

4 years Under-Graduate (UG) Course and Credit Framework

SYLLABUS
(w.e.f. 2024-2025)

B. SC. GEOGRAPHY
(SEMESTER: I -VIII)



Department of Geography
PANSKURA BANAMALI COLLEGE (AUTONOMOUS)
Affiliated to Vidyasagar University
Panskura R.S., Purba Medinipur
West Bengal – 721152

B.Sc. Geography 4 Years Course
Semester and Year wise Course with Total Credits

| Years | Total Credits | Semesters | Total Papers | Paper Codes | | | | | | | Sem. wise Credits |
|---|---------------|-----------|--------------|-------------|-----|-----|----------|------|------------------|-----|-------------------|
| | | | | MCC | DSE | MDC | MCC (GE) | AECC | SEC | VAC | |
| 1st | 40 | I | 6 | 1 | - | 1 | 1 | 1 | 1 | 1 | 20 |
| | | II | 6 | 1 | - | 1 | 1 | 1 | 1 | 1 | 20 |
| UG Certificate to be awarded | | | | | | | | | | | |
| 2nd | 40 | III | 6 | 2 | - | 1 | 1 | 1 | 1 | - | 20 |
| | | IV | 6 | 3 | | - | 1 | 1 | C* | - | 20 |
| UG Diploma to be awarded | | | | | | | | | | | |
| 3rd | 48 | V | 6 | 4 | 1 | - | 1 | - | - | - | 24 |
| | | VI | 6 | 4 | 1 | - | 1 | - | - | - | 24 |
| UG Degree to be awarded | | | | | | | | | | | |
| 4th | 48 | VII | 6 | 3 | 2 | - | 1 | - | - | - | 24 |
| | | VIII | 6 | 3 | 2 | - | 1 | - | - | - | 24 |
| UG Hons. Degree to be awarded | | | | | | | | | | | |
| 4 Yrs. | 176 | 8 Sems. | 48 | 21 | 6 | 3 | 8 | 4 | 4 | 2 | 176 |
| UG Hons. with Research Degree to be awarded | | | | | | | | | | | |
| 4th | 48 | VII | 6 | 3 | 1 | | 1 | | 1 s [^] | | 24 |
| | | VIII | 6 | 3 | | | 1 | | 2 s [^] | | 24 |
| 4Yrs | 176 | 8 Sems. | 48 | 21 | 3 | 3 | 8 | 4 | 6 | 2 | 176 |

MCC= Major Course; DSE= Discipline Specific Elective; MIC= Minor Course (GE= Generic Elective); SEC= Skill Enhancement Course; AECC= Ability Enhancement Course; VAC= Value Added Course; MDC= Multi-Disciplinary Course;

T= Theory; P= Practical; PR= Field Project; (4/2) = Credits of the paper

C* = Community Outreach (2 Credits)

S[^] = SEC for Research (4 Credits)

**B.Sc. Geography 4 Years Course
Semester wise Major Course (MCC)**

| Semester | Course Code | Course Name | Hours per week | | | Credits |
|---------------------|-------------|--|----------------|---|----|---------|
| | | | L | P | Pr | |
| I | GEOUMCC101 | Physical Geography | 4 | 0 | 0 | 4 |
| II | GEOUMCC202 | Thematic Mapping | 0 | 4 | 0 | 4 |
| III | GEOUMCC303 | Human Geography | 4 | 0 | 0 | 4 |
| | GEOUMCC304 | Economic Geography | 4 | 0 | 0 | 4 |
| IV | GEOUMCC405 | Geography of India | 4 | 0 | 0 | 4 |
| | GEOUMCC406 | Techniques in Mapping and Surveying | 0 | 4 | 0 | 4 |
| | GEOUMCC407 | Environmental Geography | 4 | 0 | 0 | 4 |
| V | GEOUMCC508 | Hydrology | 4 | 0 | 0 | 4 |
| | GEOUMCC509 | Techniques in Environment and Hydrology | 0 | 4 | 0 | 4 |
| | GEOUMCC5010 | Climatology | 4 | 0 | 0 | 4 |
| | GEOUMCC5011 | Soil and Agricultural Geography | 4 | 0 | 0 | 4 |
| VI | GEOUMCC6012 | Techniques in Soil and Climatology | 0 | 4 | 0 | 4 |
| | GEOUMCC6013 | Settlement Geography | 4 | 0 | 0 | 4 |
| | GEOUMCC6014 | Remote Sensing and GIS | 4 | 0 | 0 | 4 |
| | GEOUMCC6015 | Field Project on Social Area Development | 0 | 0 | 4 | 4 |
| For Honours | | | | | | |
| VII | GEOUMCC7016 | Social and Political Geography | 4 | 0 | 0 | 4 |
| | GEOUMCC7017 | Population and Gender Studies | 4 | 0 | 0 | 4 |
| | GEOUMCC7018 | Techniques in Geospatial Analysis | 0 | 4 | 0 | 4 |
| VIII | GEOUMCC8019 | Geographical Thought | 4 | 0 | 0 | 4 |
| | GEOUMCC8020 | Urban and Regional Planning | 4 | 0 | 0 | 4 |
| | | Field Project in Disaster-prone area | 0 | 0 | 4 | 4 |
| For Research | | | | | | |
| VII | GEOUMCC7016 | Social and Political Geography | 4 | 0 | 0 | 4 |
| | GEOUMCC7017 | Population and Gender Studies | 4 | 0 | 0 | 4 |
| | GEOUMCC7018 | Techniques in Geospatial Analysis | 0 | 4 | 0 | 4 |
| VIII | GEOUMCC8019 | Geographical Thought | 4 | 0 | 0 | 4 |
| | GEOUMCC8020 | Urban and Regional Planning | 4 | 0 | 0 | 4 |
| | | Techniques in Disaster Management | 0 | 4 | 0 | 4 |

**B.Sc. Geography 4 Years Course
Semester wise Discipline Specific Elective (DSE)**

| Semester | Course Code | Course Name | Hours per week | | | Credits |
|---------------------|-------------|--|----------------|---|----|---------|
| | | | L | P | Pr | |
| FOR DEGREE | | | | | | |
| V | GEOUMCD501 | Transport Geography | 4 | 0 | 0 | 4 |
| VI | GEOUMCD602 | Geographical Research Methods | 4 | 0 | 0 | 4 |
| FOR HONOURS | | | | | | |
| VII | GEOUMCD703 | Network Analysis in Geography | 0 | 4 | 0 | 4 |
| | GEOUMCD704 | Natural hazard and Disaster Management | 4 | 0 | 0 | 4 |
| VIII | GEOUMCD805 | Rural and Regional Development | 4 | 0 | 0 | 4 |
| | GEOUMCD806 | Advance Statistical Methods in Geography | 0 | 4 | 0 | 4 |
| FOR RESEARCH | | | | | | |
| VII | GEOUMCD703 | Network Analysis in Geography | 0 | 4 | 0 | 4 |

**B.Sc. Geography 4 Years Course
Semester wise Minor Course (MIC) Generic Elective (GE)**

| Semester | Course Code | Course Name | Hours per week | | | Credits |
|---------------------|-------------|--|----------------|---|----|---------|
| | | | L | P | Pr | |
| I | GEOUMIC101 | Rural Development | 4 | 0 | 0 | 4 |
| II | GEOUMIC202 | Regional Development | 4 | 0 | 0 | 4 |
| III | GEOUMIC303 | Techniques in Rural Development | 0 | 4 | 0 | 4 |
| IV | GEOUMIC404 | Techniques in Regional Development | 0 | 4 | 0 | 4 |
| V | GEOUMIC505 | Industrial Geography | 4 | 0 | 0 | 4 |
| VI | GEOUMIC606 | Agricultural Geography | 4 | 0 | 0 | 4 |
| For Honours | | | | | | |
| VII | GEOUMIC707 | Project on Rural Economic Study | 0 | 0 | 4 | 4 |
| VIII | | Techniques in Demography | 0 | 4 | 0 | 4 |
| For Research | | | | | | |
| VII | | Techniques in Demography | 0 | 4 | 0 | 4 |
| VIII | | Advance Statistical Methods in Geography | 0 | 4 | 0 | 4 |

**B.Sc. Geography 4 Years Course
Semester wise Skill Enhancement Course (SEC)**

| Semester | Course Code | Course Name | Hours per week | | | Credits |
|---------------------|-------------|-------------------------------------|----------------|---|----|---------|
| | | | L | P | Pr | |
| I | GEOUSEC101 | Geography of Tourism | 3 | 0 | 0 | 3 |
| II | GEOUSEC202 | Quantitative Geography | 3 | 0 | 0 | 3 |
| III | GEOUSEC303 | Basic Statistics in Geography | 0 | 3 | 0 | 3 |
| IV | GEOUSEC404 | <i>Community Outreach Programme</i> | 0 | 0 | 2 | 2 |
| For Research | | | | | | |
| VII | GEOUSEC705 | Research Ethics and Methodology | 0 | 4 | 0 | 4 |
| VIII | GEOUSEC806 | Research Field Work | 0 | 4 | 0 | 4 |
| | GEOUSEC807 | Research Report and Viva | 0 | 0 | 4 | 4 |

**B.Sc. Geography 4 Years Course
Semester wise Multidisciplinary Course (MDC)**

| Semester | Course Code | Course Name | Hours per week | | | Credits |
|----------|-------------|----------------------------------|----------------|---|-----|---------|
| | | | L | P | Pr. | |
| I | | To be allotted by the Department | 3 | 0 | 0 | 3 |
| II | | To be allotted by the Department | 3 | 0 | 0 | 3 |
| III | | To be allotted by the Department | 3 | 0 | 0 | 3 |

**B.Sc. Geography 4 Years Course
Semester wise Value Added Course (VAC)**

| Semester | Course Code | Course Name | Hours per week | | | Credits |
|----------|-------------|--|----------------|---|-----|---------|
| | | | L | P | Pr. | |
| I | VACUDTS102 | Information & Technology Solution | 4 | 0 | 0 | 4 |
| II | VACUEVS101 | Environmental Science | 4 | 0 | 0 | 4 |
| III | GEOGVAC1BP | Project on Information & Technology Solution | 0 | 2 | 0 | 2 |
| IV | GEOGVAC2BPR | Project on Environmental Science | 0 | 0 | 2 | 2 |

**B.Sc. Geography 4 Years Course
Semester wise Ability Enhancement Course (AECC)**

| Semester | Course Code | Course Name | Hours per week | | | Credits |
|----------|-------------|--------------------------------|----------------|---|-----|---------|
| | | | L | P | Pr. | |
| I | AECCUEL103 | English Communicative Language | 2 | 0 | 0 | 2 |
| II | AECCUBL101 | Bengali Language | 2 | 0 | 0 | 2 |
| III | | English Communicative Language | 2 | 0 | 0 | 2 |
| IV | | Bengali Language | 2 | 0 | 0 | 2 |

B.Sc. Geography 4 Years Course Semester wise Course and Credits Pattern

Semester-I

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|-----|-----|----------|-----|------|-----|---------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| I | 6 | 1 | - | 1 | 1 | 1 | 1 | 1 | 20 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|-------------------|-----------------------------------|----------------------|---|----|---------|
| | | L | P | Pr | |
| GEOUMCC101 | Physical Geography | 4 | 0 | 0 | 4 |
| | To be allotted by the Department | 3 | 0 | 0 | 3 |
| GEOUMIC101 | Rural Development | 4 | 0 | 0 | 4 |
| GEOUSEC101 | Geography of Tourism | 3 | 0 | 0 | 3 |
| AECCUEL103 | English Communicative Language | 2 | 0 | 0 | 2 |
| VACUDTS102 | Information & Technology Solution | 4 | 0 | 0 | 4 |
| TOTAL | | 22 | 0 | 0 | 20 |

Semester-II

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|-----|-----|----------|-----|------|-----|---------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| II | 6 | 1 | - | 1 | 1 | 1 | 1 | 1 | 20 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|-------------------|----------------------------------|----------------------|---|----|---------|
| | | L | P | Pr | |
| GEOUMCC202 | Thematic Mapping | 0 | 4 | 0 | 4 |
| | To be allotted by the Department | 3 | 0 | 0 | 3 |
| GEOUMIC202 | Regional Development | 4 | 0 | 0 | 4 |
| GEOUSEC202 | Quantitative Geography | 3 | 0 | 0 | 3 |
| AECCUBL101 | Bengali Language | 2 | 0 | 0 | 2 |
| VACUEVS101 | Environmental Science | 4 | 0 | 0 | 4 |
| TOTAL | | 20 | 0 | 0 | 20 |

Exit option with Certificate

Semester-III

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|-----|-----|----------|-----|------|-----|---------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| III | 6 | 2 | - | 1 | 1 | 1 | 1 | - | 20 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|-------------------|----------------------------------|----------------------|----|----|---------|
| | | L | P | Pr | |
| GEOUMCC303 | Human Geography | 4 | 0 | 0 | 4 |
| GEOUMCC304 | Economic Geography | 4 | 0 | 0 | 4 |
| | To be allotted by the Department | 4 | 0 | 0 | 4 |
| GEOUMIC303 | Techniques in Rural Development | 0 | 4 | 0 | 4 |
| GEOUSEC303 | Basic Statistics in Geography | 0 | 2 | 0 | 2 |
| | English Communicative Language | 2 | 0 | 0 | 2 |
| TOTAL | | 10 | 10 | 0 | 20 |

Semester-IV

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|-----------|--------------|-------------|----------|----------|----------|----------|----------|----------|-----------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| IV | 6 | 3 | - | - | 1 | 1 | 1 | - | 20 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|-------------------|-------------------------------------|----------------------|----------|----------|-----------|
| | | L | P | Pr | |
| GEOUMCC405 | Geography of India | 4 | 0 | 0 | 4 |
| GEOUMCC406 | Techniques in Mapping and Surveying | 4 | 0 | 0 | 4 |
| GEOUMCC407 | Environmental Geography | 4 | 0 | 0 | 4 |
| GEOUMIC404 | Techniques in Regional Development | 0 | 4 | 0 | 4 |
| GEOUSEC404 | Community Outreach Programme | 0 | 0 | 2 | 2 |
| | Bengali Language | 2 | 0 | 0 | 2 |
| TOTAL | | 14 | 4 | 2 | 20 |

