CURRICULUM
OF
GEOGRAPHY
BS/MS/MPHIL

(Revised 2013)

HIGHER EDUCATION COMMISSION
ISLAMABAD
CURRICULUM DIVISION, HEC

Prof. Dr. Mukhtar Ahmed  Executive Director
Mr. Fida Hussain        Director General (Acad)
Mr. Rizwan Shoukat     Deputy Director (Curr)
Mr. Abid Wahab         Assistant Director (Curr)
Mr. Riaz-ul-Haque      Assistant Director (Curr)
PREFACE

The curriculum, with varying definitions, is said to be a plan of the teaching-learning process that students of an academic programme are required to undergo. It includes objectives & learning outcomes, course contents, scheme of studies, teaching methodologies and methods of assessment of learning. Since knowledge in all disciplines and fields is expanding at a fast pace and new disciplines are also emerging; it is imperative that curricula be developed and revised accordingly.

University Grants Commission (UGC) was designated as the competent authority to develop, review and revise curricula beyond Class-XII vide Section 3, Sub-Section 2 (ii), Act of Parliament No. X of 1976 titled “Supervision of Curricula and Textbooks and Maintenance of Standard of Education”. With the repeal of UGC Act, the same function was assigned to the Higher Education Commission (HEC) under its Ordinance of 2002, Section 10, Sub-Section 1 (v).

In compliance with the above provisions, the Curriculum Division of HEC undertakes the revision of curricula after every three years through respective National Curriculum Revision Committees (NCRCs) which consist of eminent professors and researchers of relevant fields from public and private sector universities, R&D organizations, councils, industry and civil society by seeking nominations from their organizations.

In order to impart quality education which is at par with international standards, HEC NCRCs have developed unified templates as guidelines for the development and revision of curricula in the disciplines of Basic Sciences, Applied Sciences, Social Sciences, Agriculture and Engineering in 2007 and 2009.

It is hoped that this curriculum document, prepared by the respective NCRC’s, would serve the purpose of meeting our national, social and economic needs, and it would also provide the level of competency specified in Pakistan Qualification Framework to make it compatible with international educational standards. The curriculum is also placed on the website of HEC (www.hec.gov.pk).

(Fida Hussain)
Director General (Academics)
CURRICULUM DEVELOPMENT PROCESS

STAGE-I  
CURRI. UNDER CONSIDERATION  
COLLECTION OF REC  
CONS. OF CRC.  
PREP. OF DRAFT BY CRC  
PREP. OF CURRI. BY V.C.C.

STAGE-II  
CURRI. IN DRAFT STAGE  
APPRAISAL OF 1ST DRAFT BY EXP. OF COL./UNIV.  
FINALIZATION OF DRAFT BY CRC  
APPROVAL OF CURRI. BY V.C.C.

STAGE-III  
FINAL STAGE  
PREP. OF FINAL CURRI.  
INCORPORATION OF REC. OF V.C.C.

STAGE-IV  
FOLLOW UP STUDY  
QUESTIONNAIRE  
COMMENTS  
PRINTING OF CURRI.

IMPLE. OF CURRI.  
BACK TO STAGE-I  
ORIENTATION COURSES

Abbreviations Used:
CRC.  Curriculum Revision Committee
VCC.  Vice Chancellor's Committee
EXP.  Experts
COL.  Colleges
UNI.  Universities
PREP.  Preparation
REC.  Recommendations
CONTENTS

1. Introduction ............................................................................................................6
2. Layout for BS Geography .........................................................................................10
   i) Scheme of Studies ..............................................................................................13
   ii) Details of Courses .............................................................................................15
3. Scheme of Studies for MS/MPHIL Geography ....................................................... 47
   i) Layout for MS/MPHIL Geography ....................................................................48
   ii) Details of Courses .............................................................................................49
4. General Recommendations ....................................................................................... 63
5. Compulsory Courses Annexures ............................................................................ 65
INTRODUCTION:

MINUTES OF THE FINAL MEETING OF NCRC IN THE DISCIPLINE OF GEOGRAPHY HELD ON APRIL 23~25, 2013 AT HEC REGIONAL CENTRE, LAHORE

The final meeting of National Curriculum Revision Committee in the discipline of Geography was held on April 23-25, 2013 at Higher Education Commission, Regional Centre, Lahore. The purpose of the meeting was to finalize the curriculum of Geography reviewed by NCRC in its preliminary meeting held on December 12-14, 2012 at the same venue. The following members attended the meeting:

1. Dr. Syed Jamil Hasan Kazmi, Professor, Department of Geography, University of Karachi, Karachi.
   Convener
2. Prof. Dr. Abdul Ghaffar, Professor & Chairman, Department of Geography, University of the Punjab, Lahore.
   Member
3. Prof. Dr. Farkhunda Burke, Professor & Chairperson, Department of Geography, University of Karachi, Karachi.
   Member
4. Dr. Tabasum Jamal, Professor, Department of Geography, University of the Punjab, Lahore.
   Member
5. Prof. Dr. Zulfiqar Ahmad, Professor, Department of Earth Sciences, Quaid-i-Azam University, Islamabad.
   Member
6. Prof. Muhammad Sharif Shaikh, Professor & Chairman, Department of Geography, Shah Abdul Latif University, Khairpur.
   Member
7. Mrs. Bushra Sharif, Professor, Department of Geography, Lahore College for Women University, Lahore.
   Member
8. Dr. Iftikhar Ahmad, Chairman, Department of Geography,
University of Balochistan, Quetta.

9. Dr. Asad Ali Khan,
Chairman,
Department of Geography,
The Islamia University of Bahawalpur,
Bahawalpur.

10. Dr. Muhammad Mushahid Anwar,
Associate Professor & Chairman
Department of Geosciences &
Geography, University of Gujrat,
Gujrat.

11. Dr. Ali Iqtadar Mirza,
Chairman,
Department of Geography,
Government College University,
Lahore.

12. Mr. Muhammad Shafqat Anjum,
Chairman,
Department of Geography,
GC University, Faisalabad.

13. Dr. Shahibzad Khan,
Director,
Regional Meteorological Center,
Lahore.

14. Dr. Ihsanullah,
Assistant Professor,
Institute of Geography, Urban &
Regional Planning, University of
Peshawar, Peshawar.

15. Dr. Sheikh Saeed Ahmad,
Assistant Professor,
Department of Environmental
Sciences, Fatima Jinnah Women
University, The Mall, Rawalpindi.

16. Dr. Ibtisam Butt,
Assistant Professor,
Department of Geography,
University of the Punjab, Lahore.

17. Dr. Omar Riaz,
Assistant Professor,
Department of Earth Sciences,
University of Sargodha, Sargodha.

18. Mr. Noor Hussain Chandio,
Lecturer,
Department of Geography,
Shah Abdul Latif University, Khairpur.
2. The following members could not attend the meeting due to other engagements:
   1. Mrs. Zareen Jameel Qureshi, Member
      Assistant Professor,
      Department of Geography,
      Forman Christian College, Lahore.
   2. Dr. Fazlur Rahman,
      Member/Secretary
      Assistant Professor,
      Department of Geography,
      University of Peshawar,
      Peshawar.
   3. Mr. Muhammad Nawaz,
      Member
      Assistant Professor,
      Department of Geography,
      University of Balochistan, Quetta.

3. The meeting started with the recitation of Holy Verses from the Holy Quran by Mr. Farrukh Raza, Assistant Director (Curriculum), HEC. He welcomed the Members of NCRC on behalf of the HEC. After brief introduction of the participants, the Assistant Director (Curriculum), HEC, handed over floor of the house to the Convener NCRC viz. Dr. Syed Jamil Hasan Kazmi, Professor, Department of Geography, University of Karachi, for further proceedings of the meeting. Since Dr. Fazlur Rahman, Secretary of the preliminary meeting of NCRC regretted his inability to join the final meeting, the house unanimously elected Dr. Ibtisam Butt, Assistant Professor, University of the Punjab, Lahore, as the Secretary of the meeting.

4. The Convener of NCRC thanked the HEC for providing an opportunity to review / finalize the curriculum of Geography and recalled the proceedings of the preliminary meeting. He further requested the participants to give their suggestions/inputs for the improvement of the curriculum and opened the house for discussion. After thorough and detailed deliberations, the house unanimously approved the curriculum of Geography for BS, MS/M.Phil and made the recommendations as Annexed.

5. The Convener and Secretary of the Committee thanked all the Members for sparing their valuable time and quality contribution towards finalizing the curriculum. The Committee highly admired the efforts made by the officials of HEC as well for making excellent arrangements to facilitate the smooth work by the Committee and their comfortable accommodation/stay at Lahore.
6. The meeting ended with the vote of thanks to the Chair as well as participants of the meeting.

VISION
To introduce the most recent perspective of Geography and enhance awareness of the earth as a living planet with reference to man-environment interaction and resulting physical and human phenomena and their spatial variation amongst students of the discipline and allied sciences.

MISSION
- To employ Geography as an integral part of education from primary to higher levels of education;
- To enhance the quality of geographical education for broader applications and its implementation for the resolution of human problems;
- To promote Geography as an important discipline for the enhancement of quality of environment and wellbeing of humanity;
- To develop pragmatic geographic research in order to make it effective in our daily lives;
- To expand the geographic research horizons and to effectively integrate it with the national planning and development;
- To create a comprehensive insight for appreciating current world affairs embracing the modern geographic arena; and
- To extend the integration of Geography with other disciplines of science and humanities.

Aims and objectives
1. To develop a standardised Geography curriculum for four years BS and two years MPhil/MS., so that uniformity could be assured in the Public and Private sector institutions across the country.
2. To impart current knowledge and practical skills to Geography graduates through theory, practicum and field exercises.

4 YEARS BACHELOR STUDIES IN GEOGRAPHY
1. Eligibility
   Intermediate or equivalent (all disciplines) not less than 45% marks.
2. Duration
   Four years programme spread over 8 semesters (two semesters per year).
3. Degree Requirement
   Minimum of 124 credits are required to complete 4 years BS in Geography.
4. Evaluation
For uniformity in the evaluation system, NCRC recommends that the minimum CGPA required to pass a semester is 2.0 out of 4.0 at an undergraduate level or as decided by the respective universities, as per rules in vogue.

