan, USA.1-57504-101-4
4. John Stillwell & Graham Clarke (2004), "Applied GIS and Spatial Analysis", John Wiley &Sons, UK. ISBN: 1-57504-101-4

Suggested Readings:

1. Peter M. Atkinson and Nicholas J. Tate (1999), "Advances in Remote Sensing and GISAnalysis" John Wiley & Sons, UK. ISBN:0-471-985070-5
2. Heywood, I., Cornelius, S. and Carver, S.(1999), "An introduction to Geographic InformationSystem", Addison Wesley Longman, New York, 2nd ed., ISBN: 81-7808-982-3
3. Paul, L., Michael, G., David, M. & David, R.(1999), "Geographic Information Systems:Principles, Techniques, Applications and Management", John Wiley & Sons, ISBN: 0-471-73545-0
4. Peter A. Burrough& Rachael A. McDonnell (2000), "Principles of Geographical InformationSystems", Oxford University Press Stewart Fotheringham
5. Robert Haining (2003), "Spatial Data Analysis : Theory and Practice", Cambridge UniversityPress ISBN: 0521774373
6. Michael Batty & Paul A. (2003), "Longley Advanced Spatial Analysis", The CASA Book ofGIS Publisher: ESRI Press ISBN: 1589480732

GEOG-6151	Active Remote Sensing and Space Laws	3(3-0)

Course Brief:

This course is designed to introduce students to the use and applications of Active Remote Sensing and Space Laws. Space laws aim to regulate the exploration and use of outer space for peaceful purposes. They establish the legal framework for space activities, including space exploration, satellite launches, and space research.

Course Learning Objectives:

The objectives of active remote sensing and space laws are intertwined as active remote sensing technologies rely on legal frameworks to ensure responsible and sustainable use of space resources and the protection of the space environment.

Course Contents:

1. Introduction to Active Remote Sensing and Space Laws
2. History and Introductionto Space Laws,
3. International Space Agency, SUPARCO
4. Satellite Launching; Mechanism, SpaceEthics
5. Types of Active Remote Sensing. LiDAR, RADAR, SONAR, GPR, SRTM etc.
6. Advantagesand Disadvantages of Active Remote sensing, Sensor and Platform
7. Working Mechanism
8. Spectral Characteristics, Basic Concepts, Image Geometry, Data Compression and
9. Reconstruction
10. Image Pre-processing and Classification, Field Verification, Data FusionTechniques\

Recommended Texts:

1. Campbell, James B. (2002) “Introduction to Remote Sensing”, 3rd Ed., The Guilford PressISBN # 0-7484-0663-8 (pbk).
2. Henderson, F.M and Lewis, A.J (Latest edition), “Principles and Applications of ImagingRadar”. John Wiley and Sons,

Suggested Readings:

1. Peebles, P.Z (1998), “Radar Principles”, Wiley Inter science, New York.
2. Henderson, F.M. and Lewis, A. J (1998) “Principles & Application Imaging Radar / Manual of Remote Sensing” / 3rd Ed., Vol. 2, Published in Cooperation with the American Society for Photogrammetry and Remote Sensing, John Wiley & Sons, New York.
3. Elachi, C. (1988), “Spaceborne Radar Remote Sensing: Applications and Techniques”, IEEE Press, New York.

GEOG-6152	Spatial Data Infrastructure and Standardization	3(3-0)

Course Brief:

This course attempts to provide an understanding to the data structures, processes and its standards which are involved in data sharing. Subject includes the applications and architecture of Spatial Data Infrastructure. Learn the fundamental concepts, principles, and components of SDI, which refers to the framework of policies, technologies, and institutional arrangements for managing and sharing spatial data effectively.

Course Learning Objectives:

Familiarize students with various spatial data standards and their significance in ensuring interoperability, data quality, and seamless integration of spatial data across different systems and organizations.

Course Contents:

1. Main components of SDI
2. Clearing house architecture
3. National Geospatial Clearinghouse
4. Metadata concepts, its structures and functionality
5. System Architecture for SDI Interoperability, Client Server Architecture
6. Data Quality Information (DQI)Accuracy, Precision, Bias Error Modeling
7. Data Modeling Abstraction of real world
8. Types of abstraction, Problems of information sharing (Heterogeneities)
9. Distributed database concept
10. GIS Internet Services and SDI Technologies
11. Available Services, Technologies that support internet GIS services
12. Commercial tools for Internet GIS, legal aspects of SDI.

Lab Outline:

Comparison of working SDI's, Development of Metadata according to Standards, Development of Architecture of SDI, Data Standardization, Data transformations and translations, Web Publishing & development.