Exit option with Diploma

Semester-V

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|----------|----------|----------|----------|----------|----------|-----------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| V | 6 | 4 | 1 | - | 1 | - | - | - | 24 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|--------------------|---------------------------------------|----------------------|----------|----------|-----------|
| | | L | P | Pr | |
| GEOUMCC508 | Hydrology | 4 | 0 | 0 | 4 |
| GEOUMCC509 | Techniques in Environment & Hydrology | 0 | 4 | 0 | 4 |
| GEOUMCC5010 | Climatology | 4 | 0 | 0 | 4 |
| GEOUMCC5011 | Soil and Agricultural Geography | 4 | 0 | 0 | 4 |
| GEOUMCD501 | Transport Geography | 4 | 0 | 0 | 4 |
| GEOUMIC505 | Industrial Geography | 4 | 0 | 0 | 4 |
| TOTAL | | 20 | 4 | 0 | 24 |

Semester-VI

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|-----------|--------------|-------------|----------|----------|----------|----------|----------|----------|-----------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| VI | 6 | 4 | 1 | - | 1 | - | - | - | 24 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|--------------------|--|----------------------|----------|----------|-----------|
| | | L | P | Pr | |
| GEOUMCC6012 | Techniques in Soil and Climatology | 0 | 4 | 0 | 4 |
| GEOUMCC6013 | Settlement Geography | 4 | 0 | 0 | 4 |
| GEOUMCC6014 | Remote Sensing and GIS | 4 | 0 | 0 | 4 |
| GEOUMCC6015 | Field Project on Social Area Development | 0 | 0 | 4 | 4 |
| GEOUMCD602 | Geographical Research Methods | 4 | 0 | 0 | 4 |
| GEOUMIC606 | Agricultural Geography | 4 | 0 | 0 | 4 |
| TOTAL | | 16 | 4 | 4 | 24 |

Exit option with Bachelor of Science (B.Sc.) Basic Degree

Semester-VII

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|-----|-----|----------|-----|------|-----|---------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| VII | 6 | 3 | 2 | - | 1 | - | - | - | 24 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|--------------|--|----------------------|----------|----------|-----------|
| | | L | P | Pr | |
| GEOUMCC7016 | Social and Political Geography | 4 | 0 | 0 | 4 |
| GEOUMCC7017 | Population and Gender Studies | 4 | 0 | 0 | 4 |
| GEOUMCC7018 | Techniques in Geospatial Analysis | 0 | 4 | 0 | 4 |
| GEOUMCD703 | Network Analysis in Geography | 0 | 4 | 0 | 4 |
| | Natural hazard and Disaster Management | 4 | 0 | 0 | 4 |
| GEOUMIC707 | Project on Rural Economic Study | 0 | 0 | 4 | 4 |
| TOTAL | | 12 | 8 | 4 | 24 |

Semester-VIII

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|-----|-----|----------|-----|------|-----|---------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| VIII | 6 | 3 | 2 | - | 1 | - | - | - | 24 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|--------------|--|----------------------|----------|----------|-----------|
| | | L | P | Pr | |
| GEOUMCC8019 | Geographical Thought | 4 | 0 | 0 | 4 |
| GEOUMCC8020 | Urban and Regional Planning | 4 | 0 | 0 | 4 |
| | Field Project in Disaster-prone area | 0 | 0 | 4 | 4 |
| | Rural and Regional Development | 4 | 0 | 0 | 4 |
| | Advance Statistical Methods in Geography | 0 | 4 | 0 | 4 |
| | Techniques in Demography | 0 | 4 | 0 | 4 |
| TOTAL | | 12 | 8 | 4 | 24 |

Award of Bachelor of Science with Honours Degree

Semester-VII

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|-----|-----|----------|-----|------|-----|---------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| VII | 6 | 3 | 1 | - | 1 | 1 | - | - | 24 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|--------------|-----------------------------------|----------------------|-----------|----------|-----------|
| | | L | P | Pr | |
| GEOUMCC7016 | Social and Political Geography | 4 | 0 | 0 | 4 |
| GEOUMCC7017 | Population and Gender Studies | 4 | 0 | 0 | 4 |
| GEOUMCC7018 | Techniques in Geospatial Analysis | 0 | 4 | 0 | 4 |
| GEOUMCD703 | Network Analysis in Geography | 0 | 4 | 0 | 4 |
| | Techniques in Demography | 0 | 4 | 0 | 4 |
| GEOUSEC705 | Research Ethics and Methodology | 4 | 0 | 0 | 4 |
| TOTAL | | 12 | 12 | 0 | 24 |

Semester-VIII

| Semester | Total Papers | Paper Codes | | | | | | | Credits |
|----------|--------------|-------------|-----|-----|----------|-----|------|-----|---------|
| | | MCC | DSE | MDC | MIC (GE) | SEC | AECC | VAC | |
| VIII | 6 | 3 | | - | 1 | 1 | - | - | 24 |

| Course Code | Course Name | Class Hours per week | | | Credits |
|-------------|-----------------------------------|----------------------|---|----|---------|
| | | L | P | Pr | |
| GEOUMCC8019 | Geographical Thought | 4 | 0 | 0 | 4 |
| GEOUMCC8020 | Urban and Regional Planning | 4 | 0 | 0 | 4 |
| | Techniques in Disaster Management | 0 | 4 | 0 | 4 |
| GEOUSEC806 | Research Field Work | 0 | 4 | 0 | 4 |
| GEOUSEC807 | Research Report and Viva | 0 | 0 | 4 | 4 |

| | | | | | |
|--------------|--|----------|-----------|----------|-----------|
| | Advance Statistical Methods in Geography | 0 | 4 | 0 | 4 |
| TOTAL | | 8 | 12 | 4 | 24 |

Award of Bachelor of Science with Research Degree

4 Years UG Curriculum and Credit Framework for Geography (with Honours)

| SEM | MAJOR (4) | MAJOR PAPER NAME | Elective (DSE)(4) | DSE PAPER NAME | MDC (4) | MDC PAPER NAME | GE (4) | GE PAPER NAME | AECC (2) | SEC (2) | SEC PAPER NAME | VAC (2) | VAC PAPER NAME |
|------|-----------|--|-------------------|--|---------|----------------|------------|------------------------------------|------------|------------------------------|-------------------------------|--------------|-----------------------------------|
| I | CC1 T | Physical Geography | | | MDC1 | | GE1 A (T) | Rural Development | AECC (EC1) | SEC1 (T) | Geography of Tourism | VAC1 A (T) | Information & Technology Solution |
| II | CC2 T | Thematic Mapping | | | MDC2 | | GE2 A (T) | Regional Development | AECC (BL1) | SEC2 (T) | Quantitative Geography | VAC2A (T) | Environmental Science |
| III | CC3 P | Human Geography | | | MDC3 | | GE1 B (P) | Techniques in Rural Development | AECC (EC2) | SEC2 (P) | Basic Statistics in Geography | VAC 1 B (P) | |
| | CC4 T | Economic Geography | | | | | | | | | | | |
| IV | CC5 T | Geography of India | | | | | GE2 B (P) | Techniques in Regional Development | AECC (BL2) | Community Outreach Programme | | VAC 2 B (PR) | |
| | CC6 P | Techniques in Mapping & Surveying | | | | | | | | | | | |
| | CC7 T | Environmental Geography | | | | | | | | | | | |
| V | CC8 T | Hydrology | DSE1 (T) | Transport Geography | | | GE1 C (T) | Industrial Geography | | | | | |
| | CC9 P | Techniques in Environment & Hydrology | | | | | | | | | | | |
| | CC10 T | Climatology | | | | | | | | | | | |
| | CC11 T | Soil and Agricultural Geography | | | | | | | | | | | |
| VI | CC12 P | Techniques in Soil and Climatology | DSE2 (T) | Geographical Research Methods | | | GE2 C (T) | Agricultural Geography | | | | | |
| | CC13 T | Settlement Geography | | | | | | | | | | | |
| | CC14 T | Remote Sensing and GIS | | | | | | | | | | | |
| | CC15 PR | Field Project on Social Area Development | | | | | | | | | | | |
| VII | CC16 T | Social and Political Geography | DSE3 (P) | Network Analysis in Geography | | | GE1 D (PR) | Project on Rural Economic Study | | | | | |
| | CC17 T | Population and Gender Studies | DSE4(T) | Natural hazard and Disaster Management | | | | | | | | | |
| | CC18 P | Techniques in Geospatial Analysis | | | | | | | | | | | |
| VIII | CC19 T | Geographical Thought | DSE5(T) | Rural and Regional Development | | | GE2 D (P) | Techniques in Demography | | | | | |
| | CC20 T | Urban and Regional Planning | DSE6 (P) | Advance Statistical Methods in Geography | | | | | | | | | |
| | CC21 PR | Field Project in Disaster-prone area | | | | | | | | | | | |

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4 Years UG Curriculum and Credit Framework for Geography (with Research)

| SEM | MAJOR (4) | MAJOR PAPER NAME | Elective (DSE)(4) | DSE PAPER NAME | MDC (4) | MDC PAPER NAME | GE (4) | GE PAPER NAME | AECC (2) | SEC (2) | SEC PAPER NAME | VAC (2) | VAC PAPER NAME |
|------|-----------|-----------------------------------|-------------------|-------------------------------|---------|----------------|----------|--|----------|-------------------------------|-------------------------------------|---------|----------------|
| VII | CC16 T | Social and Political Geography | DSE3 (P) | Network Analysis in Geography | | | GE2D (P) | Techniques in Demography | | SEC4T Research Course Work | Research Ethics and Methodology (4) | | |
| | CC17 T | Population and Gender Studies | | | | | | | | | | | |
| | CC18 P | Techniques in Geospatial Analysis | | | | | | | | | | | |
| VIII | CC19 T | Geographical Thought | | | | | GE3D (P) | Advance Statistical Methods in Geography | | SEC5P Research Field Work | Research Field Work (4) | | |
| | CC20 T | Urban and Regional Planning | | | | | | | | SEC6PR Writing & Presentation | Research Report and Viva (4) | | |
| | CC21 P | Techniques in Disaster Management | | | | | | | | | | | |

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Question patterns of End Semester Examination(ESE)
For UGC Curriculum and Credit Framework Undergraduate Programmes
Question pattern for all Theory Paper

| | Course | Marks | | | | |
|----------------|--|--|---|---|---|-----------|
| | | CC/DSE/IDC/ GE/AECC/ SEC/VAC (Theoretical) | END Semester Examination FullMarks:40, Time: 2 hours, (Weightage100%)* ¹ | | Internal Assessment (WrittenMid-Sem+CA) MID-Semester (Written)Examination FullMarks:10, Time: 30 min. (Weightage50%)* ² | |
| Question Types | Objective/ Very short type | Answer 05 questions (outof08) 02 marks each | 02 ×5=10 | Answer 05 question (outof08) 02 marks each | 02 ×5=10 | 05 |
| | Descriptive/ Broad Type* ⁴ | Answer 03 questions (out of 05) 10 marks each | 10 ×3=30 | | | |
| | | | 40 | | 05 | 05 |

*¹ 100%weightagemeanstotal marks scored out of 40willbe counted/reflected in full finally.

*² 50%weightagemeanshalf the marks scored out of 10 will be counted/reflected finally.

*³CA stands for Continuous assessment (that may be based on class attendance, role sin departmental activities, *viva* etc.). Full weightage.

*⁴Any Descriptive/Broad Type Question, carrying10 marks, needs not necessarily be a single question.

Question pattern forall Practical Papers

| Course | Marks distribution | | |
|------------------|---|---------------------|-----------|
| Practical | END Semester Examination Full Marks: 50, Time: 2 hours | | |
| | 1 | Experiments | 30 |
| | 2 | Practical Note Book | 15 |
| | 3 | <i>Viva voce</i> | 5 |
| | TOTAL | | 50 |

Project Work sother than Research work/Dissertation in 8th Sem.

| Course | Marks distribution | | |
|---------------------------|--|------------------|-----------|
| Project Work(2Cr.) | END Semester Examination, Full Marks: 50 | | |
| | 1 | Report writing | 25 |
| | 2 | Presentation | 15 |
| | 3 | <i>Viva voce</i> | 10 |
| | TOTAL | | 50 |

N.B.

- Students would be allowed to pursue research provided they scored 7.5 CGPA up to the 6th Semester exam.
- Up to the 6th semester the course structure and credits would remain the same for all. In the 7th and 8th semesters only, research work would be conducted (as shown by the course titles in green colour), and this entails some changes in the number of DSE courses.
- Those who are allowed to pursue Research course (RC) since 7th Semester, and to conduct research for Dissertation in the 8th semester is advised to consult the Under-Graduate Research Regulation (UG-RR)-2023 of the College, available / to be made available on the website in the due course.
- All through the eight semesters, ESE and other examination patterns would remain the same for those students who undertake Research.

PROGRAMME OUTCOMES IN GEOGRAPHY

By the end of the program the students will be able to:

(Refer to literature on outcome-based education (OBE) for details on Program Outcomes)

PO1: Relating to Knowledge

By the end of the program the students will be able to:

- 1.1 gives explanation of relevant terms and concept of geography including definitions.
- 1.2 gives better explanation about relevant principles, theories and models in geography.
- 1.3 show clear knowledge relating to man and environmental process and factors.

PO2: Understanding and application

By the end of the program the students will be able to:

- 2.1 Identify the importance of spatial scale and time scale.
- 2.2 Know the complex and interactive nature of physical and human environments.
- 2.3 Identify the importance of the resemblances and variance between places, environments and people.
- 2.4 Comprehend how processes bring changes in systems, distributions and environments.