**STANDARDIZED FORMAT/SCHME OF STUDIES FOR 4-YEARS CURRICULA FOR BASIC SOCIAL, NATURAL AND APPLIED SCIENCES**

### STRUCTURE

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Categories</th>
<th>No. of Courses</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min. – Max.</td>
<td>Min. – Max.</td>
</tr>
<tr>
<td>2.</td>
<td>General Courses to be chosen from other disciplines</td>
<td>7 – 8</td>
<td>21 – 24</td>
</tr>
<tr>
<td>3.</td>
<td>Discipline Specific Foundation Courses</td>
<td>9 – 10</td>
<td>30 – 33</td>
</tr>
<tr>
<td>4.</td>
<td>Major Courses including research project / Internship</td>
<td>11 – 13</td>
<td>36 – 42</td>
</tr>
<tr>
<td>5.</td>
<td>Electives within the Major</td>
<td>4 – 4</td>
<td>12 – 12</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>40 – 44</strong></td>
<td><strong>124 – 136</strong></td>
</tr>
</tbody>
</table>

- Total numbers of Credit hours: 124-136
- Duration: 4 years
- Semester duration: 16-18 weeks
- Semesters: 8
- Course Load per Semester: 15-18 Credit hours
- Number of courses per semester: 4-6 (not more than 3 labs./practical courses)
### General Courses to be chosen from other departments

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ENGLISH I</td>
<td>3</td>
<td>2. ENGLISH II</td>
<td>3</td>
<td>3. ENGLISH III</td>
<td>3</td>
</tr>
<tr>
<td>4. ENGLISH IV/UNIV. OPTIONAL *</td>
<td>3</td>
<td>5. PAKISTAN STUDIES</td>
<td>3</td>
<td>6. ISLAMIC STUDIES / ETHICS</td>
<td>3</td>
</tr>
<tr>
<td>7. MATHEMATICS I</td>
<td>2</td>
<td>8. MATHEMATICS II / UNIV. OPTIONAL **</td>
<td>2</td>
<td>9. INTRODUCTION TO COMPUTERS</td>
<td>2</td>
</tr>
</tbody>
</table>

### Discipline Specific Foundation Courses

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ENGLISH I G-1</td>
<td>3</td>
<td>2. ENGLISH II G-I</td>
<td>3</td>
<td>3. ENGLISH III G-I</td>
<td>3</td>
</tr>
<tr>
<td>7. MATHEMATICS I G-I</td>
<td>3</td>
<td>8. MATHEMATICS II / UNIV. OPTIONAL ** G-VII</td>
<td>3</td>
<td>9. INTRODUCTION TO COMPUTERS G-VIII</td>
<td>2</td>
</tr>
</tbody>
</table>

### Major courses including research project/internship

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ENGLISH I Fundamentals of Geography</td>
<td>3</td>
<td>2. ENGLISH II Geomorphology</td>
<td>3</td>
<td>3. ENGLISH III Climatology</td>
<td>3</td>
</tr>
<tr>
<td>4. ENGLISH IV/UNIV. OPTIONAL * Physical Geography</td>
<td>3</td>
<td>5. PAKISTAN STUDIES Human Geography</td>
<td>3</td>
<td>6. ISLAMIC STUDIES / ETHICS Map work Geography of Pakistan</td>
<td>3</td>
</tr>
<tr>
<td>7. MATHEMATICS I Map work Geography of Pakistan</td>
<td>3</td>
<td>8. MATHEMATICS II / UNIV. OPTIONAL ** Surveying History &amp; Development of Geographic Thought</td>
<td>3</td>
<td>9. INTRODUCTION TO COMPUTERS Principles of Cartography</td>
<td>3</td>
</tr>
</tbody>
</table>

### Elective Courses within the major

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
<th>Subject</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ENGLISH I Geographical Information</td>
<td>3</td>
<td>2. ENGLISH II Remote Sensing</td>
<td>3</td>
<td>3. ENGLISH III Settlement Geography</td>
<td>3</td>
</tr>
<tr>
<td>4. ENGLISH IV/UNIV. OPTIONAL * Remote Sensing</td>
<td>3</td>
<td>5. PAKISTAN STUDIES Geography</td>
<td>3</td>
<td>6. ISLAMIC STUDIES / ETHICS Field Study</td>
<td>3</td>
</tr>
</tbody>
</table>

### Credit hours

- 25 Credit hours: 21-24 Cr.
- 30 Credit hours: 30-33 Cr.
- 36 Credit hours: 36-42 Cr.
- 12 Credit Hours
<table>
<thead>
<tr>
<th>Major courses including research project/internship</th>
<th>Elective courses within the Major</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11-13 courses</strong></td>
<td><strong>4 courses</strong></td>
</tr>
<tr>
<td><strong>36-42 credit hours</strong></td>
<td><strong>12 credit hours</strong></td>
</tr>
<tr>
<td><strong>Subject</strong></td>
<td><strong>Cr. hr.</strong></td>
</tr>
<tr>
<td>Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>Climatology</td>
<td>3</td>
</tr>
<tr>
<td>Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>Economic Geography</td>
<td>3</td>
</tr>
<tr>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Settlement Geography</td>
<td>3</td>
</tr>
<tr>
<td>Geographical Information Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>Region and Regional Concept</td>
<td>3</td>
</tr>
<tr>
<td>Population Geography Research Project/Internship</td>
<td>6</td>
</tr>
</tbody>
</table>

* University has the option to recommend German, French, Arabic, Chinese and any other course in lieu of English IV
** University may recommend any other course in lieu of Mathematics II
*** Any course can be chosen from Regional Geography Group D
SCHEME OF STUDY FOR
BS (Four Years)

The scheme of study for 4 years BS in Geography is given in the following table.

SCHEME OF STUDIES FOR 4 YEARS BS IN GEOGRAPHY

<table>
<thead>
<tr>
<th>Semester/Years</th>
<th>Course Nos.</th>
<th>Course Titles</th>
<th>Credit Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>ENGLISH-I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAKISTAN STUDIES</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH/STAT-1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GENERAL-I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GENERAL-II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOG 101</td>
<td>FOUNDATION-I Fundamentals of Geography</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Second</td>
<td>ENGLISH-II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISLAMIC STUDIES / ETHICS</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH/STAT-II / UNIV. OPTIONAL</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GENERAL-III</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GENERAL-IV</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOG 210</td>
<td>FOUNDATION-II Physical Geography</td>
<td>3</td>
</tr>
<tr>
<td></td>
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<td>17</td>
</tr>
<tr>
<td>Third</td>
<td>ENGLISH-III</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INTRODUCTION TO COMPUTERS</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GENERAL-V</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>GENERAL-VI</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOG 220</td>
<td>FOUNDATION-III Human Geography</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GEOG 221</td>
<td>FOUNDATION-IV Map work</td>
<td>3</td>
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<tr>
<td></td>
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<td>18</td>
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<tr>
<td>Fourth</td>
<td>ENGLISH-IV / UNIV. OPTIONAL</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>GENERAL-VII</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>GENERAL-VIII</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>GEOG 230</td>
<td>FOUNDATION-V Geography of Pakistan</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td></td>
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<td>-------------</td>
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<tr>
<td>GEOG 280</td>
<td>FOUNDATION-VI Land Surveying</td>
<td>3</td>
<td></td>
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<tr>
<td>GEOG 281</td>
<td>FOUNDATION-VII History &amp; Development of Geographic Thought</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 381</td>
<td>FOUNDATION-VIII Principles of Cartography</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 311</td>
<td>MAJOR-I Geomorphology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 312</td>
<td>MAJOR-II Climatology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 314</td>
<td>MAJOR-IV Oceanography</td>
<td>3</td>
<td></td>
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<tr>
<td>GEOG 382</td>
<td>FOUNDATION-IX Quantitative Geography</td>
<td>3</td>
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<tr>
<td>GEOG 383</td>
<td>FOUNDATION-X Environmental Geography</td>
<td>3</td>
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<tr>
<td>GEOG 321</td>
<td>MAJOR-V Economic Geography</td>
<td>3</td>
<td></td>
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<tr>
<td>GEOG 390</td>
<td>MAJOR-VI Research Methods</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 322</td>
<td>MAJOR-VII Regional Concepts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 371</td>
<td>MAJOR-VIII Geographical Information Sciences</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 372</td>
<td>MAJOR-IX Remote Sensing</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>ELECTIVE-I (***), ELECTIVE-II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 491</td>
<td>MAJOR-X / XI Digital Cartography</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 492</td>
<td>MAJOR-X / XI Field Study</td>
<td>6</td>
<td></td>
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<tr>
<td>GEOG 341</td>
<td>MAJOR-XII Population Geography</td>
<td>3</td>
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<tr>
<td>GEOG</td>
<td>ELECTIVE-III</td>
<td>3</td>
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</tr>
<tr>
<td>GEOG</td>
<td>ELECTIVE-IV</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>130-136</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Students are allowed to select any four electives from the given groups.
DETAIL OF COURSES

Foundation-I GEOG 101  Fundamentals of Geography

Objective:
To expose students with the founding principles of Geography and geographical knowledge.

Course outline:
- Introduction
  - Definitions, scope and branches of Geography
  - Roots of the discipline and basic geographic concepts
  - Themes and traditions of Geography
  - Tools of Geography
- The Universe
  - Galaxies and solar system
- The Earth as a planet
  - Celestial positions, its shape and size
  - Rotation, revolution and related phenomena
- Spheres of the earth
  - Lithosphere
  - Atmosphere
  - Hydrosphere
  - Biosphere
- Man-environment interaction
  - Population
  - Major Economic activities
  - Settlements
  - Pollution

Lab. work:
Comprehension of atlases, map reading skills, location of places, features and relevant work related to topics of the theoretical section.