Recommended Texts:

1. Robert, C. H. (2005), "SDI : A View from Europe" Oxford University Press, Oxford, ISBN:089875982X.
2. Groot, R. (2001), "Geospatial Data Infrastructure: Concepts, Cases, and Good Practice(Spatial Information Systems (Cloth)", Oxford University Press.

Suggested Readings:

1. Beth E. Lachman (2001), "Lessons for the Global Spatial Data Infrastructure: InternationalCase Study Analysis", RAND Corporation.
2. Mapping Science Committee (1993), "Toward a Coordinated Spatial Data Infrastructure forthe Nation". National Academy Press.

GEOG-6153	Spatial Data Modeling	3(2-1)

Course Brief:

This course attempts to provide an introduction to GIS data models and data structures. The subject continues with a systematic overview of spatial data models (e.g. raster and vector) and the structures used to implement these, together with methods of spatial feature addressing, geometry of objects, topology, object hierarchies and aggregations, the modeling of fuzzy objects and the uncertainty aspects of spatial data. Gain a solid understanding of spatial data, including its characteristics, representations, and the unique challenges associated with modeling and analyzing geographic information.

Course Learning Objectives:

Learn the foundational concepts and principles of spatial data modeling, such as spatial relationships, topology, coordinate systems, and spatial indexing.

Course Contents:

1. Introduction to Fields, Objects, Geometry
2. Objects represented in raster, Vector Structure
3. Vector data representing the geometry of geographical objects
4. Networks and graphs
5. Properties of Graphs, graph areas and error checking procedures
6. Terrain object classed and generalization hierarchies aggregation hierarchies
7. Object association
8. Fuzzy set theory, fuzzy boundaries
9. Uncertainties of Spatial Objects.

Lab Outline:

Preparation of Symbolic Charts for representation of Earth Features, Assignment on Geometry of spatial objects, Utility Network Analysis, Spatial data generalization and aggregation

Recommended Texts:

1. Michael, N. D.(2003) "Fundamentals of Geographic Information Systems" 3rd Ed., John Wiley& sons.
2. Heywood, I., Cornelius, S. and Carver, S. (1999) "An introduction to Geographic Information System", 2nd ed., Addison Wesley Longman, New York.

Suggested Readings:

1. DeMers, M. (1996), "Fundamentals of Geographic Information Systems", John Wiley & Sons ,New York.
2. Burrough, P., (1986), "Principles of Geographic Information Systems for Land Resources Management", Oxford University Press, Oxford.

GEOG-6154	Microwave and Hyper Spectral RS	3(3-0)

Course Brief:

This course focuses on the basic concepts, data acquisition, working mechanism, spectral and spatial characteristics of microwave and hyper spectral data sets. Gain a comprehensive understanding of the basic principles and concepts of microwave remote sensing, including the interaction of microwaves with the Earth's surface and atmosphere.

Course Learning Objectives:

Learn about the different types of microwave remote sensing systems, such as synthetic aperture radar (SAR) and radiometers, and understand their principles of operation, capabilities, and limitations. Gain knowledge of microwave data acquisition techniques, including SAR imaging modes, polarization, and microwave frequency bands. Learn the techniques and algorithms for processing and analyzing microwave remote sensing data.

Course Contents:

1. Introduction to Microwave Image Processing and Hyper-spectral Active Remote Sensing
2. History and types of Microwave and Hyper-spectral Active Remote Sensing
3. Sensor and Platform Types (RADAR, SAR, SLAR etc.)
4. Advantages and Disadvantages of Active Remote sensing
5. Working Mechanism, Spectral Characteristics of Microwave Images
6. Like and Unlike Polarization, Key Concepts
7. Image Geometry and interferometer
8. Data Compression and Reconstruction, RADAR Image
9. Pre-processing and Classification, Field Verification
10. Data Fusion Techniques, Microwave Applications
11. Channels and Spectral Libraries Sensors (AIS, AIVIS etc.)
12. Application of Hyper-spectral data.

Lab Outline:

Microwave Image Comparisons, Visual Interpretation of Radar Images, Radar Image pre-processing (Total Power Image, Ground Resolution, Rectification and Registration, Optical and data fusion case studies, Student Projects: Application Areas such as Mining, Environmental Monitoring, Vegetation Changes, Cropping Pattern, Salinity/Sodicity and Water Logging etc.

Recommended Texts:

1. Campbell, James B. (2002) Introduction to Remote Sensing. 3rd Ed., The Guilford Press.
2. Henderson, F.M and Lewis, A.J (1998) Principles and Applications of Imaging Radar. Manual of Remote Sensing. 3rdEd. Vol. 2. John Wiley and Sons, New York..

Suggested Readings:

1. Peebles, P.Z (1998) Radar Principles. Wiley Inter science, New York.
2. Elachi, C. (1988) Space-borne Radar Remote Sensing: Applications and Techniques. IEEE Press, NewYork.