PO3: Students Skills

By the end of the program the students will be able to:

- 3.1 Interpret a variety of types of geographical data and sources and recognise their limitations.
- 3.2 Communicate geographical evidence, ideas and arguments.
- 3.3 Use geographical data to identify trends and patterns.
- 3.4 Use diagrams and sketch maps to demonstrate geographical aspects.
- 3.5 Demonstrate skill of analysis and synthesis of geographical information

PO4: Students Evaluation

By the end of the program the students will be able to:

- 4.1 Critically evaluate geographical principles, theories and models
- 4.2 Assess the effects of geographical processes and change on physical and human environments.
- 4.3 Assess how the viewpoints of different groups of people, potential conflicts of interest and other factors interact in the management of physical and human environments.
- 4.4 Evaluate the relative success or failure of initiative

Programme Articulation Matrix for Major Courses (MCC)

| Semester | Course Code | Course Name | Program outcomes that the course addresses | Assessment |
|---------------------|-------------|--|--|------------------------------------|
| I | GEOUMCC101 | Physical Geography | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| II | GEOUMCC202 | Thematic Mapping | PO-1, PO-3, PO-4 | In-course & End Course Assessment |
| III | GEOUMCC303 | Human Geography | PO-1, PO-3 | End Course Assessment |
| | GEOUMCC304 | Economic Geography | PO-1 | In-course & End Course Assessment |
| IV | GEOUMCC405 | Geography of India | | |
| | GEOUMCC406 | Techniques in Mapping and Surveying | PO-1, PO-2 | In-course & End Course Assessment |
| | GEOUMCC407 | Environmental Geography | PO-1, PO-3 | End Course Assessment |
| V | GEOUMCC508 | Hydrology | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| | GEOUMCC509 | Techniques in Environment and Hydrology | PO-1, PO-3 | End Course Assessment |
| | GEOUMCC5010 | Climatology | PO-1, PO-2 | In-course & End Course Assessment |
| | GEOUMCC5011 | Soil and Agricultural Geography | PO-1, PO3 | In-course & End Course Assessment |
| VI | GEOUMCC6012 | Techniques in Soil and Climatology | PO-1, PO3 | End Course Assessment |
| | GEOUMCC6013 | Settlement Geography | PO-1, PO3 | In-course & End Course Assessment |
| | GEOUMCC6014 | Remote Sensing and GIS | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| | GEOUMCC6015 | Field Project on Social Area Development | PO-2, PO-3, PO-4 | End Course Final report Assessment |
| For Honours | | | | |
| VII | GEOUMCC7016 | Social and Political Geography | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| | GEOUMCC7017 | Population and Gender Studies | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| | GEOUMCC7018 | Techniques in Geospatial Analysis | PO-1, PO-3 | End Course Assessment |
| VIII | GEOUMCC8019 | Geographical Thought | PO-2, PO-3, PO-4 | In-course & End Course Assessment |
| | GEOUMCC8020 | Urban and Regional Planning | PO-1 | In-course & End Course Assessment |
| | | Field Project in Disaster-prone area | PO-1, PO-3 | End Course Final report Assessment |
| For Research | | | | |
| VII | GEOUMCC7016 | Social and Political Geography | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| | GEOUMCC7017 | Population and Gender Studies | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| | GEOUMCC7018 | Techniques in Geospatial Analysis | PO-1, PO-3 | End Course Assessment |
| VIII | GEOUMCC8019 | Geographical Thought | PO-2, PO-3, PO-4 | In-course & End Course Assessment |
| | GEOUMCC8020 | Urban and Regional Planning | PO-1 | In-course & End Course Assessment |
| | | Techniques in Disaster Management | PO-1, PO-3 | End Course Assessment |

Program Articulation Matrix for Discipline Specific Electives (DSE)

| Semester | Course Code | Course Name | Program outcomes that the course addresses | Assessment |
|---------------------|-------------|--|--|-----------------------------------|
| V | GEOUMCD501 | Transport Geography | PO-1 | In-course & End Course Assessment |
| VI | GEOUMCD602 | Geographical Research Methods | PO-1, PO-3 | In-course & End Course Assessment |
| FOR HONOURS | | | | |
| VII | GEOUMCD703 | Network Analysis in Geography | PO-1 | End Course Assessment |
| | | Natural hazard and Disaster Management | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| VIII | | Rural and Regional Development | PO-1 | In-course & End Course Assessment |
| | | Advance Statistical Methods in Geography | PO-1, PO-2, PO-4 | End Course Assessment |
| FOR RESEARCH | | | | |
| VII | GEOUMCD703 | Network Analysis in Geography | PO-1 | End Course Assessment |

Program Articulation Matrix for Generic Electives (GE)

| Semester | Course Code | Course Name | Program outcomes that the course addresses | Assessment |
|---------------------|-------------|--|--|-------------------------------------|
| I | GEOUMIC101 | Rural Development | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| II | GEOUMIC202 | Regional Development | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| III | GEOUMIC303 | Techniques in Rural Development | PO-1, PO-2 | End Course Assessment |
| IV | GEOUMIC404 | Techniques in Regional Development | PO-1 | End Course Assessment |
| V | GEOUMIC505 | Industrial Geography | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| VI | GEOUMIC606 | Agricultural Geography | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| For Honours | | | | |
| VII | GEOUMIC707 | Project on Rural Economic Study | PO-2, PO-3, PO-4 | End Course Assessment, Final report |
| VIII | | Techniques in Demography | PO-1, PO-2 | End Course Assessment |
| For Research | | | | |
| VII | | Techniques in Demography | | End Course Assessment |
| VIII | | Advance Statistical Methods in Geography | PO-1, PO-2, PO-4 | End Course Assessment |

Program Articulation Matrix for Skill Enhancement Course (SEC)

| Semester | Course Code | Course Name | Program outcomes that the course addresses | Assessment |
|---------------------|-------------|-------------------------------------|--|-------------------------------------|
| I | GEOUSEC101 | Geography of Tourism | PO-1, PO-2, PO-4 | In-course & End Course Assessment |
| II | GEOUSEC202 | Quantitative Geography | PO-1, PO-2 | In-course & End Course Assessment |
| III | GEOUSEC303 | Basic Statistics in Geography | PO-1, PO-2, PO-4 | End Course Assessment |
| IV | GEOUSEC404 | <i>Community Outreach Programme</i> | PO-2, PO-3, PO-4 | End Course Assessment, Final report |
| For Research | | | | |
| VII | GEOUSEC705 | Research Ethics and Methodology | PO-1, PO-2 | In-course & End Course Assessment |
| VIII | GEOUSEC806 | Research Field Work | PO-1, PO-2 | In-course Assessment |
| | GEOUSEC807 | Research Report and Viva | PO-2, PO-3, PO-4 | End Course Assessment, Final report |

B.Sc. Geography Degree (Basic / Honours/ Research)
Technical skills and possible jobs after each exit

| Year (Semester) | Exit Level | Credits | Technical Skills | Possible Job opportunities |
|---|--------------------|----------------|--|---|
| 1st (I & II) | Certificate | 40 | 1.Map Interpretation 2.Geographical Analysis 3.Tourism management 4.Data Analysis 5.Basic Computer Skill | 1. Field Surveyor 2. Tourism Sector |
| 2nd (III & IV) | Diploma | 80 | 1. Cartography 2. Environmental analysis 3. Statistical analysis 4. Development analysis | 1. Field Surveyor 2. Cartographer 3. Nature Conservation Officer 4. Local level Development Officer |
| 3rd (V & VI) | Degree | 128 | 1. GIS & Image analysis 2. Soil analysis 3. Field survey 4. Teaching skill | 1. GIS Trainee 2. Field Surveyor 3. Environmental consultant 4. Geography Teacher |
| 4th (VII & VIII) | Honours | 176 | 1. Environmental analysis 2. Disaster analysis 3. Planning & development 4. Geospatial analysis | 1. GIS Trainee 2. Nature Conservation Officer 3. Environmental consultant 4. Geography Teacher |
| 4th (VIII & VIII) | Research | 176 | 1. Environmental analysis 2. Disaster analysis 3. Planning & development 4. Geospatial analysis 5. Teaching skill 6. Research skill | 1. GIS Trainee 2. Nature Conservation Officer 3. Environmental consultant 4. Geography Teacher 5. Planning officer 6. Researcher |

MAJOR CORE COURSE

GEOUMCC101: Physical Geography

Course Objectives:

- 1) An understanding of the linkages between landscape form and processes.
- 2) Familiarity and experience applying fundamental concepts in physical systems.
- 3) Practice in using models, data and logical reasoning to critically evaluate and connect information about geomorphic processes.

Course Learning Outcome:

- 1) Explain basic principles for development of landforms through time.
- 2) Make an initial geomorphological fieldwork.
- 3) Learn the techniques of geomorphological analysis.

Course Contents:

- 1) Geomorphology: Approaches in analysis of geomorphology, fundamental concepts in geomorphology, Geological Time scale.
- 2) Earth Structure: Rock types, Interior Structure, Folds and Faults, Theory of Isostasy (Airy, Pratt).
- 3) Earth Movements: Earth movement, Continental Drift Theory, Plate Tectonics and sea floor spreading; Earthquakes and Volcanisms.
- 4) Geomorphic Processes: Weathering and Mass Wasting; Erosional and Depositional landforms: Fluvial, Aeolian, Glacial, Karst, and Coast.
- 5) Evolution of Landforms: Cycle of Erosion by Davis and Penck; Rejuvenation of landforms.

Reference book list

1. Bloom A. L., 2003: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
2. Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.
3. Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
4. Kale V. S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.
5. Knighton A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London.
6. Richards K. S., 1982: Rivers: Form and Processes in Alluvial Channels, Methuen, London.
7. Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP
8. Singh, S. (1998). Geomorphology. Prayag Pustak Bhawan.
9. Skinner, Brian J. and Stephen C. Porter (2000), The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons
10. Thornbury W. D., 1968: Principles of Geomorphology, John Wiley and Sons, New York.

Reference Websites

1. <http://www.solarviews.com/eng/earth.htm>
2. <http://www.moorlandschool.co.uk/earth/tectonic.htm>
3. <https://www.usgs.gov/>
4. <https://www.ksndmc.org/>

GEOUMCC202: Thematic Mapping

Course Objectives

1. To know the concept of scale and their types, process of graphical construction.
2. To understand and interpreted the map and their different pattern

Course Learning Outcomes:

1. After the completion of course, the students will have basic ideas about cartographic techniques and ability to prepare maps, comprehend locational and spatial aspects.
2. Use and importance of maps for regional development and decision making.
3. Students will be able to calculate and draw the different scales and map.
4. Students can understand the graphical presentation of data in various forms.

Course Content:

1. Scales: Concept and application; Graphical construction of Plain, Diagonal and Vernier Scales
2. Maps: Concept and classification; Map Projections: Properties and Uses; Construction of Polar Zenithal Stereographic, Simple Conical, Bonne's and Universal Transverse Mercator (UTM) Projection.
3. Diagrammatic Data Presentation: Line, Bar and Circle, Choropleth, Dot.
4. ProportionalData Mapping: Circles, Square; Point Data – Isopleths, Isobar
5. Cartographic Overlays: Point, Line and Areal Data.

Practical Record: Thematic map should be prepared on a specific theme with at least ten plates.

Reference book list

- 1) Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books
- 2) Dent B. D., Torguson J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), McGraw-Hill Higher Education
- 3) Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
- 4) Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
- 5) Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New Delhi.
- 6) Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- 7) Sharma J. P., 2010: Prayogic Bhugol, Rastogi Publishers, Meerut.
- 8) Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
- 9) Slocum T. A., McMaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geo-visualization (3rd Edition), Prentice Hall.
- 10) Tyner J. A., 2010: Principles of Map Design, The Guilford Press.

GEOUMCC303 – Human Geography

Course Objectives:

1. Understand the basics concepts of human geography
2. Study population attributes and dynamic nature of it
3. Introduce economic, cultural, and trade activities and their impact on the development of the region

Course Learning Outcomes:

1. Students will learn how human, physical, and environmental components of the world interact.
2. Students will be familiarized with economic processes such as globalization, and their impacts on cultural and social activities.
3. The student will describe what geography and human geography are.
4. Understand human ethics and values in life.

Course Content:

1. Human Geography: Definition, Nature and Scope, Contemporary relevance, Human values and ethics.
2. Society: Concept and types; Race; Religion and Language (Indian case).
3. Culture: Concept, Ecology, Convergence, Cultural Regions (India)
4. Social: Structure and Processes, Social Well-being, Social Exclusion.
5. Human adaptation to Environment: Jarwa, Santhals, Banjara, Garo.

Reference book list

1. Chandna, R.C. (2010) Population Geography, Kalyani Publisher. New Delhi.
2. Daniel, P.A. and Hopkinson, M.F. (1989), The Geography of Settlement, Oliver & Boyd, London.
3. Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
4. Hussain, Majid (2012) ManavBhugol. Rawat Publications, Jaipur
5. Johnston R; Gregory D, Pratt G. et al. (2008), The Dictionary of Human Geography, Blackwell Publication.
6. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.
7. Kaushik, S.D. (2010) ManavBhugol, Rastogi Publication, Meerut.
8. Maurya, S.D. (2012) ManavBhugol, ShardaPustakBhawan. Allahabad.
9. Zapf, H. 2016 ed. Handbook of Ecocriticism and Cultural Ecology: De Gruyter, Berlin

Reference Websites

<https://www.betterup.com/blog/what-is-social-well-being-definition-types-and-how-to-achieve-it>
<https://www.jetir.org/papers/JETIR1807883.pdf>
<https://pangeography.com/social-well-being-in-geography/>
<https://upscwithnikhil.com/index.php/article/ethics/human-values-and-ethics>

GEOUMCC304: Economic Geography

Course Objectives:

- 1) The students will appreciate the significance of social, cultural and political factors as central to the functioning of economies; and that the economic processes need to be analysed in social, cultural and political contexts.
- 2) The students will be exposed to contemporary themes in economic geography and be conscious of the numerous economic issues confronting the world economic system.
- 3) The students will realise the relevance of economic geography for analysing contemporary societies and economies.

Course Learning Outcomes:

- 1) The students will be able to appreciate that geography and space matter in economy.
- 2) The students will be able to identify some key issues that economic geography engages with.
- 3) The students will be able to comprehend and analyse the principal questions confronting the contemporary space-economy.

Course Contents:

1. Introduction: Concept and classification of economic activity
2. Factors of location of economic activity: Agriculture (Von Thunen theory), Industry (Weber's theory).
3. Primary Activities: Subsistence and Commercial agriculture, forestry, fishing and mining.
4. Secondary Activities: Manufacturing (Cotton Textile, Iron and Steel), Concept of Manufacturing Regions, Special Economic Zones and Technology Parks.
5. Tertiary and quaternary Activities: Transport, Trade and Services.