Recommended Books:

Foundation-II GEOG 210 Physical Geography

Objective:
To create understanding about the physical characteristics of the earth

Course outline:
- Introduction
  - Definition, scope and major branches
  - Realms of the physical environment
- Lithosphere
  - Internal structure of earth
  - Rocks–origin, formation and types: Igneous, Sedimentary and Metamorphic Rocks
  - Plate tectonics, mountain building forces
  - Geomorphic processes – endogenic and exogenic processes and their resultant landforms
  - Earthquakes and volcanic activity, folding and faulting
  - Weathering, mass wasting, cycle of erosion, erosion and deposition
  - Landforms produced by running water, ground water, wind and glaciers
- Atmosphere
  - Composition and structure of atmosphere
  - Atmospheric temperature and pressure, global circulation
  - Atmospheric moisture and precipitation
  - Air masses and fronts
  - Cyclones and other disturbances
- Hydrosphere
  - Hydrological cycle
  - Ocean composition, temperature and salinity of ocean water
- Movements of the ocean water; waves, currents and tides
  - Biosphere
    - Eco-systems
    - Formation and types of soils

Lab. Work:

Identification of rocks and minerals, study and identification of landform using Satellite imageries and Topographic Sheets. Construction and applications of models showing various types of landforms. Observation and recording of weather data from a mini weather station.

Field visits:

Ground truthing and identification of various types of rocks, fluvial, glacial, desert landform, type of soils.
Visit to any suitable area to observe and appreciate the characteristics of physical features (recommended areas: Mountainous, Plains, Plateaus, deserts and coastal areas).
Visit to any national park/biosphere reserves; Soil Survey of Pakistan, Geological survey of Pakistan, Meteorological station/observatory and National Institute of Oceanography (NIO) and SUPARCO.
Observations about the clouds and identification of their types

Recommended Books:

Foundation-III GEOG 220  Human Geography

Objective:
This course attempts to impart knowledge about the relationship between man and environment including natural resources and related human activities.

Course outline:

- Introduction
  - Definition, scope and branches
- Basic approaches
  - Environmental determinism
  - Possibilism
  - Probabilism
  - Cognitive behaviourism
  - Coupled nature-human systems
- Population and its characteristics
  - Population distribution
  - Population structure and composition
  - Population dynamics (fertility, mortality, migration etc.)
- Economic activities
  - Classification of Economic Activities
    - Agriculture, mining, forestry, animal husbandry and poultry
    - Industries: cottage, light and heavy
    - Trade, transport and services
    - Tourism
- Settlements
  - Theories of human settlement
  - Types of settlements
  - Rural settlements
  - dispersed, nucleated and Ribbon settlements
  - Urban Settlements
- Urban hierarchy and functions
  - Urbanization
    - Process of urbanization
    - Urban structure, morphology and theories
    - Land use and land cover patterns
- Environmental issues, causes and remedies

Field visits:
To explore economic activities in the context of natural environment of relevant area/region. To study rural and urban settlements, industrial areas and national parks.
Recommended Books:


Foundation-IV GEOG 221        Map Work

Objective:
To train students in map drawing, reading and its use for geographical analysis

Course outline:

- Maps: its elements and types
- Principles and methods of map making, reading and reproduction
- Scale: types and their use, grid reference and indexation,
- Map projections: choice, construction, characteristics, and uses
- Enlargement and reduction of maps
- A study of the Survey of Pakistan maps
- Physical and cultural features to be described and interpreted
- Interpretation of weather maps of Pakistan
Field visits:
Visit to Survey of Pakistan and Pakistan Meteorological Departments.

Recommended Books:


Foundation-V GEOG 230 Geography of Pakistan

Objective:
This course attempts to impart knowledge about the relationship between man and physical, socio-economic and cultural environment with special reference to Pakistan, including land, population, human settlements, resources and related human activities.

Course outline:

- Introduction
- Geo-strategic position of Pakistan
  - Location and Geographical significance
  - Geo-political Importance
  - Administrative setup
- Land and Physical Environment:
  - Physiography
  - Climate and climatic regions
  - Hydrology
  - Soils and vegetation
- The People
  - Population characteristics: structure, composition and distribution
  - Population Change
  - Urbanization
- Economy
  - Agriculture (crops and livestock)
  - Irrigation
  - Power and mineral resources
  - Industries
  - Trade
  - Tourism

20
- Transport and Communication
- Major challenges of Pakistan
  - Water, power, security and environmental issues

**Lab. Work:**
Survey, data collection and presentation on different thematic maps

**Field visits:**
To identify various physical regions and study of at least one region's land use, urban structure, mining area, national parks, industrial areas and various rural and urban settlements and other natural resources.

**Recommended Books:**
Johnson, B.L.C (198).

**Foundation-VI GEOG 280 Land Surveying**

**Objective:**
To train students in different surveying techniques

**Course Outline:**
- Introduction
- Instrumental survey and records
- Surveying using the following instruments:
  - Chain survey
  - Plane Table
  - Prismatic Compass
  - Determination of heights and slopes with Abney Level
  - Contouring by Indian Clinometer
  - Use of Dumpy level and Theodolite
Field visits:
Visit to Survey of Pakistan and other concerned departments.

Lab. Work:
Preparation of the practical note book is mandatory.

Recommended Books:

Foundation-VII GEOG 281 History & Development of Geographic Thought

Objectives:
To study the evolution of geographic thought and concepts.

Course outline:
- Nature of Geography
- Evolution of Geography
  - Pre-classical and classical periods: ancient Geography
Medieval Geography: Muslim contributions, European contributions.

Modern Geography: Humboldt and Ritter, Geography from the middle of the 20th century, Dichotomies-physical and human, systematic and regional. Quantitative Revolution, Geoinformatics and Ecology.

- Established traditions: Earth science, area study, spatial organization, man-land, system analysis and cartographic science.
- Philosophical framework: Positivism: Pragmatism, Phenomenology
- Evolution of modern tools and models in geography
- Development of geography in Pakistan

Lab. Work:

Writing of assignments and construction of maps relating to geographical thought and seminar presentation.

Recommended Books:

Foundation-VIII GEG 381 Principles of Cartography

Objective:
To familiarise students with map-making science and its applications.

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

Lab. Work:
Drawing of various thematic maps and other relevant exercises in cartography and mapping.

Recommended Books:
Major-I GEOG 311  Geomorphology

Objectives:
To make students understand the origin and recognize different types of landform with the help of shape, material and process.

Course outline:
- Scope and status of geomorphology
- Introduction to geomorphic concepts/principles
- Factors of landform development; structure, process and geological time scale
- Endogenic Processes
  - Isostasy
  - Diastrophism
  - Continental drift
  - Plate tectonic
  - Volcanism
  - Earthquakes
- Exogenic Processes
  - Weathering; mass wasting and their types
- Cycle of erosion: fluvial, glacial, eolian and Karst
- Fluvial erosional landforms, transportation mechanisms of running water; fluvial depositional landforms, types of drainage patterns and structure
- Glacier formation, glacier as geomorphic agent: glacial erosion and depositional landforms; glacio-lacustrine and glacio-fluvial features
- Eolian landforms: wind as geomorphic agent; eolian erosional landforms, transportation by wind; Eolian depositional landforms
- Ground water: porosity and permeability of rocks; aquifers
- Karst topography and associated landforms
- Sea wave as geomorphic agent; erosional and depositional landforms
- Soil development: factors of soil formation, physical and chemical properties of soil, soil profile, texture and structure; types of soils

Lab. Work:
Lab. work must be conducted for soil, rocks and minerals recognition where relevant material is readily available. Geomorphic profiles, use of Remote
sensing techniques for the interpretation of landforms and geomorphic features

Field Visit:
Field trips to accessible areas for in-depth geomorphic studies.

Recommended Books:

Major-II GEOG 312  Climatology

Objectives:
To understand the elements and factors of climate, spatial and temporal variations in weather and climate.
To familiarise students with the major climatic regions of the world and Pakistan.

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

Lab. Work:
Recording and analysis of weather data, interpretation of weather maps and synoptic charts. Visit to local office of Pakistan Meteorological Department and hands on exercises.

Recommended Books:

**Major-IV GEOG 314 Oceanography**

**Objective:**

To develop a comprehension of the origin of oceans, geomorphology, circulation and resultant physical characteristics of the oceans among the students.

**Course outline:**

- Introduction
- Origin of oceans and seas: major water masses and their distribution.
- Morphology of the ocean basins.
- Ocean floor deposits, their characteristics and classification.
- Temperature, salinity and density of ocean water; distribution, causes and effects
- Oceanic circulation: waves, currents and tides, their nature, causes, effects and impact on environment.
- Special phenomena: tropical storms; Tsunami.
- 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.

**Field visit:**

Visit to any coastal area to study the various coastal morphological features.

**Recommended Books:**

**Foundation-IX GEOG 382  Quantitative Methods in Geography**

**Objectives:**
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

**Course outline:**
- Introduction
- Quantitative revolution and its impact on Geography
- Parametric and non-parametric statistics
- Nature of geographical data and measurement scales.
- Data summarizing techniques: theory of central tendency, dispersion, and variability.
- Time Series: graphs, growth and decline, index numbers, logarithmic scales, trends and fluctuations, components of time series.
- Methods of drawing trend lines for linear and exponential series scatter diagrams, standard errors and probability, correlation and regression.
- Quantitative models in Geography

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

**Recommended Books:**

**Foundation-X GEOG 383  Environmental Geography**

**Objective:**
To impart basic environmental knowledge to the students and enhance their awareness regarding global and local environmental issues.
Course outline:

- Introduction
- Evolution of Environmental Studies in Geography
- Comparative Advantage of Geography
- Concept of environmental management
- Environment and Man
  - Ecosystem
  - Resources
  - Important Cycles
  - Population explosion
  - The human impact on the environment
  - Environmental hazards
- Types of Hazards
  - Geophysical
  - Quasi-Natural
  - Biological
  - Technological
- Human Response Parameters
- Risk assessment and perception
- Adjustment to Hazards
- Major Environmental hazards and Problems in Pakistan:
  - Floods
  - Earthquake; Tsunami
  - Cyclones
  - Landslides
  - Droughts
  - Deforestation and Desertification
  - Water-logging and Salinity
  - Soil Erosion
  - Global Warming and ozone depletion
  - Environmental Pollution
  - Waste Management
- Control and Mitigation Measures
  - Technology
  - Awareness
  - Legislation
  - Ethics
  - Pakistan Environmental Act
  - National Conservation Strategy
  - National Environmental Quality Standards
Lab. Work:
Field visits of urban and rural areas to identify local environmental problems and documentation of these problems through GIS and SRS data

Recommended Books:
Geographers, Washington, DC.
Major-V GEOG 321 Economic Geography

Objective:
To create an understanding of Spatial variations of Economic resources and activities with reference to global and national scenarios.