GEOG-6155	Multidisciplinary Applications of Geomatics	3(3-0)

Course Brief:

This course covers important fields of application of Geomatics.

Course Learning Objectives:

The course covers various topics from the multidisciplinary special area. Students will gain a comprehensive understanding of the core principles and concepts that underpin geomatics, including surveying, remote sensing, geographic information systems (GIS), and global navigation satellite systems (GNSS).Geomatics encompasses various disciplines such as geography, cartography, geodesy, computer science, and engineering. Students should recognize the interdisciplinary nature of geomatics and learn how it integrates knowledge from different fields to solve complex spatial problems.

Course Contents:

1. Introduction to the course
2. Identification of important areas of applications including
   2.1 Natural hazards and disasters
   2.2 Water related issues
   2.3 Environmental issues
   2.4 Administrative and managerial issues
3. Land cover/ land uses
4. Developmental projects
5. Watershed management
6. Urban planning
7. Rural areas planning.

Recommended Texts:

1. Lillesand, T. M. and Kiefer, R. W. (2004), "Remote Sensing and Image Interpretation", 5th ed., (John Wiley and Sons), ISBN 0-471-15227-7
2. Mather, P M (2004), "Computer Processing of Remotely Sensed Images", 3rd Ed., (John Wileyand Sons), ISBN 0-470-84919-3
3. Campbell, James B. (2002), "Introduction to Remote Sensing", 3rd Ed., The Guilford Press,ISBN # 0-7484-0663-8 (pbk).

Suggested Readings:

1. Gibson, P.J (2000), "Introductory Remote Sensing: Principles and Concepts", Routledge,ISBN 0-415-19646-9
2. Jensen, J. (2000), "Remote Sensing of the Environment: An Earth Resources Perspective",Amazon Publishers.
3. Sabins, F.F (1996), "Remote Sensing: Principles and Interpretation", 3rd ed., W.H Freeman&Co, ISBN # 0-7167-2442-1

Journals / Periodicals:

1. International Journal of Remote Sensing
2. Remote Sensing of Environment Journal
3. Photogrammetric Engineering & Remote Sensing Journal
4. Geo Carto International Journal
5. Asian Pacific Remote Sensing Journal
6. Canadian Journal of Remote Sensing

GEOG-6156	Mobile Technology for Data Collection	3(2-1)

Course Brief:

The subjective of the course is to make students familiar with the use of different mobile technologies for the real time data collection from field and its analysis. Familiarize yourself with the various mobile technologies and tools available for data collection, such as smart phones, tablets, mobile applications, and sensors. Explore different data collection platforms and software used in mobile data collection, including their features, functionalities, and deployment options.

Course Learning Objectives:

Develop proficiency in using mobile technology for various data collection techniques, such as interviews, observations, geolocation data, multimedia data, and sensor data.

Course Contents:

1. Introduction to mobile technology
2. History of Mobil Technology for Data Collection
3. Scope & status of Mobil Tech in modern era
4. Applications of GPS enabled Mobil tech in different sectors
5. Type of mobile phone used for data collection GPRS and GPS enabled.
6. Questionnaire Designing for Mobile Applications
7. ODK Tools registration & preparation and configuration for Survey
8. Form Uploading and Retrieving
9. Field orientation and practice for various types of data including x-y coordinates and itsretrieval,
10. Visualization and analysis through ODK and relevant database systems and software's

Lab. Outline:

Tools registration, preparation and designing of questionnaires in xml, field survey, categories, their uploading and implementation. Field Outline Field orientation and practice for various types of data including x-y-z coordinates and its retrieval, visualization and analysis through ODK (open Data toolkit).

Recommended Texts:

1. Gary, W. (2010) The Mobile Learning Edge: Tools and Technologies for Developing Your Teams.McGraw-Hill.
2. Kevin S. and Klaas, W. (2011) Building the mobile networking technology. Cisco Systems, Indianapolis, USA.
3. Muehlenhaus I. (2014) Web Cartography: Map Design for Interactive and Mobile Devices. CRCPublisher, London.

Suggested Readings:

1. Quinn C N. (2011) *The Mobile Academy: M-Learning for Higher Education*. John Wiely and Sons.
2. Trimble 2009: *Mapping and GIS customer stories*. URL source:http://www.trimble.com/mgis/customer_stories.aspx
3. Wankel, LA and Blessinger P. (Eds.) (2013) Increasing Student Engagement and Retention using Mobile Applications: Smartphones, Skype and Texting Technologies (Cutting- Edge Technologies in Higher Education). Emerald publishing services UK.URL
   Sources :http//mobile phones for data collection mobile active .org
   http://www.theclearinitiative.org/mobile-based-tech.pdf