Reference book list

- 1) Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- 2) Bagchi-Sen S. and Smith H. L., 2006: Economic Geography: Past, Present and Future, Taylor and Francis.
- 3) Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. 2000: The Oxford
- 4) Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
- 5) Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.
- 6) Durand L., 1961: Economic Geography, Crowell.
- 7) Hodder B. W. and Lee Roger, 1974: Economic Geography, Taylor and Francis.
- 8) Wheeler J. O., 1998: Economic Geography, Wiley.
- 9) Willington D. E., 2008: Economic Geography, Husband Press.

GEOUMCC405: Geography of India

Course Objectives:

- 1) This course on the Geography of India assumes' that the students are familiar with the basic landforms, climate, soil, vegetation and population characteristics of India.
- 2) It is a course designed to enable students to broaden and deepen their understanding of India.

Course Learning Outcomes:

- 1) Students would gain understanding of 'new' geography of their country.
- 2) The spatial variations of dimensions of vitality and vulnerability would help them see the strength and weakness of the country.
- 3) The course would help students to contextualize much of their further learnings, teaching and research on India within the contents of this course.

Course Contents:

1. Physical: Physiographic Divisions, soil and vegetation, climate (characteristics and classification), Drainage System – Himalayan and Peninsular Rivers.
2. Population: Demographic structure, Distribution, Trends of urban and rural population growth.
3. Economic: Mineral and power resources distribution and utilisation- iron ore, coal, petroleum, gas, hydro-electricity; Agriculture & Plantation - rice, wheat and tea; Industries-automobile and information technology.
4. Social: Distribution of population by race, caste, religion, language, tribes and their correlation
5. Regionalisation of India: Physiographic (R. L. Singh), Socio – cultural (Sopher), Economic (Sengupta)

Reference book list

- 1) Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
- 2) Johnson, B. L. C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.
- 3) Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective. Vol.3 – Indian Perspective.
- 4) Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
- 5) Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
- 6) Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur
- 7) Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.
- 8) Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
- 9) Spate O. H. K. and Learmonth A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen.
- 10) Tirtha, Ranjit 2002: Geography of India. RawatPubls., Jaipur & New Delhi. 10. Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
- 11) Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad.

GEOUMCC406: Techniques in Mapping and Surveying

Course Objectives

3. To know the concept of map projection and their types, process of graphical construction.
4. To understand and interpreted the topographical map and their different physical features.

Course Learning Outcomes:

5. After the completion of course, the students will have basic ideas about cartographic techniques and ability to prepare maps, comprehend locational and spatial aspects of the earth's surface.
6. Use and importance of maps for regional development and decision making.
7. Students will be able to calculate and draw the different scales and map projections.
8. Students can understand the relief and slope of mountain and plateau areas and interpret them from topographical sheets.

Course Contents:

1. Map Analysis: History of topographical mapping in India, Reference scheme of old and open series
2. Topographical Map Analysis: Preparation and interpretation of physical and cultural elements – Drainage, Vegetation, Settlement; Preparation of Transect chart.
3. Preparation of Relief Maps from Toposheet: Cross and Longitudinal Profiles (Superimposed, projected and composite), Relative relief, Dissection index, Ruggedness index, Average slope (Wentworth method)
4. Geological Map: Profile, structure and interpretation of Uniclinal, Fold and Fault.
5. Surveying: Traversing by Prismatic Compass, Profile by Dumpy Level and Height measurement by Theodolite.

Practical Record: Thematic map should be prepared on a specific theme with plates.

Reference book list

- 1) Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books
- 2) Dent B. D., Torguson J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), McGraw-Hill Higher Education
- 3) Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
- 4) Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
- 5) Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New Delhi.
- 6) Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- 7) Sharma J. P., 2010: Prayogic Bhugol, Rastogi Publishers, Meerut.
- 8) Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
- 9) Slocum T. A., McMaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geo-visualization (3rd Edition), Prentice Hall.

GEOUMCC407: Environmental Geography

Course Objectives:

- 1) Various dimensions of the ecosystems, their spatial distribution.
- 2) Anthropogenic interventions and resultant impacts on various ecosystems.
- 3) Understanding of environmental governance.

Course Learning Outcomes:

- 1) Detailed exposure to the concept of ecosystem, processes, theories and concepts.
- 2) In-depth knowledge of anthropogenic interventions and impacts, conservation strategies and planning
- 3) Evaluation and achievement of different environmental programs, policies and legislations.

Course Contents:

- 1) Environmental geography: Perception of environment; Geographers approaches to environment, historical progression, Man-environment relationships.
- 2) Environmental and Ecology: Components of environmental ecosystem- structure, food chain, web and pyramid; functions- energy flow and nutrient cycle.
- 3) Global Environmental Issues: Causes and management- Ozone depletion, Deforestation, Desertification and climate change.
- 4) Environmental Problems and Policies in India: Urban air and water pollution, Soil degradation; Indian Wildlife Protection Act-1972, Environmental Protection Act-1986, Environment Policy of India-2006
- 5) Environmental Summits and agreement: Club of Rome, Stockholm, Earth summit-1992; International agreement – Montreal, Kyoto Protocol, Paris Agreement.

Reference book list

- 1) N. Strahler and A. H., Strahler (1977). Geography & Man's Environment, John Wiley & Sons, New York. Communities, Thomas Telford, London.
- 2) Daniel D. Chiras (1997). Environmental Science Action for a Sustainable Future, The Benjamin/Cummings Publishing Company, Inc.
- 3) David Reid (1995). Sustainable Development CAU Introductory Guide. Earthscan Publication Ltd. London.
- 4) Declaration on Environment and Development), New York.
- 5) Desh Bandhoo & Ekalvya Chauhan (1977). Current Trends in Indian Environment, Today & Tomorrow Publisher, New Delhi.
- 6) Frank Vanclay and Daniel A. Bronstein (1996). Environmental and Social Impact Assessment, John Wiley & Sons Ltd.
- 7) G. Miller and Scott Spoolman (2018). Environmental Science, Brooks/Cole; 16th edition.
- 8) Henk, A. Becker (1997). Social Impact Assessment: Method and experience in Europe, North America and the Developing World. UCL Press.
- 9) Jonathan Turk (1989). Introduction to Environmental Studies, Saunders College Publishing.
- 10) K. S. K. Valdiya (1987). Environmental Geography-Indian Context, Tata McGraw Hill
- 11) P.A. Merriman and C. W. A. Browitt (1993). Natural Disasters: Protecting Vulnerable
- 12) P.R. Ehlich, A.H. Ehrlich & J. P. Holderen (1978). Eco-Science Population, Resources and Environment, W.H. Freeman & Co Ltd, San Francisco.
- 13) Pears Nigel (1977). Basic Bio-Geography, Longman Publishers, London. Publishing Company, New Delhi.
- 14) Savindra Singh (1991). Environmental Geography, Prayag Pustak Bhawan, Allahabad.
- 15) UNEP (1997). Global Environment Outlook Oxford University Press, New York.
- 16) United Nations (1992). Agenda 21: Programme of Action for Sustainable Development (Rio)
- 17) United Nations, ESCAP (1991). Environmental Impact Assessment: A Management Tool for Development Projects, New York.
- 18) Y. Anjaneyulu and Valli Manickam (2007). Environmental Impact Assessment Methodologies, BS Publications, Hyderabad.

GEOUMCC508: Hydrology

Course Objectives:

- 1) This course gives a holistic view of the water environments i.e., hydrology seen as a water carrier in nature with human influence.
- 2) To know diverse methods of collecting the hydrological information, which is essential to understand surface and groundwater hydrology?
- 3) To develop an understanding of how this knowledge may be applied in practice in an economic and environmentally sustainable manner.

Course Learning Outcomes:

- 1) Apply the water balance equation to various hydrological problems in time and space.
- 2) Describe how components of the water cycle are influenced by human activities.
- 3) Analyse hydrological data in order to evaluate water resource management in an area.

Course Contents:

- 1) Groundwater Hydrology: Occurrence of Groundwater: Aquifer, Aquiclude, Aquifuge and Aquitard, Porosity, Vertical distribution of Groundwater; Zone of aeration, zone of saturation,
- 2) Hydrological Cycle: Systems approach in hydrology, Precipitation, interception, infiltration, ground-water, run off and over land flow; Hydrological input and output.
- 3) Evaporation & Evapo-transpiration: Definitions, Factors effecting Evaporation, Evaporation from soil surfaces, Vapour transfer and Groundwater fluctuations, Measurement of evaporation.
- 4) River Basin and Regional Hydrology: Characteristics of river basins, basin surface run-off, measurement of river discharge; floods and droughts.
- 5) Hydrological Measurements: Concept of unit hydrograph and rating curves, Hydrograph analyses to estimate infiltration; Water Properties: BOD, COD, Dissolved Oxygen, pH, suspended solid, turbidity and electric conductivity

Reference book list

- 1) Andrew. D. ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition, Lewis
- 2) Bedient, P.B.et.al. (2008): Hydrology and Floodplain Management, Prentice Hall, Upper Saddle River, NJ 07458.
- 3) Biswas, A.K. (1972): History of Hydrology, North Holland Pub. Co. Amsterdam.
- 4) Boca Raton, F.L Viessman and Lewis (1996): Introduction to Hydrology, Harper Collins, New York.
- 5) Chow V.T., Maidment, D. R. and Mays, L.W. (1988): Applied Hydrology, Mc Graw Hill, New York.
- 6) Dingman, S.L. (2002): Physical Hydrology, 2nd Edition, Prentice Hall, Englewood Cliffs
- 7) Hyet, W.G. and W. Langbain (1955): Floods, Prentice Hall University Press, Princeton.
- 8) Karanth, K.R., (1988): Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
- 9) Keith, D. and Mays, L.W. (2004): Ground water hydrology, 3rd Edition, Wiley, Chichester. National Science Academy, New Delhi. CRC Press.
- 10) Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian
- 11) Rao, K.L., (1982): India's Water Wealth 2nd edition, Orient Longman, Delhi.
- 12) Singh, Vijay P. (1995): Environmental Hydrology. Kluwer Academic Publications.

GEOUMCC509: Techniques in Environment and Hydrology

Course Objectives:

- 1) This course gives a holistic view of the water environments i.e., hydrology seen as a water carrier in nature with human influence.
- 2) To know diverse methods of collecting the hydrological and environmental information, which is essential to understand surface and groundwater and environment.
- 3) To develop an understanding of how this knowledge may be applied in practice in environment and ground and surface water.

Course Learning Outcomes:

- 1) Apply the techniques to analyse water and environment.
- 2) Describe components of the water cycle and hydrograph.
- 3) Analyse hydrological data in order to evaluate water resource management in an area.

Course Contents:

- 1) Estimation of Water Properties: Dissolved Oxygen, pH, TDS, Salinity
- 2) Impact Assessment: EIA and SIA
- 3) Drainage Basin Analysis: Linear aspects - Stream ordering, Bifurcation ratio; Areal aspects - Drainage density, Stream frequency; Stream sinuosity index
- 4) Infiltration estimation using Infiltrometer, drawing infiltration curve;
- 5) Hydrograph: Construction of unit-hydrograph and rating curves

Reference book list

- 1) Andrew. D. ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition, Lewis
- 2) Bedinent, P.B.et.al. (2008): Hydrology and Floodplain Management, Prentice Hall, Upper Saddle River, NJ 07458.
- 3) Chow V.T., Maidment, D. R. and Mays, L.W. (1988): Applied Hydrology, Mc Graw Hill, New York.
- 4) Dingman, S.L. (2002): Physical Hydrology, 2nd Edition, Prentice Hall, Englewood Cliffs
- 5) Frank Vanclay and Daniel A. Bronstein (1996). Environmental and Social Impact Assessment, John Wiley & Sons Ltd.
- 6) Henk, A. Becker (1997). Social Impact Assessment: Method and experience in Europe, North America and the Developing World. UCL Press.
- 7) Karanth, K.R., (1988): Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
- 8) Keith, D. and Mays, L.W. (2004): Ground water hydrology, 3rd Edition, Wiley, Chichester. National Science Academy, New Delhi. CRC Press.
- 9) Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian
- 10) Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- 11) Singh, Vijay P. (1995): Environmental Hydrology. Kluwer Academic Publications.
- 12) Y. Anjaneyulu and Valli Manickam (2007). Environmental Impact Assessment Methodologies, BS Publications, Hyderabad.

GEOUMCC5010: Climatology

Course Objectives:

1. To know about atmospheric structure, composition and temperature variation.
2. To understand the atmospheric pressure and resultant different wind flows and also understand the atmospheric moisture and resultant climatic events.
3. To explain the cyclones and their formation and effects.

Course Learning Outcomes:

1. Understand the elements of weather and climate and its impacts at different scales.
2. Comprehend the climatic aspects and its bearing on planet earth.
3. Form this course students also can explain the different cyclonic events and their mechanism.
4. Understand the mechanisms and genesis of various climatological disasters

Course Content:

1. Atmosphere: Fundamental principles of climatology. Elements and factors of weather and climate
Composition and Structure, Temperature changes
2. Insolation: Factors and Distribution, Heat Budget, Temperature Inversion.
3. Atmospheric Pressure and Winds –Winds (Planetary Wind, Periodic & Local Wind), General Circulation, Monsoon - Origin and Mechanism.
4. Atmospheric Moisture – Evaporation, Humidity, Condensation, Fog and Clouds, Precipitation Types, Stability and Instability; Climatic Regions (Koppen)
5. Cyclones – Cyclones & Anti-Cyclones (Tropical & Temperate). ENSO events (El Nino, La Nina and Southern Oscillations).

Reference book list

1. Barry, R.G. & Chorley, P.J. (1998). Atmosphere, weather and climate, Routledge, London.
2. Critchfield, J.H. (1993). General Climatology, Prentice Hall, New Delhi.
3. Das, P.K. (1987). Monsoons, National Book Trust of India, New Delhi.
4. Fein, J.S. & Stephens, P.N. (1987). Monsoons, Wiley Interscience.
5. Griffith, J.F. (1978). Applied Climatology, Oxford University Press,
6. Hanwell, J. & Newson, M. (1973). Technique in Physical Geography, Palgrave Macmillan.
7. Indian Meteorological Department (1968). Climatological Tables of observations in India, Govt. of India.
8. Lal, D.S. (1985). Climatology, Chaitanya Publications, Allahabad, 1986
10. Menon, A. (1989). Our weather, National Book Trust of India, New Delhi.
11. Peterson, S. (1969). Introduction to Meteorology, Mc Graw Hill Book, London.
12. Robinson, P. J., & Henderson-Sellers, A. (2014). Contemporary climatology. Routledge.
13. Strahler, A.N. (1975). Physical Geography, Wiley International Edition, Singapore.
14. Trewartha, G.T. & Horn, L.H. (1971). An introduction to climate, Mc Graw Hill Book Company.
15. Thompson, R. (1997). Applied climatology: principles and practice. Psychology Press.