Course outline:
- Introduction
- Evolution of world economic systems: Medieval feudal economics, economic impacts of colonialism. Modern world economic systems
- Concept of natural resources and reserves
- Human resource and its development
- Classification of economic activities
- Primary activities; gathering, hunting, herding, subsistence, Intensive and extensive farming, commercial grain farming, livestock farming, dairying, mixed farming, plantation farming, lumbering, fishing and mining
- Green revolution and its implications
- Secondary activities: Industrial revolution and manufacturing industries
- Tertiary activities
  - Trade and service functions
  - Transport systems.
- Quaternary and Quinary activities
- Regional inequalities, sustainable development and poverty alleviation
- Impacts of Globalization

Lab. work:
Collection and presentation of data from Economic Survey of Pakistan, Agricultural Statistics of Pakistan etc. pertaining to economic activities on maps with the help of different cartographic methods.

Recommended Books:

Major-VI: GEOG-390 Research Methods

Objective:
To create awareness among students regarding basics of geographical research

Course outline:

Introduction
Research approaches
- Research paradigms in Geography
- Types of research: historical research, qualitative/descriptive research, quantitative/experimental research
- Research design; research topic, formulation and statement of a problem, research questions, research hypotheses, research objectives, research plan
- Literature review; Literature sources: Journals (types) Books, Monographs and web sources
- Data collection, universe and sampling: primary and secondary data, sources of data
- Selection of a sample and measuring instruments, basic considerations in sampling, size of sample, geo-statistical considerations, Sampling units and design; points, traverses, random sampling, stratified sampling, systematic sampling
- Field Techniques
- Data analysis and interpretation: pre-analysis considerations,
preparing data for analysis: use of the descriptive statistics and quantitative methods.

- Data presentation
- Research report writing; Proposal and Synopsis writing
- Bibliography and references

Lab. Work:
Preparation of Research presentations with the help of software (end note, reference manager etc).

Recommended Books:

Major-VII GEOG Regional Concepts

Objective: This course is framed to impart knowledge of the principles underlying the division of the world into geographic regions & to transfer knowledge of the characteristics of regions at global level

Course Outline:

- **Introduction to Regional Concepts**
  - Scope, Status, and the significance of the regional approach
  - Regional approach and its evolution
  - Criteria for dividing world into regions
- **Physical Attributes:** Location, Physiography, Climate, Soils, Hydrology and Natural Vegetation
- **Economic attributes:** Human Resources, Mineral and Power sources, Agriculture, Industry, Communication and Trade
- **Types of Regions**
  - Physical Regions
  - Economic Regions
  - Political Regions
  - Cultural Regions
  - Special Purpose Regions
- **Major Regions of the world**
  - Distinguishing characteristics
  - South Asia
  - South West Asia
  - Far-eastern regions
  - Western Europe
  - Russia and Central Asia
  - North Africa and Anglo-America
  - Other Regions
- **Role of the Region in Global Development**
Lab. Work:

Identification and delimitation of different types of regions on maps.

Recommended Books:


Major-VIII GEOG 371 Geographical Information System

Objective:

The course aims to equip students with an understanding of GIS, evolution and applications of spatial data through Geo-spatial technologies.

Course outline:

- **Introduction:**
  Definitions, key components, functional subsystem,
  Raster data model, vector data model, attribute data model,
  Data acquisition techniques, data sources, data capturing techniques and procedures, data transformation, visualization of spatial data, layers and projections and datums

- **Map design:** symbols to portray points, lines, polygons and volumes,
  graphic variables, visual hierarchy, Data classification graphic approach, mathematical approach.

- **Spatial analysis:** neighbourhood functions, network, and overlay analysis, buffering, spatial data quality: components of data quality,
  micro level components, macro level components, usage components, sources of errors, accuracy and resolution and uncertainty.

- **GIS Applications**
Lab. Work:

Introduction to GIS Lab (hardware/software), Raster/Vector/Attribute Data Display, Scanning, Digitization, coordinate based point mapping, Raster/Vector Conversion, Data layer integration and display of different projections, Map layout, Data Classification and Thematic Mapping, Handling of Topological Errors, Overlay and network analysis.

Recommended Books:

Major-IX GEOG 372  Remote Sensing

Objectives:

- To introduce knowledge of recording earth’s surface features from space-borne platforms and different ways in which images can be analysed.
- To 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 Outline:

- Introduction
- History and Development
- Concepts and Foundation of Remote Sensing
  - Electromagnetic spectrum
    - Visible Spectrum
    - Colour Theory
    - Atmospheric Attenuation
  - Types of Remote Sensing Systems
    - Active Remote Sensing
    - Passive Remote Sensing
- Type of Sensors
  - RBV, MSS, TM,HRV, HRPT/APT/AVHRR, MODIS (Terra and Aqua) non-imaging systems (RADAR)
- Types of Satellites
  - Manned Satellites (Gemini, Mercury, Apollo, Space Shuttles)
  - Unmanned Satellites (Meteorological, Earth Resources, Telecommunication, Spy, Scientific etc.)
  - Platforms (Orbits)
  - Ground Receiving Stations (Reception of Data)
  - Image Processing
  - Image Classification

Image Interpretation
- Image Interpretation Methods
- Image Interpretation Elements
- Image Interpretation Tasks
  - Image Measurements

Global Positioning System (GPS)

Applications (Hydrology, Geology, Climatology, Environmental Application, Planning, Agricultural, Forestry, Socio-economic, Health etc.)

Remote Sensing in Pakistan: Potential and Prospects

Lab Work:
Introduction to labs., single band image interpretation, false color predictions, false color composite images interpretation, visual interpretation of aerial photographs, various sensors data comparison, thermal infrared image interpretation, introduction to ERDAS imagine, display, geo-linking, identification of targets, field trips.

Recommended Books:


Major XGEOG 491 Research Project (Thesis)

• Introduction
  o Background
  o The Problem
  o Research Questions
  o Hypothesis
  o Objectives
  o Significance
  o Historical Context

• Methodological Framework
  o Data Sources
  o Data Quality

• Data Uncertainty and Limitations
  o Methods
    ▪ Techniques
    ▪ Models
    ▪ Sampling
    ▪ Accuracy Assessments
    ▪ Qualitative data (Questionnaire)
    ▪ In-situ Observation (Field Records)

• Review of Literature
Major-XIGEOG492 Internship

Objective:
To expose students to do practical work in a real world situation to bridge the gap between theory and practice by writing a report independently. Learn communication skills by presenting it in a seminar.

Internship project outline:
Internship with any public, private sector, district governments, national /international organization, inter university linkages, academic and research institutions, NGO, CBO, CCBs or Group Survey with report and its presentation in a seminar.

Elective322 Settlement Geography

Objectives:
To explain the process of formation and development of human settlements
To enable students to develop an understanding regarding the processes of urbanization.

Course outline:
- Introduction
- Significance of settlement geography, basic definitions: Site and situation, hierarchy and types of settlements
- Rural settlements: Dispersed settlements, nucleated and ribbon settlements; their contrasts between More Developed Countries (MDCs) and Less Developed Countries (LDCs)
- Forms and patterns of settlements, house types and their evolution in rural areas
- Commercial functions of rural settlements and their role as a market town
- Infrastructure and services in rural settlements.
- Historical evolution of urban settlements, western and non-western urbanization, rural-urban fringe, suburbs and satellites
- Economic base, urban function and functional classification
- Towns and villages as central places
- Internal structure of the cities and land use pattern
- Theories of urban structure: Concentric Zone theory, Sector theory, Multiple Nuclei theory, and social area analysis,
- Urban development: slums and blighted areas.
- City-size, distribution, rank-size rule, primate city

Lab. Work:
Analysis of settlement types from topographic sheets, their centrality as population foci, urban areas etc.

Field Visit:
Field trips to study land use of major cities in Pakistan.

Recommended Books:


Major-XII GEOG 341 Population Geography

Objectives:
To make students understand the dynamics of population characteristics; Relationship between man, environment and resources. To highlight the importance of demographic data in planning and decision-making.

Course outline:
- Introduction
- Population theories
- Sources and methods of population data collection and associated problems
- Population distribution and density
- Urban and rural population
- Population composition: gender composition, age structure, marital status, families and households, languages, religions, ethnic groups etc.
- Population dynamics: Patterns of fecundity and fertility, morbidity and mortality
- Migration and its types
- Demographic transition
- Population growth and change
- Population Projections
Lab. Work:
Consultation of the Population Census of Pakistan and representation of population data on maps.

Recommended Books:

Semester 7
Cr. Hrs. 3x5=15
Cr. Hrs. 3x5=15

Five optional papers each with 3 credit hours and one compulsory paper on research methodology (including submission of research proposal to be conducted in semester 8) to be studied in semester 7. Five papers from group A,B,C,D and E. will be selected, not more than one paper from these given groups. The individual board of studies of various universities shall decide about the number of courses to be taken in this semester and shall prepare course outline for these papers or can add more topics depending on the availability of resources.