Reference Websites

1. <https://earthobservatory.nasa.gov/>
2. <https://mausam.imd.gov.in/>
3. <https://www.weatheronline.in/>
4. <https://earthexplorer.usgs.gov/>
5. <https://www.nhc.noaa.gov/satellite.php>

GEOUMCC5011: Soil and Agricultural Geography

Course Objectives:

1. To analyse the importance of soil with its physical and chemical properties
2. This course attempts to introduce the students to the nature and origin of agriculture and its regions.
3. The course examines the questions related to agricultural development and productivity in India.

Course Learning Outcomes:

1. Describe the different soil features and their properties and the impact on agriculture practice.
2. Understand the cropping pattern, mechanization of agriculture and institution's role on Indian agriculture.

Course Content:

- 1) Soil Geography: Nature, Physical and Chemical Properties of Soil, Soil profile Soil-Forming Processes, Controlling factors, Soil Classification.
- 2) Bio-functions and degradation of Soil; Soil organic matter, Soil organisms and Micro-organisms and their relation with soil fertility; Soil degradation and pollution: causes, processes and consequences; conservation measures.
- 3) Approaches in Agricultural Geography: Agricultural systems (ecological or near-ecological systems). Approaches to study agricultural geography, Jonnason's concept of agricultural land use
- 4) Determinants of agricultural: Physical and institutional, precision farming, use of modern technology
- 5) Issues and policies in Agriculture: Impact of green revolution, GM Crops, food security, agricultural policies of India.

Reading book list

1. Bhatia B.M. (2008): Indian agriculture: a policy perspective, Sage Publications India New Delhi
2. Deininger Dina and Umali Maguire Charles (2006): Agriculture in liberalizing economics: changing roles for governments, World Bank Washington.
3. Gautam, Alka (2012): Agricultural Geography, Sharda Pustak Bhawan, Allahabad.
4. Grig, B, David (1995): An Introduction to Agricultural Geography, Routledge,
5. Hussain, Majid (2003): Agricultural Geography, Anmol Publications Pvt Ltd, India.
6. Jha D N (2001): Agriculture and Regional Planning, Mittal Publications New Delhi.
7. Joshi, V. Mahesh (1999): Green revolution and its impacts. New Apcon, New Delhi.
8. Kamath M.G. (2000): A dictionary of Indian agriculture, Allied Publishers New Delhi.
9. Rao C H Hanumantha (2005): Agriculture, food security, poverty, and environment: essays on postreform India, Oxford University Press New Delhi.
10. Report: Asian Development Bank (2010): Agriculture, food security, and rural development, Oxford University Press New Delhi.
11. Shiva, Vandana (1991): The Violence of Green Revolution: Third World Agriculture, Ecology and Politics, Zed Books.
12. Singh, J. S and Dhillon, S. S. (2004): Agricultural Geography, Tata McGraw-Hill Education.

GEOUMCC6012: Techniques in Soil and Climatology

Course Objectives:

1. To analyse the importance of soil with its physical and chemical properties
2. This course attempts to practical experience to the students regarding the technical aspects of climate.
3. The course examines the questions related to soil and climatic elements.

Course Learning Outcomes:

1. Describe the different soil features and their properties and the impact on agriculture practice.
2. Understand the daily weather condition and forecasting the weather conditions of India.

Course contents:

1. Physical properties of soil: Soil structure and texture analysis
2. Chemical properties of soil: N.P.K, pH.
3. Measurements of weather elements: Reading with Barometer, Hygrometer, Rain-gauge, and Anemometer.
4. Climatic graph presentation: Wind rose, Climograph, Hythergraph, Ombrothermic diagram, Isotherm map, Isohyet map and Rainfall-dispersion diagram.
5. Weather Analysis: Interpretation of Indian daily weather maps published from IMD.

Reading book list

1. Barry, R.G. & Chorley, P.J. (1998). Atmosphere, weather and climate, Routledge, London.
2. Critchfield, J.H. (1993). General Climatology, Prentice Hall, New Delhi.
3. Das, P.K. (1987). Monsoons, National Book Trust of India, New Delhi.
4. Fein, S. & Stephens, P.N. (1987). Monsoons, Wiley Interscience.
5. Griffith, J.F. (1978). Applied Climatology, Oxford University Press,
6. Hanwell, J. & Newson, M. (1973). Technique in Physical Geography, Palgrave Macmillan.
7. Indian Meteorological Department (1968). Climatological Tables of observations in India, Govt. of India.

Reference Websites

1. <https://earthobservatory.nasa.gov/>
2. <https://mausam.imd.gov.in/>
3. <https://www.weatheronline.in/>
4. <https://earthexplorer.usgs.gov/>
5. <https://www.nhc.noaa.gov/satellite.php>

GEOUMCC6013: Settlement Geography

Course Objectives:

4. To analyse the development of settlement in both rural and urban areas
5. This course attempts to study the characteristics and morphology of the urban centres.
6. The course examines the hierarchical pattern of the urban settlement.

Course Learning Outcomes:

3. Describe the different features and of urban and rural settlement.
4. The hierarchical growth reflects the economic centrality of the region.
5. The course reflects changes from rural to urban community of any region of the world.

Course contents:

1. Concept and evolution of settlement: Evaluation of Rural and Urban settlement in India.
2. Urban Settlements: Census categories, Factors of growth, Types, Metropolitan concept, City-region. Conurbation
3. Rural Settlements: Site and situation, Types and patterns of rural settlement, Classification.
4. Urban morphology. Classical models - Burgess, Homer-Hoyt, Harris and Ullman.
5. Settlement Hierarchy: Primate City, Rank-Size Rule, Central Place theory.

Reading book list

1. Brian, K.R (1996): Landscapes of Settlements: Prehistory to the Present, Routledge, London
2. Ghosh, S. (1998): Introduction to Settlement Geography, Orient Longman Ltd., Calcutta: 158p.
3. Hudson, F.S. (1970): Geography of Settlements, Macdonald and Evans Ltd., Plymouth
4. Hussain, M. (1994): Human Geography, Rawat Pub. Co., New Delhi: 485p.
5. Ramachandram, R. (1999): Urbanization and urban systems in India, Oxford University Press, New Delhi
6. Rodwin (2006): Shelter, Settlement and Development, Rawat Pub.
7. Roy Chaudhuri, J. (2001): An Introduction to Development and Regional Planning-with special reference to India Orient Blackshawn, Hyderabad
8. Singh, R. Y. (1994): Geography of Settlements, Rawat Pub. Co., New Delhi: 335p.
9. Singh, R.L. et. al. (ed) (1976): Geographic Dimensions of Rural Settlements, National Geographical Society of India, Varanasi.
10. Verma, L (2009): Urban Geography, Rawat publication, Jaipur

GEOUMCC6014: Remote Sensing and GIS

Course Objectives:

1. Understand the concept and techniques of the Geographic Information Systems.
2. Define the GIS data types and structures.
3. Study geo processing and visualization concepts and techniques in GIS.

Course Learning Outcomes:

1. Students are trained to adapt the theoretical concepts in a practical way through the mathematical models of geography.
2. Students will have the hands-on training on various modes of spatial and non-spatial data collection, data storage, data analytics, data interpretation and data display through the thematic maps.
3. Students are exposed on spatial thinking to solve the geographical problems with range of proven mathematical and statistical models.
4. Students can employ in various corporate and government organisation where they deal to solve geographical problems.

Course Content

1. Elements of Remote Sensing: Principles of electromagnetic waves, spectrum, regions, wavelength, frequencies, and applications. Types-Satellites (LANDSAT, IRS, CARTOSAT), Sensors, Orbits.
2. Process of remote sensing: Interaction of radiation with atmosphere and earth surface, atmospheric noises, attenuation in radiance, resolutions of remote sensing, optical remote sensing, visible region of the spectrum, thermal remote sensing, microwave remote sensing,
3. Satellite products and its spectral characteristics, composite images, band ratios; Visual image interpretation, elements; Image classification- supervised, unsupervised, accuracy assessment, NDVI.
4. GIS data: Components of GIS, GIS data type, GIS data model, method of data analysis in GIS platform- vector data and raster data analysis, function of DBMS, component and function of GPS and its application.
5. Application of GIS: Environment, urban, agriculture, hydrology. Perpetration of GIS maps.

Reading book list

- Aronoff, S. 1989; Geographic Information Systems: A Management Perspective.
- Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.
- Chang, Kang-Tsung, 2015; Introduction to Geographical Information Systems
- Elangovan, K.20063; GIS - Fundamentals, Applications, and Implementations
- Ian Heywood, 2011: An Introduction to Geographical Information Systems
- Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- Joseph, G. 2005: Fundamentals of Remote Sensing United Press India.
- Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
- Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
- Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.

Reference Websites

IIRS MOOC programme: <https://isat.iirs.gov.in/mooc.php>

ITC Netherlands, Principles of GIS

https://webapps.itc.utwente.nl/librarywww/papers_2009/general/principlesgis.pdf

Geographical Information Systems: Principles, Techniques, Management and Applications

https://www.geos.ed.ac.uk/~gisteac/gis_book_abridged

GEOUMCC6015: Field Project on Social Area Development

Course Objectives:

1. To developed the ability in the field study and project work regarding the social and economic status of the study area.
2. To increase the hands on training and study in the problems of the regions.
3. Demonstrate the socio-economic and cultural pattern of the study area;

Course Learning Outcomes:

Students will be able to

1. Understand the basic concepts of social and economic status of the study area
2. Reflection of problems of the area and proposal for development.

Course Contents:

1. Field project area selection: Selection of field study area based on social issues within an administrative boundary of rural or urban areas of plateaus or hill settings.
2. Duration of field project study: Five to seven days in a selected area and study in details as per daily schedule.
3. Project study and Data collection: On the basis of selected objectives collection of primary data through pre-scheduled questionnaire and secondary information from different offices.
4. Data compilation and mapping: Compilation of data as per requirement of the objectives and preparation of graphs and maps using statistical techniques and GIS.
5. Report writing: a) Introduction and relevance of the study, Literature review, Objectives, Methodology, Geographical background, Data analysis with graphs and maps, Summary, Major findings of the study and Bibliography. b) Report should be in clear hand written or type in preferably English language within 60 to 70 pages including diagrams and plates.

Report writing format will be provided from the department and the students have to submit both hard copy and soft copy (.pdf format) of the report at the department before the examination duly certified by the field supervisor (s) and authenticated by the Head of the Department.

Reading book list

1. Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications.
2. Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.
3. Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in
4. Mukherjee, Neela 1993. Participatory Rural Appraisal: Methodology and Application. Concept Pubs. Co., New Delhi.
5. Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Pubs. Co., New Delhi
6. Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
7. Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
8. Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
9. Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/Hunt.
10. Wolcott, H. 1995. The Art of Fieldwork. Alta Mira Press, Walnut Creek, C

GEOUMCC7016: Social and Political Geography

Course Contents:

1. Aware about the key concepts in contemporary political geography, including the state, the nation, territory, boundaries, power, and scale;
2. Use geographic concepts to critically analyse social interacts with the political geographic outcomes;
3. Advance your understanding of the social aspects in geographical background;
4. Engage quality information about political issues contemporary political issues.

Course learning outcomes:

1. Acquire a general understanding of the major concepts and approaches in the fields of social and political geography.
2. Gain an appreciation for the role that social power plays in the formation of socio-spatial identities and the processes of peace-making.
3. Develop the ability to critically assess the aspects of nations and states.

Course Contents:

1. Social Geography: Concept, Social Categories: Caste, Class, Religion, Race and Gender and their Spatial distribution, Social space.
2. Geographies of Well-being: Concept and Components – Healthcare, Housing and Education. Social Exclusion, Slums, Communal Conflicts and Crime
3. Concepts in Political Geography: Nature and Scope. State, Nation and Nation Attributes of State – Frontiers, Boundaries, Shape, State; Geopolitics; Theories (Heartland and Rimland)
4. Electoral Geography and conflicts: Geography of Voting, Geographic Influences on voting pattern; Resource Conflicts Water Sharing Disputes, Disputes and Conflicts Related to Forest Rights and Minerals.
5. Politics of Displacement: Issues of relief, compensation and rehabilitation: with reference to Dams and Special Economic Zones

Reading book list

1. Agnew J., Mitchell K. and Toal G., 2003: A Companion to Political Geography, Blackwell.
2. Ahmed A., 1999: Social Geography, Rawat Publications.
3. Casino V. J. D., Jr., 2009) Social Geography: A Critical Introduction, Wiley Blackwell.
4. Cater J. and Jones T., 2000: Social Geography: An Introduction to Contemporary Issues, Hodder Arnold.
5. Cox K. R., Low M. and Robinson J., 2008: The Sage Handbook of Political Geography, Sage Publications.
6. Cox K., 2002: Political Geography: Territory, State and Society, Wiley-Blackwell
7. Gallaher C., et al, 2009: Key Concepts in Political Geography, Sage Publications.
8. Glassner M., 1993: Political Geography, Wiley.
9. Holt L., 2011: Geographies of Children, Youth and Families: An International Perspective, Taylor & Francis.
10. Jones M., 2004: An Introduction to Political Geography: Space, Place and Politics, Routledge .
11. Mathur H M and M M Cernea (eds.) Development, Displacement and Resettlement – Focus on Asian Experience, Vikas, Delhi
12. Painter J. and Jeffrey A., 2009: Political Geography, Sage Publications.
13. Panelli R., 2004: Social Geographies: From Difference to Action, Sage.
14. Rachel P., Burke M., Fuller D., Gough J., Macfarlane R. and Mowl G., 2001: Introducing Social Geographies, Oxford University Press.
15. Smith D. M., 1977: Human geography: A Welfare Approach, Edward Arnold, London.
16. Smith D. M., 1994: Geography and Social Justice, Blackwell, Oxford.
17. Taylor P. and Flint C., 2000: Political Geography, Pearson Education.
18. Valentine G., 2001: Social Geographies: Space and Society, Prentice Hall
19. Verma M K (2004): Development, Displacement and Resettlement, Rawat Publications, Delhi.