Elective Group Papers

Group ‘A’

<table>
<thead>
<tr>
<th>Course No</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. 411A</td>
<td>Pleistocene Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 411B</td>
<td>Quaternary Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 411C</td>
<td>Coastal Morphology</td>
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</tr>
<tr>
<td>Geog. 411D</td>
<td>Fluvial Morphology</td>
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</tr>
<tr>
<td>Geog. 411E</td>
<td>Glaciology</td>
<td>3</td>
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<tr>
<td>Geog. 411F</td>
<td>Desert Morphology</td>
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<tr>
<td>Course Code</td>
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<tr>
<td>Geog. 411G</td>
<td>Soil Geography</td>
<td>3</td>
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<tr>
<td>Geog. 412A</td>
<td>Meteorology</td>
<td>3</td>
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<tr>
<td>Geog. 412B</td>
<td>Climate Change Studies</td>
<td>3</td>
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<tr>
<td>Geog. 413A</td>
<td>Hydro Geography</td>
<td>3</td>
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<tr>
<td>Geog. 414A</td>
<td>Plant Geography</td>
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<tr>
<td>Geog. 414B</td>
<td>Zoo Geography</td>
<td>3</td>
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<tr>
<td>Geog. 415A</td>
<td>Sedimentation and Stratigraphy</td>
<td>3</td>
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**Group ‘B’**

**Human Geography**

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Geog. 421A</td>
<td>Cultural Geography</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 421B</td>
<td>Social Geography</td>
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<tr>
<td>Geog. 421C</td>
<td>Population Geography</td>
<td>3</td>
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<tr>
<td>Geog. 421D</td>
<td>Geography of Migration and Regional Development</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 421E</td>
<td>Behavioural Geography</td>
<td>3</td>
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<tr>
<td>Geog. 421F</td>
<td>Historical Geography</td>
<td>3</td>
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<tr>
<td>Geog. 421G</td>
<td>Geography of Religions</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 421H</td>
<td>Geography of Crimes</td>
<td>3</td>
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<tr>
<td>Geog. 421I</td>
<td>Geography of Recreation and Tourism</td>
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<td>Geog. 421J</td>
<td>Gender Geography</td>
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<td>Geog. 422A</td>
<td>Transportation Geography</td>
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<td>Geog. 422B</td>
<td>Agricultural Geography</td>
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<td>Geog. 422C</td>
<td>Geography of Manufacturing</td>
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<td>Geog. 422D</td>
<td>Geography of Marketing</td>
<td>3</td>
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<tr>
<td>Geog. 422E</td>
<td>Industrial Geography</td>
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<td>Geog. 423A</td>
<td>Urban Geography</td>
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<tr>
<td>Geog. 423B</td>
<td>Rural Settlement Geography</td>
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<tr>
<td>Geog. 423C</td>
<td>Urban and rural land use Studies</td>
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<tr>
<td>Geog. 423D</td>
<td>Regional Planning and Development</td>
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<tr>
<td>Geog. 423E</td>
<td>Geography of Housing</td>
<td>3</td>
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<td>Geog. 424A</td>
<td>Political Geography</td>
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<td>Geog. 425A</td>
<td>Medical Geography</td>
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<tr>
<td>Geog. 425B</td>
<td>Geography of Health Care</td>
<td>3</td>
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<tr>
<td>Geog. 425C</td>
<td>Geography of Nutrition</td>
<td>3</td>
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<tr>
<td>Geog. 429A</td>
<td>Military Geography</td>
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<tr>
<td>Geog. 429B</td>
<td>Geography of Administration</td>
<td>3</td>
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<tr>
<td>Geog. 430A</td>
<td>Geography of resource conservation</td>
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<tr>
<td>Geog. 431A</td>
<td>Geo-Archaeology</td>
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<tr>
<td>Geog. 432B</td>
<td>Geography of prehistoric cultures and civilizations</td>
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<tr>
<td>Geog. 432C</td>
<td>Anthro-Geography</td>
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</table>

Others

45
### Group 'C'

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<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. 431A</td>
<td>Environmental perceptions in Geography</td>
</tr>
<tr>
<td>Geog. 431B</td>
<td>Quantitative Geography</td>
</tr>
<tr>
<td>Geog. 431C</td>
<td>Geography of Natural Hazards and Disasters</td>
</tr>
<tr>
<td>Geog. 431D</td>
<td>Applied Geomorphology</td>
</tr>
<tr>
<td>Geog. 431E</td>
<td>Development Planning</td>
</tr>
<tr>
<td>Geog. 431F</td>
<td>Sustainable Development of Natural Resources</td>
</tr>
<tr>
<td>Geog. 431G</td>
<td>Environmental Impact Assessment (EIA)</td>
</tr>
<tr>
<td>Geog. 431H</td>
<td>Applied Cartography</td>
</tr>
<tr>
<td>Geog. 431J</td>
<td>Social Impact Assessment (SIA)</td>
</tr>
<tr>
<td>Geog. 431K</td>
<td>Mountain Geography</td>
</tr>
<tr>
<td>Geog. 431L</td>
<td>Geography of Retailing</td>
</tr>
<tr>
<td>Geog. 431M</td>
<td>Urban Environmental Planning and management</td>
</tr>
<tr>
<td>Geog. 431N</td>
<td>Geography of Wetlands</td>
</tr>
<tr>
<td>Geog. 431O</td>
<td>Urban Planning</td>
</tr>
<tr>
<td>Geog. 431P</td>
<td>Urban and Landscape Ecology</td>
</tr>
<tr>
<td>Geog. 431Q</td>
<td>Geography of Boundaries and Conflicts</td>
</tr>
<tr>
<td>Geog. 431R</td>
<td>Natural Resources Research</td>
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</tbody>
</table>

### Group 'D'

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>Geog. 441A</td>
<td>East Asia</td>
</tr>
<tr>
<td>Geog. 441B</td>
<td>South and South East Asia</td>
</tr>
<tr>
<td>Geog. 441C</td>
<td>South West Asia</td>
</tr>
<tr>
<td>Geog. 441D</td>
<td>Central Asia</td>
</tr>
<tr>
<td>Geog. 442A</td>
<td>Western Europe</td>
</tr>
<tr>
<td>Geog. 442B</td>
<td>Eastern Europe</td>
</tr>
<tr>
<td>Geog. 443A</td>
<td>North America</td>
</tr>
<tr>
<td>Geog. 443B</td>
<td>Latin America</td>
</tr>
<tr>
<td>Geog. 444A</td>
<td>North Africa</td>
</tr>
<tr>
<td>Geog. 444B</td>
<td>Sub Saharan Africa</td>
</tr>
<tr>
<td>Geog. 445A</td>
<td>Australia</td>
</tr>
<tr>
<td>Geog. 449A</td>
<td>Muslim World</td>
</tr>
<tr>
<td>Geog. 450A</td>
<td>Russian Federation</td>
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### Group 'E'

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>Geog. 471A</td>
<td>Geographical Analysis</td>
</tr>
<tr>
<td>Geog. 471B</td>
<td>Global Positioning System</td>
</tr>
</tbody>
</table>
Geog. 471C  Digital Image Processing  3
Geog. 471D  Spatial Data Visualization  3
Geog. 471E  Spatial Modelling  3
Geog. 471F  Photogrammetry  3
Geog. 471G  Spatial Data Management  3
Geog. 471H  Cyber Cartography  3

**Group 'F' Techniques**

Geog. 481A  Mathematical Geography  3
Geog. 481B  Geodesy and Advanced surveying  3
Geog. 482A  Cartographic Techniques  3
Geog. 482B  Digital Cartography  3
Geog. 483A  Advanced Quantitative Analysis  3
Geog. 484B  Computer Modelling & Simulation  3

Techniques in Geography

Others

(Individual BOS/ institutions can prepare the outline of the course and add more courses/topics depending on the availability of qualified staff and resources).

**SCHEME OF STUDIES FOR MS/MPHIL 2 YEARS**

**Eligibility:**

i. BS 4 years Geography degree or minimum of 16 years of education (HEC recognized institutes/universities) shall be required for admission in 2 years MS Geography programme.

   **OR**

ii. Those candidates having 4 years BS in any of the subject such as, GIS, Natural Sciences, Social and Behavioural Sciences, Environmental Sciences, Town/Urban & Regional Planning, shall have to enrol in prerequisite/deficiency courses as proposed by the individual Department/university and as per HEC prescribed guidelines. Those candidates who have not studied B.S. Geography have to attend the core courses in geography from semesters 5 and 6 or any other courses suggested by the Department of the University.

**Duration and Course structure**

- 2 years spread over 4 semesters (two semesters per year)

**Degree Requirement**

- 30 credit hours including thesis
**Course Structure**

<table>
<thead>
<tr>
<th>Course Structure</th>
<th>Number of courses</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficiency courses (0 Semester)</td>
<td>As required*</td>
<td>--</td>
</tr>
<tr>
<td>Core courses (First semester)</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Elective/specialized (Second semester)</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Thesis (Third &amp; Fourth semesters)</td>
<td>2(thesis)</td>
<td>06 (thesis)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
<td><strong>30</strong></td>
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</tbody>
</table>

* Mandatory for non-geographers

**Evaluation**

For the uniformity in the evaluation system, NCRC recommends that the minimum CGPA required to pass a semester is HEC/respective University accordingly at post graduate level.

**Course structure and Semesters**

**First semester**

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Core Courses in Geography</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 510</td>
<td>Techniques in Geo-Informatics</td>
<td>4</td>
</tr>
<tr>
<td>Geog 580</td>
<td>Advanced Quantitative Techniques</td>
<td>4</td>
</tr>
<tr>
<td>Geog 590</td>
<td>Advanced Research Methods</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

**Second semester**

**Elective/Specialized Courses**

<table>
<thead>
<tr>
<th>Elective/Specialized Courses</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four optional papers, each with 3 credit hours to be selected in second semester from specialization groups course No. 504 onward, but not more than one paper from group D given groups Number of options that shall be offered during the course of study shall depend upon the availability of faculty and lab facilities. More groups can also be added depending on the availability of resources. Optional courses are listed in Group A,B,C,D &amp; E. More special topics could also be added to these by</td>
<td>4x3 =12</td>
</tr>
</tbody>
</table>
the board of studies of the individual departments. The respective Board of Studies of the Departments, keeping in view the availability of staff and resources, may prepare detailed outline of the courses and approve them accordingly (some course outlines have been presented herewith).