GEOUMCC7017: Population and Gender Studies

Course Objectives:

1. Understand the concept of population growth in global and regional scale.
2. To analyse the dynamics of population and its problems
3. Discuss the gender discrimination and development strategies.

Course Learning Outcomes:

1. Learn the role of demography and population studies as distinct fields of human geography.
2. Have sound knowledge of key concept, different components of population along with its diverse nature.
3. Examine population dynamics and characteristic with contemporary issues.

Course Content:

- 1) Population Dynamics: Distribution and Growth of Population; Density of population, Carrying capacity and sustainability, Fertility and Mortality, Population Pyramid.
- 2) Population Theories: Malthus and Neo Malthus Theory of Population, Demographic Transition Theory
- 3) Population Movement: Migration, Ravenstein's Law of Migration, Migration Types: Immigration and Emigration, Internal and International Migration
- 4) Gender status: Welfare of status of Gender, Patterns of exclusion in policies and politics, Gender inequality, Forms of gendered violence.
- 5) Gender strategy: Gender discrimination and development strategy in India, UNDP Gender Equality Strategy.

Reading book list

1. Barrett H. R., 1995: Population Geography, Oliver and Boyd.
2. Bhende A. and Kanitkar T., 2000: Principles of Population Studies, Himalaya Publishing House.
3. Chandna R. C. and Sidhu M. S., 1980: An Introduction to Population Geography, Kalyani Publishers.
4. Clarke J. I., 1965: Population Geography, Pergamon Press, Oxford.
5. Jones, H. R., 2000: Population Geography, 3rd ed. Paul Chapman, London.
6. Lutz W., Warren C. S. and Scherbov S., 2004: The End of the World Population Growth in the 21st Century, Earthscan
7. Newbold K. B., 2009: Population Geography: Tools and Issues, Rowman and Littlefield Publishers.
8. Pacione M., 1986: Population Geography: Progress and Prospect, Taylor and Francis.
9. Wilson M. G. A., 1968: Population Geography, Nelson.

GEOUMCC7018: Techniques in Geospatial Analysis

Course Objectives:

1. Understand the concept and techniques of the Geographic Information Systems.
2. Define the GIS data types and structures.
3. Study geo-processing and visualization concepts and techniques in GIS.

Course Learning Outcomes:

1. Students are trained to adapt the theoretical concepts in a practical way through the mathematical models of geography.
2. Students will have the hands-on training on various modes of spatial and non-spatial data collection, data storage, data analytics, data interpretation and data display through the thematic maps.
3. Students are exposed on spatial thinking to solve the geographical problems with range of proven mathematical and statistical models.
4. Students can employ in various corporate and government organisation where they deal to solve geographical problems.

Course Content:

- 1) Image analysis: Download image from USGS and BHUBAN, Image Processing (Digital and Manual) and Data Analysis: Pre-processing (Radiometric and Geometric Correction), Enhancement (Filtering); Classification (Supervised and Un-supervised), Geo-Referencing; Overlays. NDVI.
- 2) GIS data and mapping: Creation of shape file and digitization, error in digitization and correction, data input and mapping, buffering, overlay analysis, DEM generation, raster to vector data conversion.
- 3) Aerial Photography: Principles, Types and Geometry of Aerial Photograph, Aerial photo interpretation (natural and built up features).
- 4) Interpretation and Application of Remote Sensing and GIS: Land use/ Land Cover, Urban Sprawl Analysis; Forests Monitoring.
- 5) GPS Survey: Principles Open and closed traverse survey by GPS, Tracking through GPS.

Practical Record: A project file consisting of at least two exercises will be done from all units and satellite images (scale, orientation and interpretation) and exercises on using any GIS Software on above mentioned themes.

Reading book list

- Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.
- Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- Joseph, G. 2005: Fundamentals of Remote Sensing United Press India.
- Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
- Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
- Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
- Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.
- Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGraw-Hill.

Reference Websites

- IIRS MOOC programme: <https://isat.iirs.gov.in/mooc.php>
- ITC Netherlands, Principles of GIS
- https://webapps.itc.utwente.nl/librarywww/papers_2009/general/principlesgis.pdf
- Geographical Information Systems: Principles, Techniques, Management and Applications https://www.geos.ed.ac.uk/~gisteac/gis_book_abridged/

GEOUMCC8019: Geographical Thought

Course Objectives:

1. To understand the evolution of geographical thought.
2. To know the concept geographical thought and their shifting views of pre-modern to post-modern

Course Learning Outcomes

1. Form this course students can understand concept the evolution of geographical ideas.
2. Student can concern about the pre-modern philosophical views and their shifting towards modern to post-modern period.
3. They can understand the trend and debates in geographical thought and views.

Course Content:

- 1) Geography concept: Development of Geography, Paradigms in Geography, Areal differentiation, Geography and other discipline.
- 2) Pre-Modern – Early Origins of Geographical thinking with reference to the Greek, Roman, Arab and Indian.
- 3) Modern – Evolution of Geographical Thinking and Disciplinary Trends in Germany, France, Britain, United States of America.
- 4) Debates – Environmental Determinism and Possibilism, Systematic and Regional, Ideographic and Nomenothetic.
- 5) Trends – Quantitative Revolution, Behaviouralism, Systems Approach, Radicalism, Feminism; Towards Post Modernism – Changing Concept of Space in Geography, Future of Geography.

Reading book list

1. Arentsen M., Stam R. and Thuijjs R., 2000: Post-modern Approaches to Space, ebook.
2. Bhat, L.S. (2009) Geography in India (Selected Themes). Pearson
3. Bonnett A., 2008: What is Geography? Sage.
4. Dikshit R. D., 1997: Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
5. Hartshorne R., 1959: Perspectives of Nature of Geography, Rand MacNally and Co.
6. Holt-Jensen A., 2011: Geography: History and Its Concepts: A Students Guide, SAGE.
7. Johnston R. J., (Ed.): Dictionary of Human Geography, Routledge.
8. Johnston R. J., 1997: Geography and Geographers, Anglo-American Human Geography since 1945, Arnold, London.
9. Kapur A., 2001: Indian Geography Voice of Concern, Concept Publications.
10. Martin Geoffrey J., 2005: All Possible Worlds: A History of Geographical Ideas, Oxford.
11. Soja, Edward 1989. Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.

GEOUMCC8020: Urban and Regional Planning

Course Objectives:

1. To analyse the regional concept and their types and necessity of regional planning.
2. To understand the different planning regions of India and regionalization pattern.
3. To discuss the present status of the world and Indian urban development process.

Course Learning Outcome:

1. Understand the fundamentals and patterns of urbanization process.
2. Learn the pattern and status of cities.
3. Know contemporary problems of metropolitan cities of India.

Course Content:

- 1) Urban Geography: Origin and Evolution of Urban centres, Patterns of urbanisation in developed and developing countries, Functional Classification of Towns – Ashok Mitra's Method.
- 2) Urban Concept: Central Business District, Urban Periphery, Urban Ecology, Umland, Garden city, New towns and Smart city.
- 3) Urban Issues: Problems of housing, slums, civic amenities, crime and Gentrification; Pollution and management.
- 4) Regional Planning: Evolution and Types of Regional planning: Formal, Functional, and Planning Regions and Regional Planning; Delineation of Planning Region; Regionalization of India for Planning
- 5) Theories and Models for Regional Planning: Growth Pole Model of Perroux; Myrdal, Hirschman, Rostow and Friedmann.

Reading book list

1. Blij H. J. De, 1971: Geography: Regions and Concepts, John Wiley and Sons.
2. Claval P.I., 1998: An Introduction to Regional Geography, Blackwell Publishers, Oxford
3. Friedmann J. and Alonso W. (1975): Regional Policy - Readings in Theory and Applications, MIT Press, Massachusetts.
4. Fyfe N. R. and Kenny J. T., 2005: The Urban Geography Reader, Routledge.
5. Hall T., 2006: Urban Geography, Taylor and Francis.
6. Haynes J., 2008: Development Studies, Polity Short Introduction Series. Infrastructures, Technological Mobilities and the Urban Condition, Routledge.
7. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: Urban Geography, John Wiley.
8. Knox P. L. and McCarthy L., 2005: Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
9. Knox P. L. and Pinch S., 2006: Urban Social Geography: An Introduction, Prentice- Hall.
10. Mandal, R. B. (1998). Urban geography. Concept publishing company.
11. Pacione M., 2009: Urban Geography: A Global Perspective, Taylor and Francis.
12. Peet R., 1999: Theories of Development, The Guilford Press, New York. Policy, Methuen, London.
13. Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi
14. Ramachandran, R., 1992: The Study of Urbanisation, Oxford University Press, Delhi.

GEOUMCC : Field Project in Disaster Prone Area

Course Objectives:

1. To developed the ability in the field study and project work regarding disaster prone area like flood, drought, cyclone etc.
2. To increase the hands on training and study in the problematic regions for identifying the problems for mitigation.
3. Demonstrate the devastating effect of natural disasters to society;

Course Learning Outcomes:

Students will be able to

1. Understand the basics concepts in natural disasters
2. Study types of natural disasters and their effects

Course Content:

1. Field project area selection: Selection of field study area like (i) Flood (ii) Drought (iii) Cyclone (iv) Earthquake (v) Landslides (vi) Coastal areas
2. Duration of field project study: Not less than seven days in a selected area and study in details as per daily schedule.
3. Project study and Data collection: On the basis of selected objectives collection of primary data through pre-scheduled questionnaire and secondary information from different offices.
4. Data compilation and mapping: Compilation of data as per requirement of the objectives and preparation of graphs and maps using statistical techniques and GIS.
5. Report writing: a) Introduction and relevance of the study, Literature review, Objectives, Methodology, Geographical background, Data analysis with graphs and maps, Summary, Major findings of the study and Bibliography. b) Report should be in clear hand written or type in preferably English language within 60 to 70 pages including diagrams and plates.

Report writing format will be provided from the department and the students have to submit both hard copy and soft copy (.pdf format) of the report at the department before the examination duly certified by the field supervisor (s) and authenticated by the Head of the Department.

Reading book list

1. Mrinalini Pandey; Disaster Management Wiley India Pvt. Ltd.
2. Tushar Bhattacharya; Disaster Science and Management McGraw Hill Education (India)Pvt. Ltd.
3. Jagbir Singh; Disaster Management: Future Challenges and Opportunities K W Publishers Pvt. Ltd.
4. J. P. Singhal; Disaster Management, Laxmi Publications.
5. Shailesh Shukla, Shamna Hussain; Biodiversity, Environment and Disaster Management
6. Unique Publications

7. C. K. Rajan, Navale Pandharinath; Earth and Atmospheric Disaster Management: Nature and Manmade, B S Publication.

GEOUMCC: Techniques in Disaster Management (For Research)

Course Objectives:

1. The paper is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control.
2. Introduce a holistic classification of natural disasters considering the Earth Sciences
3. Demonstrate the devastating effect of natural disasters to society;

Course Learning Outcome:

After the completion of course, the students will have ability to:

1. Gain a perspective of disasters and various dimensions of disaster management.
2. Have comprehensive knowledge of various natural and manmade disasters in India.
3. Examine the response and mitigation measures of disasters.

Course Content:

1. Disasters: Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification.
2. Disaster assessment: Flood, draught, cyclone
3. Vulnerability assessment: Livelihood vulnerability in coastal and hill areas.
4. Perception Analysis: Perception on industrial and medical waste.
5. Response and Mitigation: Mitigation and Preparedness using indigenous knowledge and Community-based Disaster Management.

Practical Record: A project file consisting of at least two exercises will be done from all units

Reading book list

1. Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
2. Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
3. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
4. Singh Jagbir (2007) "Disaster Management Future Challenges and Opportunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com)
5. Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
6. Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
7. Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
8. Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.

Web Resources

1. IEA Training Material: Vulnerability and Climate Change Impact Assessment for Adaptation. http://www.iisd.org/pdf/2010/iea_training_vol_2_via.pdf
2. Guidance on Integrating Climate Change Adaptation into Development Co-operation. <http://www.oecd.org/dac/43652123.pdf>
3. Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners. <http://www.unep.org/pdf/mainstreaming-cc-adaptation-web.pdf>
4. CGE Climate Change Training Materials. http://unfccc.int/national_reports/non_annex_i_natcom/training_material/methodological_documents/items/349.php42
5. Compendium on Methods and Tools to Evaluate Impacts of, and Vulnerability and Adaptation to, Climate

Change.http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/5457.php

6. Centre for climate and Energy solutions. https://www.c2es.org/content/extreme_weather-and-climate-change/
7. <https://www.history.com/topics/natural-disasters-and-environment/history-of-climatechange>
8. ghhttp://www.ozcoasts.org.au/glossary/images/VulnerabilityDiag_AllenConsulting.jpg
9. <https://www.checinternational.org/climate-change-mitigation-adaptation-resilience>

DISCIPLINE SPECIFIC ELECTIVES (DSE)

GEOUMCD501: Transport Geography

Course Objectives:

- 1) The students will be exposed to the role and significance of 'transport' in geography.
- 2) The students will be conscious of the various facets of transport network.
- 3) The students will be conscious of the various techniques of flow analysis.

Course Learning Outcomes:

- 1) The students will be able to understand and analyse the principal issues confronting the transportation systems today.
- 2) The students will get an insight into 'how transportation systems work', through live case study from India and World.

Course Content:

1. Transport and Space: Concept of distance, Transportation and space, time-space convergence.
2. Transport cost: Principles of transport cost fixation, comparative cost advantage.
3. Topological measurement: Transport network analysis, Centrality, Accessibility, and Connectivity.
4. Transport Model analysis: Gravity Models, Linear Programming Model.
5. Transport policy: National highways, railways and waterways.

Reading book list

1. Ashton, W.D., 1966. The Theory of Traffic Flow, Methuen, London
2. Berry, B.J.L et al., 1966. Essays on Commodity Flow and Spatial Structure of Indian Economy, Department of Geography, Chicago.
3. Berry, B.L.J. and Marble, D.F. (eds.) 197). Spatial Analysis: A Reader in Statistical Geography, Prentice Hall.
4. Brooks, P.W., 1994. The Development of Air Transport Hurst, M.E. (ed.) Transportation geography: Comments and Reading, Mc Graw Hill, 256-273
5. Cooley, C.H. 1994. The Theory of Transportation, in Hurst, M.E. (ed.) Transportation geography: Comments and Reading, Mc Graw Hill, 15-29.
6. Fleming, D.K. and Hayuth, Y. 1994. Spatial Characteristics of Transportation Hubs: Centrality and Intermediacy, Journal of Transport Geography, 2 (1), 3-18.
7. Gautam, P.S. 1992. Transport Geography of India: A Study of Chambal Division, M.P., Mittal Publications, New Delhi
8. Haggett, P. 1965. Locational Analysis in Human Geography, London.
9. Haggett, P. and Chorley, R.J. 1969. Networks Analysis in Geography, London.
10. Kansky, K.J., 1963. Structure of Transportation Networks: Relationships between Network Geometry and Regional Characteristics, University of Chicago, Department of Geography, Research Paper, Chicago, 84.
11. Nagar, V.D. and Gautam S. 1964. Principles and Problems of Indian Transport, Kailash Pustak Sadan, Gwalior.

12. Owen, W. 1968. Distance and Development: Transport and Communications in India, Washington.
13. Raza, M. and Aggarwal, Y. 1986. Transport Geography of India, Concept Publishing Company, New Delhi.
14. White, H. P. and Senior, M.L. 1983. Transportation Geography, Longman Inc. New York.

GEOUMCD602: Geographical Research Methods

Course Objectives:

1. This course attempts to introduce the students to the basic knowledge related to geographical field research design.
2. The course examines the questions related to data collection, methods and its analysis.
3. It also critically evaluates the dissertation based on field survey.

Course Learning Outcomes:

1. The students will be able to understand basic concepts of field research methods and research design in geography.
2. The students will be able to do field work through practical experience and get skills of data collection methods and processing and analysis of obtained data.
3. The students will be able to write dissertation based on field work on given topic.

Course Content:

1. Geographical Research: Concept, Significance, Types and approaches to research in Geography; Research Ethics.
2. Research Design: Steps, Research Problem; Research questions; Aims and Objectives. Literature survey.
3. Data Collection: Nature of data: Primary Data: Field survey, Selection of sample, Questionnaire, Interview, Observation, Secondary Data
4. Data Analysis: Processing of Data; tabulation, graphic presentation and analysis of data; Referencing;
5. Report writing: Notes, style of referencing, bibliography and appendices, abstract and synopsis writing.

Reading book list

1. Black, James A. and Champion, D.J. 1976. Methods and Issues in Social Research, John Wiley and Sons, New York.
2. Bonnett, Alastair, R. 2008. What Is Geography? Sage, London.
3. Creswell, J. W. 2009. Research Design: Qualitative, Quantitative and Mixed Methods Approaches, Sage, California, USA
4. Gopal, Krishan and Singh, Nina, 2016. Researching Geography: The Indian Context. Routledge, Delhi.
5. Harris, C. 2001. Archival Fieldwork, Geographical Review, 91 (1-2), 328-334
6. Hart, C. 1999. Doing Literature Review: Releasing the Social Science Research Imagination, Sage, London
7. Hay. I. 2010. Qualitative Research Methods in Human Geography, 3rd ed. Oxford University Press, South Melbourne, Australia,
8. Lunsbury J.F. and Aldrich, F.T. 1979. Introduction to Geographic Field Methods and Techniques, Charles E. Merrill Publishing Company, Columbus.
9. Misra, R. P. 2015. Research Methodology: A Handbook, Concept Publishing Company, New Delhi.
10. Montello, Daniel R. and Sutton, P.C. 2006. An Introduction to Scientific Research in Geography, Sage Publications, London.

11. Oliver, Paul, 2004. *Writing Your Thesis*, Vistaar Publications, New Delhi
12. Preece, R. 1994. *Starting Research: An Introduction to Academic Research and Dissertation Writing*, Continuum, London.
13. Sharma, P.R., R. S. Yadava and Sharma, V.N. 2011. *Research Methodology: Concepts and Studies*, R. K. Books, New Delhi.
14. Stoddard, Robert H. 1982. *Field Techniques and Research Methods in Geography*, Kendall/Hunt for National Council for Geographic Education.

GEOUMCD703: Network Analysis in Geography

Course Objectives:

1. The students will be exposed to the role and significance of 'transport' in geography.
2. The students will be conscious of the various facets of transport network.
3. The students will be conscious of the various techniques of flow analysis.

Course Learning Outcomes:

1. The students will be able to understand and analyse the principal issues confronting the transportation systems today.
2. The students will get an insight into the development an effective plan for network at local and regional level.

Course Content:

1. Topological assessment: Centrality, Average Transport Index and Accessibility.
2. Efficiency assessment: Shortest path analysis, Detour and spread.
3. Point pattern analysis: Uniformity, randomness and compactness.
4. Directional analysis: Rose diagram, Dominant Direction, Mean direction.
5. Shape analysis: Axial ratios, perimeters to areas, areas to axial length.

Reading book list

1. Ashton, W.D., 1966. *The Theory of Traffic Flow*, Methuen, London
2. Berry, B.J.L et a., 1966. *Essays on Commodity Flow and Spatial Structure of Indian Economy*, Department of Geography, Chicago.
3. Berry, B.L.J. and Marble, D.F. (eds.) 197). *Spatial Analysis: A Reader in Statistical Geography*, Prentice Hall.
4. Brooks, P.W., 1994. *The Development of Air Transport* Hurst, M.E. (ed.) *Transportation geography: Comments and Reading*, Mc Graw Hill, 256-273
5. Cooley, C.H. 1994. *The Theory of Transportation*, in Hurst, M.E. (ed.) *Transportation geography: Comments and Reading*, Mc Graw Hill, 15-29.
6. Fleming, D.K. and Hayuth, Y. 1994. *Spatial Characteristics of Transportation Hubs: Centrality and Intermediacy*, *Journal of Transport Geography*, 2 (1), 3-18.
7. Gautam, P.S. 1992. *Transport Geography of India: A Study of Chambal Division*, M.P., Mittal Publications, New Delhi
8. Haggett, P. 1965. *Locational Analysis in Human Geography*, London.
9. Haggett, P. and Chorley, R.J. 1969. *Networks Analysis in Geography*, London.
10. Kansky, K.J., 1963. *Structure of Transportation Networks: Relationships between Network Geometry and Regional Characteristics*, University of Chicago, Department of Geography, Research Paper, Chicago, 84.

11. Nagar, V.D. and Gautam S. 1964. Principles and Problems of Indian Transport, Kailash Pustak Sadan, Gwalior.
12. Owen, W. 1968. Distance and Development: Transport and Communications in India, Washington.
13. Raza, M. and Aggarwal, Y. 1986. Transport Geography of India, Concept Publishing Company, New Delhi.
14. White, H. P. and Senior, M.L. 1983. Transportation Geography, Longman Inc. New York.

GEOUMCD : Natural hazard and Disaster Management

Course Objectives:

1. The course begins with a discussion on alternative concepts of disasters, calamity, risk and hazard.
2. The course then proceeds to aggregate the models used to benchmark disasters
3. In the final it de-myths that disasters are natural and lays bare the role of vulnerability in creating disasters and what needs to be managed.

Course Learning Outcomes:

1. The student gains a perspective of disasters different than the Nature as Cause of Disaster.
2. The student keen to pursue a profession in Disasters can do so by addressing real life issues of vulnerability of people.
3. Students could become champions to spread the 'real' reason for disasters and thus become the torchbearers of change needed to mitigate disasters especially in India.

Course Contents:

1. Concepts: Risk, hazard, disaster, vulnerabilities and resilience.
2. Hazard and Disaster: Causes and Consequences; Landslide, earthquake, heat waves.
3. Case studies: Chernobyl, Bhopal Gas Tragedy, Tehri Dam Project.
4. Management: Prevention, Mitigation, Preparedness, Response and Recovery in hazard prone areas of India.
5. Act and Institutional Role: National Disaster Management Act-2005, Role of UNDP, NDMA, NDRF.

Reading book list

1. Bankoff, G., G. Frerks and D. Hilhorst (eds.) 2003. Mapping Vulnerability: Disasters, Development and People, Earthscan.
2. Beck, Ulrich, 1992. Risk Society: Towards a New Modernity, Sage.
3. Cutter, Susan (ed). 1993. Environmental Risks and Hazards, Pearson.
4. Drabek, Thomas, 2010. The Human Side of Disaster, Taylor and Francis
5. Government of India, 2005. Disaster Management Act, 2005, The Gazette of India, New Delhi.
6. Kapur, Anu, 2008. On Disasters in India, Cambridge University Press.
7. Kapur, Anu, 2010. Vulnerable India: A Geographical Study of Disaster, Sage
8. Kapur, Anu. et. al. 2005. Disasters in India: Studies of Grim Reality, Rawat Publications, Jaipur and Delhi.
9. Parasuraman, S. 2004. India Disasters Report: Towards a Policy Initiatives, Oxford University Press. National Centre for Disaster Management, 2001. Report of the High Powered Committee (HPC) on Disaster management, New Delhi, http://nidm.gov.in/PDF/pubs/HPC_Report.pdf.

10. Tripathi, Punam, 2018. Vulnerable Andaman and Nicobar Islands: A Study of Disasters and Response, Routledge.
11. United Nations, 2004. Living with Risk: A Global Review of Disaster Reduction Initiatives.
12. Wisner, B., P. Blaikie, T. Cannon and I. Davis, 2004. At Risk: Natural Hazards, Peoples' Vulnerability and Disasters, Routledge (Second Edition).
13. World Disasters Report, <http://www.ifrc.org/en/publications-and-reports/world-disastersreport>

GEOUMCD : Rural and Regional Development

Course Objectives:

1. This course studies the conception of space in rural and regional development process.
2. It lays the theoretical foundation for the various development concepts and models.
3. It also critically evaluates the numerous regional policies originating from rural and regional policies.

Course Learning Outcomes:

1. The students will learn about the regional policies emanating out of these development process;
2. Appreciate the concepts, needs and various approaches to rural development;
3. Understand the strong economic bases of rural areas of India;
4. Appreciate the area based and target group-based approaches and provision of services to rural development.

Course Content:

1. Rural Development: Rural economic base; Need for Rural Development, Gandhian Approach.
2. Approach to Rural Development: Panchayat Raj, SJSY, MNREGA, Jan Dhan Yojana and PMGSY.
3. Regional Development: Types and Need of Regional planning: Formal, Functional, and Planning Regions and Regional Development.
4. Regional Planning: Backward Regions and Regional Plans- Special Area Development Plans in India
5. Regional Policy Objectives: regional Imbalance as a policy problem; growth, income distribution and spatial inequality.

Reading book list

1. Friedmann J. 1966. Regional Development Policy: A Case Study of Venezuela, Cambridge, Mass., MIT.
2. Gilg A. W., 1985: An Introduction to Rural Geography, Edwin Arnold, London.
3. Gore C. 1984. Regions in Question: Space, Development Theory and Regional Policy, London,
4. Hirschman A. O. 1958. The Strategy of Economic Development, New Haven, Yale University Pres
5. Krishnamurthy, J. 2000: Rural Development - Problems and Prospects, Rawat Pubs. Jaipur

6. Lee D. A. and Chaudhri D. P. (eds.), 1983: Rural Development and State, Methuen, London.Methuen.
7. Misra R. P. and Sundaram, K. V. (eds.), 1979: Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.
8. Myrdal G. 1957. Economic Theory and Underdeveloped Regions, London, Duckworth.
9. Palione M., 1984: Rural Geography, Harper and Row, London.
10. Peet R. 1999. Theories of Development, Guilford Press, New York.
11. Ramachandran H. and Guimaraes J.P.C., 1991: Integrated Rural Development in Asia – Learning from Recent Experience, Concept Publishing, New Delhi.
12. UNAPDI 1986: Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
13. Wanmali S., 1992: Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India, International Food Policy Research Institute, Washington, D.C.
14. Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: Studies in Village India: Issues in Rural Development, Concept Publs. Co., New Delhi. (Kramer et al. n.d.)

GEOUMCD : Advance Statistical Methods in Geography

Course Objectives:

1. This course studies the concept of statistics and its geographical applications.
2. It lays the foundation of quantitative techniques to the students for spatial analysis.
3. It will enhance the ability to interpret data statistically.

Course Learning Outcomes:

1. The students will learn various statistical skills.
2. The students will know how the statistical theories and functions will be applied in geography.
3. The students will learn about the significance test to strengthen their argument with facts and represent data.

Course Contents:

1. Spatial and non-spatial statistical data; Measurement of inequality (Location Quotient, Lorenz curve and Gini-coefficient) and geographical application.
2. Probability theory, Permutation and Combination, Probability density functions with respect to Normal, Binomial and Poisson distributions.
3. Hypothesis testing, degree of freedom, level of significance, types I and II errors, Parametric and Non-parametric test (chi-square, students' t and ANOVA)
4. Spatial clustering: Nearest Neighbour analysis, Spatial relationship: Join Count statistics, Spatial auto-correlation, Moran's I
5. Making Indicators scale free, Standard score, Computation of Composite Index

Reading book list

1. Bart James E. and Gerld M. Barber, 1996. Elementary Statistics for Geographers, The Guilford Press, London.
2. Briggs, W. 2016. Uncertainty: The soul of modeling, probability & statistics. Springer International Publishing. doi:10.1007/978-3-319-39756-6.
3. Cressie, N.A.C. 1991. Statistics for Spatial Analysis, Wiley, New York.
4. Davis, John C. (2002). Statistics and Data Analysis in Geology (third edition), John Wiley & Sons.
5. Eldon, D. 1983. Statistics in Geography: A Practical Approach, Blackwell, London.
6. Gregory, S. 1978. Statistical Methods and the Geographer (4th Edition), Longman, London.Hill, New York.