**Third and fourth semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS/M.Phil. Thesis Writing and its evaluation as per University Rules, in 3rd and 4th Semesters.</td>
<td>6</td>
</tr>
</tbody>
</table>

**DETAIL OF COURSES**

**Geog. 510  Techniques in Geo-Informatics**

**Objectives:**

This course introduces principles, concepts and applications of Geographic Information Systems (GIS). This course will also familiarize students with advanced topics of GIS such as spatial database accuracy assessment, 2D and 3D spatial modeling, analysis of discrete and continuous entities in space. There will be special emphasis on statistical analysis of spatial data. Students will be trained to develop models based on regression analysis and logical analysis. Students will also learn customization and automation in GIS and explore techniques to implement GIS on to Internet. Spatial analyses are undertaken using mainly ESRI’s suit of ArcGIS and ERDAS Imagine (Apollo).

**Course Outline:**

- **Introduction**
  - Geographical Information System and Spatial Systems
  - ArcGIS Interface
  - Environment of ERDAS Imagine
- **Data Types in Geo-informatics**
  - Data Types (Spatial /Aspatial),
  - Data Models & Structures (Raster / Vector)
  - Attribute Data management
  - Exploring GIS Dataset in ArcCatalog,
  - Data Sources and Capturing Techniques
- **Remote Sensing Systems**
  - Sensors and Data
• Data Extraction Techniques
• Image Classification
• RS Data Applications
• Data Classification and Thematic Mapping
• Image Interpretation and Analysis

• Displaying and Manipulation of spatial information
  • Vector Data Preparation
  • Working on vector data in ArcGIS
  • Building Attribute Datasets

• GPS Data Integration
  • GPS System of Navigation
  • Integrating GPS data in GIS Environment
  • Coordinate based point mapping

• Data Transformation
  • Raster / Vector Conversion
  • Conversion of different projections (raster/vector)
  • Attribute Data Mapping

• Measurement and Query
  • Linear Measurements
  • Area Calculation and Tabulation
  • Tabulate Areas
  • Vector Data Query and Object Selection

• Errors and Uncertainties
  • Limitations of Resolution
  • Topological Errors
  • Accuracy and Uncertainty

• Spatial Exploration and Analysis
  • Buffering
  • Density Mapping
  • Map Overlay analysis
  • Interpolation
  • Survey Data Integration
  • Surface and Zonal Analysis
  • 3D Analysis
  • Functional Surfaces
  • Area Objects and Spatial Autocorrelation
  • Map Algebra and Multivariate Analysis

• Applications
Lab Work:

Introduction to GIS Lab (hardware / software), Raster/Vector/Attribute Data Display, Scanning, Digitization, Coordinate based point mapping, Raster / Vector Conversion, Data layer integration and display of different projections, Map layout, Data Classification and Thematic Mapping, Handling with Topological Errors, Overlay and network analysis. Spatial Analyses: Conditional, Density, Distance, Extraction, Generalization, Ground Water, Hydrology, Interpolation, Local, Map Algebra, Mathematical, Multivariate, Neighborhood, Overlay, Raster Creation, Reclassification, Surface and Zonal Analysis. 3D Analysis: Conversion, Functional Surfaces, TIN Creation and TIN Surface Analysis in ArcMap and 3D visualization in ArcScene and ArcGlobe

Recommended Books:


Geog: Advanced Physical Geography

Objective

To evolve critical thinking amongst MS/ MPhil students on current issues related to physical phenomena on the earth.

Course outline

- Recent advances in Physical Geography
- Geomorphic processes and structures
  - Significance of Tectonic and Denudation processes in the evolution of landforms
- Natural hazards
  - Mass wasting and their impacts
  - Earthquakes, tsunami, volcanism, cyclones, floods
  - Drought and desertification, causes and impacts
Impacts of natural reservoirs on eco-systems

Bio-geography
- Bio-diversification and ecological equilibrium
- Degradation of soils and ground water
- Watershed management; high latitude and high altitude problems

Climatic elements and mitigations
- Global Warming
- Ozone Layer depletion
- Major scenario of climate variability
- Global climate change; major scenarios of climate change;
- Sea surface temperature anomalies (El Niño/La Niña)
- Ozone depletion
- Variability in Jet streams and their effects on planetary circulation

Environmental Issue

Recommended Books:

Geog: 520 Advanced Human Geography

Objectives
To develop an understanding of the systematic organization of economic, cultural, political, demographic and occupancy milieu and the spatial variations of man-environment relationship citing real world examples with special emphasis on Pakistan.

Course outline
- Recent Approaches in Human Geography
- Scope, status,
  - Significance, domains,
- Historical development of Human Geography
- Concepts and Philosophies in Human Geography:
  - Determinism,
  - Possibilism,
  - Probabilism
  - Cognitive behaviour.
  - Inductive Generalization
  - Deductive and systematic approach, man environment relationship.
- Environmental perception, management and anthropogenic actions.
  - Impact of population growth and change
  - Urbanization
  - World economic patterns
  - World Political Systems
  - Cultural patterns
- Human development – the Welfare Approach

Recommended Books:

Geog: 590 Advanced Research Methods

Objective
To enable students to conduct independent research including literature review and search
To train students in collection, analysis, interpretation, presentation and organization of data

Course outline
- Approaches and types of research:
  - Historical research, qualitative/descriptive research;
- Case referent study/cross sectional research,
- Longitudinal, causal-comparative research,
- Experimental research; evaluative studies, forecasting studies, design and feasibility studies,

**Research design**
- Ethical issues,
- Formulation and statement of research problem,
- Conceptual framework,
- Research questions, research hypotheses, research objectives,
- Research plan

**Review of Literature**
- Preparation
- Sources
- Abstracting
- Citation and Referencing

**Data collection**
- Universe and sampling:
  - Primary and secondary data, sources of data, selection of a sample,
  - Variables and measuring instruments,
  - Basic considerations in sampling, size of sample,
  - Geo-statistical considerations. Sampling units and design; points,
  - Traverses, random and non-random sampling, stratified,
  - Purposive and systematic sampling.

**Data analysis and interpretation**
- Use of statistical/quantitative methods e.g.:
  - Central tendency, dispersion, and variability. Scatter diagram,
  - Standard error and probability
  - Methods of correlation: linear, non-linear, multiple,
  - The product moment correlation, Spearman's rank correlation, correlation matrix,
  - Regression analysis, testing of hypothesis and significance:
    - Chi Square, "T" test, "F" test, Analysis of variance (ANOVA), Multivariate analysis. Factor analysis and principal components analysis; empirical orthogonal function (EOF)
    - Poisson test, Mantle-haenszel test, scatter diagram, methods of constructing regression lines and mapping residuals,
  - Interpolation, prediction and explanation

**Computer analysis:**
- Classification by grouping similar observations, multivariate analysis.
• Introduction to EPI. Info/ CIET Map /SPSS: PC and database for quantitative analysis

• Research report writing, Bibliography and references

• Qualitative Research

Recommended Books:

Bannet, N. (1973) Research Design. Milton Keynes, the Open University, UK
Semester 2  Cr. Hrs.3x4=12

Four optional papers, each with 3 credits hrs to be selected in second semester from specialization groups course No. 704 onward, but not more than one paper from group D

Number of options that shall be offered during the course of study shall depend upon the availability of faculty and lab facilities. More groups can also be added depending on the availability of resources. Optional courses are listed in Group A,B,C,D & E. More special topics could also be added to these by the board of studies of the individual departments. The respective Board of Studies of the Departments, keeping in view the availability of staff and resources, may prepare detail outline of the course and approve it accordingly (for some of the paper the course outline is prepared and given).
Optional Course model

Geog. 564 Principles of Wetlands Ecology and their Management

Objective:
This course focuses primarily on the ecology of wetlands and wetland processes from an ecological perspective, focusing on the conservation and management of wetland ecosystem for Master of Science students.

Course Outline:

- Concepts and definition of wetlands,
  - History of wetland science and management;
- Wetland classifications,
  - Types of wetlands, classification systems;
  - Wetlands of Pakistan, wetland ecosystem structure and dynamics;
- Wetlands functions,
  - Values and significance; hydrology and biogeochemistry,
  - Soils, water quantity, recharge, landscape
  - Watershed processes, water quality and nutrient cycling,
- Wetlands habitats,
  - Wetland biodiversity;
  - habitat connectivity across a landscape
- Management of wetlands,
  - importance and components of wetlands management,
  - GIS and wetland delineation, inventory and monitoring, ecological integrity or health assessment based on physical, chemical and biological matrices, environment impact assessment of wetlands, ecological risk assessment,
  - Public and/or stakeholder participation in wetlands management, planning, wetlands restoration techniques, protection of wetlands, buffers and corridors, minimizing hydrologic effects,
  - Minimizing water quality and sedimentation effects, design considerations during construction
  - Long-term computer-based wetland decision support system; community education on wetland issues; issues related to wetlands conservation in Pakistan,
  - Gaps in wetlands management in Pakistan, international convention(s) for wetland conservation and our obligations
Lab Work:

Ecological survey design and sampling: Field visits and sampling for various wetland matrices: water, sediment, invertebrate, vertebrate, bird migration, socio-economic survey; assessment of biological diversity at wetlands; water and sediment quality, assessment of flora and fauna for environmental contaminants, evaluation survey, designing a management plan for wetland conservation, creation of wetland for pollution control, development of wetland inventory and delineation

Recommended Books:


### Groups and list of optional papers

#### Group ‘A’ - Physical Geography

<table>
<thead>
<tr>
<th>Course No</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. 611A</td>
<td>Pleistocene Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 611B</td>
<td>Quaternary Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 611C</td>
<td>Coastal Morphology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 611D</td>
<td>Fluvial Morphology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 611E</td>
<td>Glaciology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 611F</td>
<td>Desert Morphology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 611G</td>
<td>Soil Geography</td>
<td>3</td>
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<tr>
<td>Geog. 612A</td>
<td>Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 612B</td>
<td>Climatic Change Studies</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 613A</td>
<td>Hydro-geography</td>
<td>3</td>
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<tr>
<td>Geog. 614A</td>
<td>Advance Plant Geography</td>
<td>3</td>
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<tr>
<td>Geog. 614B</td>
<td>Zoo-Geography</td>
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#### Group ‘B’ - Human Geography

<table>
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<tr>
<th>Course No</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Geog. 621A</td>
<td>Cultural Geography</td>
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<tr>
<td>Geog. 621B</td>
<td>Social Geography</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 621C</td>
<td>Population Geography</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 621D</td>
<td>Geography of Migration and Regional Development</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 621E</td>
<td>Behavioural Geography</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 621F</td>
<td>Historical Geography</td>
<td>3</td>
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<tr>
<td>Geog. 621G</td>
<td>Geography of Religion</td>
<td>3</td>
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<tr>
<td>Geog. 621H</td>
<td>Geography of Crimes</td>
<td>3</td>
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<tr>
<td>Geog. 621I</td>
<td>Geography of Recreation and Tourism</td>
<td>3</td>
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<td>Geog. 621J</td>
<td>Gender Geography</td>
<td>3</td>
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<td>Geog. 622A</td>
<td>Transportation Geography</td>
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<td>Geog. 622B</td>
<td>Agriculture Geography</td>
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<td>Geog. 622C</td>
<td>Geography of Manufacturing</td>
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<tr>
<td>Geog. 622D</td>
<td>Geography of Marketing</td>
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<td>Geog. 622E</td>
<td>Industrial Geography</td>
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<td>Geog. 623A</td>
<td>Urban Geography</td>
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<tr>
<td>Geog. 623B</td>
<td>Rural Settlement Geography</td>
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<tr>
<td>Geog. 623C</td>
<td>Urban and rural land use</td>
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<td>Geog. 623D</td>
<td>Regional Planning</td>
<td>3</td>
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<tr>
<td>Geog. 623E</td>
<td>Geography of Housing</td>
<td>3</td>
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<tr>
<td>Geog. 624A</td>
<td>Political Geography</td>
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<td>Geog. 625A</td>
<td>Medical Geography</td>
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<td>Geog. 625B</td>
<td>Geography of Health Care</td>
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<td>Geog. 625C</td>
<td>Geography of Nutrition</td>
<td>3</td>
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<td>Geog. 629A</td>
<td>Military Geography</td>
<td>3</td>
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<tr>
<td>Geog. 629B</td>
<td>Geography of Administration</td>
<td>3</td>
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<tr>
<td><strong>Group ‘C’</strong></td>
<td><strong>Applied Geography</strong></td>
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</tr>
<tr>
<td>Geog. 631A</td>
<td>Environmental Geography</td>
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</tr>
<tr>
<td>Geog. 631B</td>
<td>Quantitative Geography</td>
<td>3</td>
</tr>
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<td>Geog. 631C</td>
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<tr>
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<tr>
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<td>Development Planning</td>
<td>3</td>
</tr>
<tr>
<td>Geog. 631F</td>
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<td>3</td>
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<td>Geog. 631G</td>
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<td>Applied Cartography</td>
<td>3</td>
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<td>Geography of Boundaries and Conflicts</td>
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<td>Geog. 631R</td>
<td>Natural Resources Research</td>
<td>3</td>
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<td><strong>Group ‘D’</strong></td>
<td><strong>Regional Geography</strong></td>
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</tr>
<tr>
<td>Geog. 641A</td>
<td>Far East</td>
<td>3</td>
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<tr>
<td>Geog. 641B</td>
<td>South and South East Asia</td>
<td>3</td>
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<tr>
<td>Geog. 641C</td>
<td>South West Asia</td>
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<td>Geog. 641D</td>
<td>Central Asia</td>
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<td>Geog. 642A</td>
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<td>Sub Saharan Africa</td>
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<td>Geog. 645A</td>
<td>Australia</td>
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<td>Geog. 649A</td>
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<td><strong>Group ‘E’</strong></td>
<td><strong>Geo-informatics</strong></td>
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<td>Geographical Analysis</td>
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<tr>
<td>Geog. 671B</td>
<td>Global Positioning System</td>
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</tr>
<tr>
<td>Geog. 671C</td>
<td>Digital Image Processing</td>
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<tr>
<td>Geog. 671D</td>
<td>Spatial Data Visualization</td>
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<td>Credits</td>
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<td>Spatial Modeling</td>
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<td>Geog. 671F</td>
<td>Photogrammetry</td>
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<tr>
<td>Geog. 671G</td>
<td>Spatial Data Infrastructure</td>
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<td>Geog. 671H</td>
<td>Cyber Geography</td>
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<tr>
<td>Geog. 681A</td>
<td>Mathematical Geography</td>
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<tr>
<td>Geog. 681B</td>
<td>Geodesy /and Advance surveying</td>
<td>3</td>
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<tr>
<td>Geog. 682A</td>
<td>Cartographic Techniques</td>
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<tr>
<td>Geog. 682B</td>
<td>Computer Cartography</td>
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(Individual institutions can prepare the outline of the course and add more topics depending on the availability of the qualified staff and the resources).
RECOMMENDATIONS FOR BS/ MS/ MPHIL COURSES IMPLEMENTATION

1. NCRC recommended that a National level workshop should be organized by HEC to discuss the problems related to the implementation of the 4 year BS and 2 year MS/ M.Phil. Geography curriculum at the national level at regular intervals. In principal, HEC should invite in all NCRC meetings the heads of Geography departments from all public sector universities.

2. The broad spectral domain of geography provides an opportunity for a wide range of useful multi-disciplinary associations. Therefore, HEC is requested to advise the institutions to provide maximum range of combinations both with BS sciences, humanities and commerce groups.

3. Opening of Geography Departments in all general public sector universities of the country including Quaid-i-Azam University Islamabad.

4. Provision of computers for geography labs. There should be Central Computer lab. in each institution/colleges to provide computing facility to the different disciplines of sciences including geography. The GIS and Remote Sensing software should be provided at least to the post graduate level institutions where geography is taught.

5. Refresher courses should be arranged at regular intervals for college teachers (preferably at District level) to keep them abreast with continuing changes in the discipline in the given fields.
   a. Physical Geography
   b. Human Geography
   c. Quantitative Methods in Geography
   d. Field study and Surveying Techniques
   e. Aerial Photographs and remote sensing including GPS
   f. Computing and GIS

6. HEC is requested to provide adequate funds for field works/research works related to geography in the institutions.

7. Sufficient funds should be allocated by the institutions for the purchase of teaching aids, surveying and computing equipment/instruments, GPS, Total Station and other field survey equipments.

8. Geography must be treated at par with other physical sciences by the HEC and other National bodies.
9. Facility of publications and distribution of journals, monographs and books in geography be provided by HEC to the respective Departments.

10. The HEC may advise subordinate institutions to run short-term courses during summer/ winter vacations within the ramifications of Geography enabling its teachers to enhance their knowledge. NCRC strongly recommends revitalization and introduction of Geography as a subject in various departments of the colleges.

11. Introduction of Geography as a subject in the curriculum of B.Ed. and M.Ed. Degree programs

12. Development of well-equipped seminar libraries and provision of funds for appropriate collection of journals, literature and reference materials including government publications.

13. Organizing refresher courses regularly for postgraduate teachers in collaboration with Survey of Pakistan, PMD, and SUPARCO etc. to cover the practical syllabus related with Instrumental Surveying, GIS and Remote Sensing.

14. Appropriate funds should be provided by HEC for the organization of Workshops and conferences along with the publications of the professional journals.

15. Ample funds should be provided by HEC for the purchase of books journals
English I (Functional English)

Objectives: Enhance language skills and develop critical thinking.

Course Contents

Basics of Grammar
Parts of speech and use of articles
Sentence structure, active and passive voice
Practice in unified sentence
Analysis of phrase, clause and sentence structure
Transitive and intransitive verbs
Punctuation and spelling

Comprehension
Answers to questions on a given text

Discussion
General topics and every-day conversation (topics for discussion to be at the discretion of the teacher keeping in view the level of students)

Listening
To be improved by showing documentaries/films carefully selected by subject teachers

Translation skills

Urdu to English

Paragraph writing
Topics to be chosen at the discretion of the teacher

Presentation skills
Introduction

Note: Extensive reading is required for vocabulary building

Recommended books:

1. Functional English
   a) Grammar

b) Writing

c) Reading/Comprehension

d) Speaking

English II (Communication Skills)

Objectives: Enable the students to meet their real life communication needs.

Course Contents

Paragraph writing
Practice in writing a good, unified and coherent paragraph

Essay writing
Introduction

CV and job application
Translation skills
Urdu to English

Study skills
Skimming and scanning, intensive and extensive, and speed reading, summary and précis writing and comprehension

Academic skills
Letter/memo writing, minutes of meetings, use of library and internet

Presentation skills
Personality development (emphasis on content, style and pronunciation)

Note: documentaries to be shown for discussion and review
Recommended Books:

Communication Skills

a) Grammar

b) Writing

c) Reading

English III (Technical Writing and Presentation Skills)

Objectives: Enhance language skills and develop critical thinking

Course Contents

Presentation skills

Essay writing
Descriptive, narrative, discursive, argumentative

Academic writing
How to write a proposal for research paper/term paper
How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency)

Technical Report writing

Progress report writing

Note: Extensive reading is required for vocabulary building

Recommended Books:

Technical Writing and Presentation Skills
a) **Essay Writing and Academic Writing**


b) **Presentation Skills**

c) **Reading**

The Mercury Reader. A Custom Publication. Compiled by northern Illinois University. General Editors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharton. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).
Pakistan Studies (Compulsory)

Introduction/Objectives

- Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.
- Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Outline

1. Historical Perspective
   b. Factors leading to Muslim separatism
   c. People and Land
      i. Indus Civilization
      ii. Muslim advent
      iii. Location and geo-physical features.

2. Government and Politics in Pakistan
   Political and constitutional phases:
   a. 1947-58
   b. 1958-71
   c. 1971-77
   d. 1977-88
   e. 1988-99
   f. 1999 onward

3. Contemporary Pakistan
   a. Economic institutions and issues
   b. Society and social structure
   c. Ethnicity
   d. Foreign policy of Pakistan and challenges
   e. Futuristic outlook of Pakistan

Recommended Books:

National Commission of Historical and Cultural Research.
Annexure - C

ISLAMIC STUDIES
(Compulsory)

Objectives:

This course is aimed at:

1. To provide Basic information about Islamic Studies
2. To enhance understanding of the students regarding Islamic Civilization
3. To improve Students skill to perform prayers and other worships
4. To enhance the skill of the students for understanding of issues related to faith and religious life.

Detail of Courses

Introduction to Quranic Studies

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

Study of Selected Text of Holly Quran

1) Verses of Surah Al-Baqra Related to Faith (Verse No-284-286)
2) Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18)
3) Verses of Surah Al-Mumanoon Related to Characteristics of faithful (Verse No-1-11)
4) Verses of Surah al-Furqan Related to Social Ethics (Verse No.63-77)
5) Verses of Surah Al-Inam Related to Ihkam (Verse No-152-154)

Study of Selected Text of Holly Quran

1) Verses of Surah Al-Ihzab Related to Adab al-Nabi (Verse No.6,21,40,56,57,58.)
2) Verses of Surah Al-Hashar (18,19,20) Related to thinking, Day of Judgment
3) Verses of Surah Al-Saf Related to Tafakar, Tadabar (Verse No.1,14)

Seerat of Holy Prophet (S.A.W) I

1) Life of Muhammad Bin Abdullah (Before Prophet Hood)
2) Life of Holy Prophet (S.A.W) in Makkah
3) Important Lessons Derived from the life of Holy Prophet in Makkah
Seerat of Holy Prophet (S.A.W) II
1) Life of Holy Prophet (S.A.W) in Madina
2) Important Events of Life Holy Prophet in Madina
3) Important Lessons Derived from the life of Holy Prophet in Madina

Introduction to Sunnah
1) Basic Concepts of Hadith
2) History of Hadith
3) Kinds of Hadith
4) Uloom –ul-Hadith
5) Sunnah& Hadith
6) Legal Position of Sunnah

Selected Study from Text of Hadith

Introduction to Islamic Law & Jurisprudence
1) Basic Concepts of Islamic Law & Jurisprudence
2) History & Importance of Islamic Law & Jurisprudence
3) Sources of Islamic Law & Jurisprudence
4) Nature of Differences in Islamic Law
5) Islam and Sectarianism

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

Islam & Science
1) Basic Concepts of Islam & Science
2) Contributions of Muslims in the Development of Science
3) Quran & Science

Islamic Economic System
1) Basic Concepts of Islamic Economic System
2) Means of Distribution of wealth in Islamic Economics
3) Islamic Concept of Riba
4) Islamic Ways of Trade & Commerce

Political System of Islam
1) Basic Concepts of Islamic Political System
2) Islamic Concept of Sovereignty
3) Basic Institutions of Govt. in Islam

Islamic History
1) Period of Khlaft-E-Rashida
2) Period of Ummayyads
3) Period of Abbasids

Social System of Islam
1) Basic Concepts of Social System of Islam 
2) Elements Of Family 
3) Ethical Values Of Islam 

Recommended Books:

Hassan, H.H. “An Introduction to the Study of Islamic Law” leaf Publication Islamabad, Pakistan. 
Muhammad, H. “Emergence of Islam” IRI, Islamabad 
Muhammad, H. “Muslim Conduct of State” 
Muhammad, H. “Introduction to Islam Mulana Muhammad Yousaf Islahi,” 

Annexure - D

Note: One course will be selected from the following six courses of Mathematics.

COMPULSORY MATHEMATICS COURSES FOR BS (4 YEAR)

( FOR STUDENTS NOT MAJORING IN MATHEMATICS )

1. MATHEMATICS I (ALGEBRA)

Prerequisite (s): Mathematics at secondary level

Credit Hours: 3 + 0

Specific Objectives of the Course: To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines.

Course Outline:

Preliminaries: Real-number system, complex numbers, introduction to sets, set operations, functions, types of functions.
Matrices: Introduction to matrices, types, matrix inverse, determinants, system of linear equations, Cramer's rule.
Quadratic Equations: Solution of quadratic equations, qualitative analysis of roots of a quadratic equations, equations reducible to quadratic equations, cube roots of unity, relation between roots and coefficients of quadratic equations.
Sequences and Series: Arithmetic progression, geometric progression, harmonic progression.

Recommended Books:
2. **MATHEMATICS II (CALCULUS)**

**Prerequisite(s):** Mathematics I (Algebra)

**Credit Hours:** 3 + 0

**Specific Objectives of the Course:** To prepare the students, not majoring in mathematics, with the essential tools of calculus to apply the concepts and the techniques in their respective disciplines.

**Course Outline:**

- **Preliminaries:** Real-number line, functions and their graphs, solution of equations involving absolute values, inequalities.
- **Limits and Continuity:** Limit of a function, left-hand and right-hand limits, continuity, continuous functions.
- **Derivatives and their Applications:** Differentiable functions, differentiation of polynomial, rational and transcendental functions, derivatives.
- **Integration and Definite Integrals:** Techniques of evaluating indefinite integrals, integration by substitution, integration by parts, change of variables in indefinite integrals.

**Recommended Books:**


3. **MATHEMATICS III (GEOMETRY)**

**Prerequisite(s):** Mathematics II (Calculus)

**Credit Hours:** 3 + 0

**Specific Objectives of the Course:** To prepare the students, not majoring in mathematics, with the essential tools of geometry to apply the concepts and the techniques in their respective disciplines.

**Course Outline:**

*Geometry in Two Dimensions:* Cartesian-coördinate mesh, slope of a line, equation of a line, parallel and perpendicular lines, various forms of equation
of a line, intersection of two lines, angle between two lines, distance between two points, distance between a point and a line.

**Circle:** Equation of a circle, circles determined by various conditions, intersection of lines and circles, locus of a point in various conditions.

**Conic Sections:** Parabola, ellipse, hyperbola, the general-second-degree equation

**Recommended Books:**


### 4. COURSE FOR NON-MATHMATICS MAJORS IN SOCIAL SCIENCES

**Title of subject:** MATHEMATICS  
**Discipline:** BS (Social Sciences).  
**Pre-requisites:** SSC (Metric) level Mathematics  
**Credit Hours:** 03 + 00  
**Minimum Contact Hours:** 40  
**Assessment:** written examination;  
**Effective:** 2008 and onward

**Aims:** To give the basic knowledge of Mathematics and prepare the students not majoring in mathematics.

**Objectives:** After completion of this course the student should be able to:

- Understand the use of the essential tools of basic mathematics;
- Apply the concepts and the techniques in their respective disciplines;
- Model the effects non-isothermal problems through different domains;

**Contents:**

1. **Algebra:** Preliminaries: Real and complex numbers, Introduction to sets, set operations, functions, types of functions.  
   Quadratic equations: Solution
of quadratic equations, nature of roots of quadratic
equations, equations reducible to quadratic equations.
Sequence and Series: Arithmetic, geometric and
harmonic progressions. Permutation and combinations:
Introduction to permutation and combinations, Binomial
Theorem: Introduction to binomial theorem.
Trigonometry: Fundamentals of trigonometry,
trigonometric identities. Graphs: Graph of straight line,
circle and trigonometric functions.

2. Statistics: Introduction: Meaning and definition of statistics,
relationship of statistics with social science,
characteristics of statistics, limitations of statistics and
main division of statistics. Frequency distribution:
Organisation of data, array, ungrouped and grouped
data, types of frequency series, individual, discrete and
continuous series, tally sheet method, graphic
presentation of the frequency distribution, bar
frequency diagram histogram, frequency polygon,
cumulative frequency curve. Measures of central
tendency: Mean medium and modes, quartiles, deciles
and percentiles. Measures of dispersion: Range, inter
quartile deviation mean deviation, standard deviation,
variance, moments, skewness and kurtosis.

Recommended Books:
edition), PWS-Kent Company, Boston
Kaufmann. J. E., ‘College Algebra and Trigonometry’, PWS-Kent
Wilcox, R. R., ‘Statistics for the Social Sciences’,
INTRODUCTION TO STATISTICS

Unit 1. What is Statistics?

Unit 2. Presentation of Data
Introduction, basic principles of classification and Tabulation, Constructing of a frequency distribution, Relative and Cumulative frequency distribution, Diagrams, Graphs and their Construction, Bar charts, Pie chart, Histogram, Frequency polygon and Frequency curve, Cumulative Frequency Polygon or Ogive, Historigram, Ogive for Discrete Variable. Types of frequency curves. Exercises.

Unit 3. Measures of Central Tendency
Introduction, Different types of Averages, Quantiles, The Mode, Empirical Relation between Mean, Median and mode, Relative Merits and Demerits of various Averages. Properties of Good Average, Box and Whisker Plot, Stem and Leaf Display, definition of outliers and their detection. Exercises.

Unit 4. Measures of Dispersion

Unit 5. Probability and Probability Distributions.
Discrete and continuous distributions: Binomial, Poisson and Normal Distribution. Exercises

Unit 6. Sampling and Sampling Distributions
Introduction, sample design and sampling frame, bias, sampling and non-sampling errors, sampling with and without replacement, probability and non-probability sampling. Sampling distributions for single mean and proportion, Difference of means and proportions. Exercises.

Annexure - E

Credit hrs: 3(3-0)
Unit 7. **Hypothesis Testing**
Introduction, Statistical problem, null and alternative hypothesis, Type-I and Type-II errors, level of significance, Test statistics, acceptance and rejection regions, general procedure for testing of hypothesis. Exercises.

Unit 8. **Testing of Hypothesis - Single Population**
Introduction, testing of hypothesis and confidence interval about the population mean and proportion for small and large samples, Exercises

Unit 9. **Testing of Hypotheses - Two or more Populations**
Introduction, Testing of hypothesis and confidence intervals about the difference of population means and proportions for small and large samples, Analysis of Variance and ANOVA Table. Exercises

Unit 10. **Testing of Hypothesis - Independence of Attributes**

Unit 11. **Regression and Correlation**

**Recommended Books:**

**Note: General Courses from other Departments**
Details of courses may be developed by the concerned universities according to their Selection of Courses as recommended by their Board of Studies.