7. Mathews, J.A. 1987. Quantitative and Statistical Approaches to Geography: A Practical Manual, Pergamon, Oxford.
8. McGrew, Jr. J.C. and Monroe, C.B. (2000). An Introduction to Statistical Problem Solving in Geography (second edition), McGraw Hill, Boston.
9. Nussbaum, E. M. 2015. Categorical and Nonparametric Data Analysis: Choosing the Best Statistical Technique. New York: Taylor & Francis. doi:10.1007/978-3-319-39756-6
10. Rohatgi, V. K. and Saleh, A. K. 2015. An Introduction to Probability and Statistics, John Wiley & Sons, New Jersey.
11. Tayler, P.J. 1977. Quantitative Methods in Geography: An Introduction to Spatial Analysis, Houghton Mifflin Company Boston, London.
12. Wei, W.S. 1990. Time Series Analysis: Variate and Multivariate Methods, Addison Wesley Publishing.
13. Yeates, Mauris, 1974. An Introduction to Quantitative Analysis in Human Geography, Mc Graw Hill, New York.

MINOR COURSE (MIC) / GENERIC ELECTIVE (GE)

GEOUMIC101: Rural Development

Course Objectives:

1. This course studies the conception of space in rural development process.
2. It lays the theoretical foundation for the various development concepts and models.
3. It also critically evaluates the numerous regional policies originating from rural policies.

Course Learning Outcomes:

1. Appreciate the concepts, needs and various approaches to rural development;
2. Understand the strong economic bases of rural areas of India;
3. Appreciate the area based and target group-based approaches and provision of services to rural development

Course Contents:

1. Development: Inter-Dependence of Urban and Rural Sectors of economy; Need for Rural Development, Gandhian Approach
2. Rural Economic Base: Panchayati Raj System, Agriculture and Allied Sectors, Non-Farm Activities, Co-operatives.
3. Area Based Approach: Drought Prone Area Programmes, PMGSY.
4. Target Group Approach to Rural Development: SJSY, MNREGA, Jan Dhan Yojana
5. Provision of Services – Physical and Socio-Economic access to Elementary Education, Primary Health Care and Micro credit.

Reading book list

1. Gilg A. W., 1985: An Introduction to Rural Geography, Edwin Arnold, London.
2. Krishnamurthy, J. 2000: Rural Development - Problems and Prospects, Rawat Pubs. Jaipur
3. Lee D. A. and Chaudhri D. P. (eds.), 1983: Rural Development and State, Methuen, London. Methuen.
4. Misra R. P. and Sundaram, K. V. (eds.), 1979: Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.

5. Myrdal G. 1957. *Economic Theory and Underdeveloped Regions*, London, Duckworth.
6. Palione M., 1984: *Rural Geography*, Harper and Row, London.
7. Peet R. 1999. *Theories of Development*, Guilford Press, New York.
8. Ramachandran H. and Guimaraes J.P.C., 1991: *Integrated Rural Development in Asia – Learning from Recent Experience*, Concept Publishing, New Delhi.
9. UNAPDI 1986: *Local Level Planning and Rural Development: Alternative Strategies*. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
10. Wanmali S., 1992: *Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India*, International Food Policy Research Institute, Washington, D.C.
11. Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: *Studies in Village India: Issues in Rural Development*, Concept Publs. Co., New Delhi. (Kramer et al. n.d.)

GEOUMIC202: Regional Development

Course Objectives:

1. This course studies the conception of space in regional development process.
2. It lays the theoretical foundation for the various development concepts and models.
3. It also critically evaluates the numerous regional policies originating from regional policies.

Course Learning Outcomes:

1. Identify notable lagging regions and solutions for their overall development.
2. Have comprehensive understanding regarding the different regions and application of different models and theories for integrated regional development.
3. Select appropriate indicators for the measurement of socio- economic regional development.

Course Contents:

1. Region: Evolution, Types and Need of Regional planning, Regional Development.
2. Regional Imbalances and Problems of Functional Regions.
3. Delineation of Planning Region; Regionalization of India for Planning
4. Strategies for Regional Planning: Growth Pole Model of Perroux; Growth Centre Model in Indian Context.
5. Problem of Regions: Backward Regions and Regional Plans- Special Area Development Plans in India.

Reading book list

1. Adell, Germán (1999) *Literature Review: Theories and Models of the Peri-Urban Interface: A Changing Conceptual Landscape*, Peri-urban Research Project Team, Development Planning Unit, University College London
2. Bhatt, L.S. (1976) *Micro Level Planning in India*. KB Publication, Delhi
3. Deshpande C. D., 1992: *India: A Regional Interpretation*, ICSSR, New Delhi.

4. Dreze J. and A. Sen, Indian Development: Select Regional Perspectives(Oxford: Oxford University Press, 1996).
5. Rapley, John (2007) Understanding Development: Theory and Practice in the 3rdWorld. Lynne Rienner, London.
6. Raza, M., Ed. (1988). Regional Development. Contributions to Indian Geography. New Delhi, Heritage Publishers.
7. Schmidt-Kallert, Einhard (2005) A Short Introduction to Micro-RegionalPlanning, Food and Agriculture Organization of the United Nations (FAO)
8. Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Censusof India
9. Sen, Amratya (2000) Development as Freedom. Random House, Toronto.

GEOUMIC303: Techniques in Rural Development

Course Objectives:

1. This course studies the conception of space in rural development process.
2. It lays the practical foundation for the various development concepts and models.
3. It also critically evaluates the numerous regional policies originating from rural policies.

Course Learning Outcomes:

1. Appreciate the concepts, needs and various approaches to rural development;
2. Understand the strong economic bases of rural areas of India;
3. Appreciate the area based and target group-based approaches and provision of services to rural development

Course Contents:

1. Ratio analysis: Land and population, Land and road,
2. Development assessment: Delineation of rural development level based on services and amenities in Block level by weighted index method
3. Development schemes: Identification of the status of available rural development schemes for economic and housing.
4. Survey technique: Preparation of questionnaire for rural problem studies.
5. Quality of life: Identification of quality of rural life on perception survey.

Reading book list

1. Gilg A. W., 1985: An Introduction to Rural Geography, Edwin Arnold, London.
2. Krishnamurthy, J. 2000: Rural Development - Problems and Prospects, Rawat Pubs. Jaipur
3. Lee D. A. and Chaudhri D. P. (eds.), 1983: Rural Development and State, Methuen, London.Methuen.
4. Misra R. P. and Sundaram, K. V. (eds.), 1979: Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.
5. Myrdal G. 1957. Economic Theory and Underdeveloped Regions, London, Duckworth.
6. Palione M., 1984: Rural Geography, Harper and Row, London.

7. Peet R. 1999. Theories of Development, Guilford Press, New York.
8. Ramachandran H. and Guimaraes J.P.C., 1991: Integrated Rural Development in Asia – Learning from Recent Experience, Concept Publishing, New Delhi.
9. UNAPDI 1986: Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
10. Wanmali S., 1992: Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India, International Food Policy Research Institute, Washington, D.C.
11. Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: Studies in Village India: Issues in Rural Development, Concept Publs. Co., New Delhi. (Kramer et al. n.d.)

GEOUMIC404: Techniques in Regional Development

Course Objectives:

1. This course studies the conception of space in regional development process.
2. It lays the theoretical foundation for the various development concepts and models.
3. It also critically evaluates the numerous regional policies originating from regional policies.

Course Learning Outcomes:

1. Identify notable lagging regions and solutions for their overall development.
2. Have comprehensive understanding regarding the different regions and application of different models and theories for integrated regional development.
3. Select appropriate indicators for the measurement of socio- economic regional development.

Course Contents:

1. Delineation of formal regions by weighted index method
2. Delineation of functional regions by breaking point analysis
3. Measurement of inequality by location quotient
4. Transport connectivity: alpha, beta, gamma index.
5. Traffic flow analysis, Road Density

Reading book list

1. Adell, Germán (1999) Literature Review: Theories and Models of the Peri-Urban Interface: A Changing Conceptual Landscape, Peri-urban Research Project Team, Development Planning Unit, University College London
2. Bhatt, L.S. (1976) Micro Level Planning in India. KB Publication, Delhi
3. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
4. Dreze J. and A. Sen, Indian Development: Select Regional Perspectives (Oxford: Oxford University Press, 1996).

5. Rapley, John (2007) Understanding Development: Theory and Practice in the 3rd World. Lynne Rienner, London.
6. Raza, M., Ed. (1988). Regional Development. Contributions to Indian Geography. New Delhi, Heritage Publishers.
7. Schmidt-Kallert, Einhard (2005) A Short Introduction to Micro-Regional Planning, Food and Agriculture Organization of the United Nations (FAO)
8. Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
9. Sen, Amratya (2000) Development as Freedom. Random House, Toronto.

GEOUMIC505: Industrial Geography

Course Objectives:

This course studies the conception of space in industrial development process.

It lays the theoretical foundation for the various concepts and models in industrial location.

It also critically evaluates the numerous industrial policies adopted for economic development

Course Learning Outcomes:

1. Understand the factors responsible for location of an industry.
2. Differentiate various types of industries and industrial regions and policies of India.
3. Evaluate the socio, economic and environmental implications of various types of industries

Course Contents:

1. Concept: Importance of Industrial Geography, Nature and Scope.
2. Theory: Characteristics and Location of Industries (Weber's Theory)
3. Types: Coal and Iron based industries; Rural based Industries, Footloose Industry.
4. Industrial Complexes: National Capital Region, Mumbai-Pune, Region, and Chhota Nagpur Region
5. Industrialisation in India: Environmental; Social and Economic, Industrial Policy of India.

Reading book list

1. Alexander J.W. (1979). Economic Geography, Printice Hall of India Pvt. Ltd., New Delhi.
2. Goh Cheng Leong (1997). "Human and economic geography", Oxford University Press, New York.
3. Gunnar Alexandersson (1967). "Geography of Manufacturing, Prentice Hall, New Jersey
4. Miller, E. (1962) Geography of Manufacturing Printice Hall - Englewood Cliff, New Jersey
5. Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
6. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur
7. Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.

8. Thoman, R.S., Conkling E.C. and Yeates, M.H. (1968). *Geography of Economic Activity*, McGraw Hill Book Company, 1968.
9. Tirtha, Ranjit 2002: *Geography of India*, Rawat Pubs., Jaipur & New Delhi.
10. Tiwari, R.C. (2007) *Geography of India*. Prayag Pustak Bhawan, Allahabad
11. Truman, A. Harishorn, John W. Alexander (2000), *Economic Geography*, Prentice Hall of India Ltd., New Delhi.

GEOUMIC606: Agricultural Geography

Course Objectives:

1. This course attempts to introduce the students to the nature and origin of agriculture and its regions.
2. The course examines the questions related to agricultural development and productivity in India.
3. It also critically evaluates the environmental consequences and emerging perspective and policies and interventions aimed at sustainable agriculture

Course Learning Outcomes:

1. The students will be able to understand and analyse the historical perspective of agriculture.
2. The students will be able to analyse the agriculture development and productivity and its impacts on various sectors
3. The students will be able to get updated knowledge of contemporary issues and strategies.

Course Contents

1. Approaches in agricultural geography: Agricultural systems (ecological or near-ecological systems), Jonnason's the theory of agricultural land use
2. Determinants of agriculture: Physical and institutional, precision farming, use of modern technology
3. Agricultural regions: Bases of classification; Regionalisation: Concept and criteria; Agricultural regions of India.
4. Issues and policies in agriculture: Impact of green revolution, food security GM Crops, food security, agricultural policies
5. Consequences of Agriculture in India: Concept, Environmental degradation, ground water depletion, deterioration of soil fertility.

Reading book list

1. Bryant, C.R., Johnston, T.R. 1992. *Agriculture in the City Countryside*, Belhaven Press, London.
2. Burch, D., Gross, J. and Lawrence, G. (eds.), 1999. *Restructuring Global and Regional Agriculture*, Ashgate Publishing Company, Burlington.
3. Cakmak, I. and Welch, R. M. (eds), 2009. *Impacts of agriculture on Human Health and Nutrition*, EOLSS Publications, UK.
4. Ferroni, Marco, 2013. *Transforming Indian agriculture- India 2040: Productivity, Markets and Institutions*, Sage Publications, New Delhi.
5. Grigg, D.B. 1984. *Introduction to Agricultural Geography*, Hutchinson, London.
6. Mohammad, N. 1992. *New Dimension in Agriculture Geography*, Vol. I to VIII, Concept Publishing Company, New Delhi.
7. Mohammad, N. and Rai, S.C. 2014. *Agricultural Diversification and Food Security in the Mountain Ecosystem*, Concept Publishing Company, New Delhi.

8. Roling, N.G., and Wageruters, M.A.E. (eds.) 1998. Facilitating Sustainable Agriculture, Cambridge University Press, Cambridge.
9. Shafi, M. 2006. Agricultural Geography. Pearson Education, Delhi.
10. Singh, J., and Dhillon, S.S. 1994. Agricultural Geography, Tata McGraw Hill, New Delhi.
11. Singh, R. B. 2000. Environmental Consequences of Agricultural Development: A Case Study from the Green Revolution state of Haryana, India, Agriculture, Ecosystems and Environment
12. White P. 2007. Emergence of agriculture: A global view, Routledge, London.
13. Wright J. 2009. Sustainable agriculture and food security in an era of oil scarcity, Earthscan, London.
14. Young, A. 1998. Landuse Resources: Now and for the Future, Cambridge University Press, Cambridge.

GEOUMIC707: Project on Rural Economic Study

Course Objectives:

4. To developed the ability in the field study and project work regarding the economic status of the study area.
5. To increase the hands on training and study in the problems of the regions.
6. Demonstrate the socio-economic pattern of the study area;

Course Learning Outcomes:

Students will be able to

3. Understand the basic concepts of economic status of the study area
4. Reflection of problems of the area and proposal for development.

Course Contents:

6. Field project area selection: Selection of field study area based on economic issues within an administrative boundary of rural settings.
7. Duration of field project study: Five days in a selected area and study in details as per daily schedule.
8. Project study and Data collection: On the basis of selected objectives collection of primary data through pre-scheduled questionnaire and secondary information from different offices.
9. Data compilation and mapping: Compilation of data as per requirement of the objectives and preparation of graphs and maps using statistical techniques
10. Report writing: a) Introduction and relevance of the study, Literature review, Objectives, Methodology, Geographical background, Data analysis with graphs and maps, Summary, Major findings of the study and Bibliography. b) Report should be in clear hand written or type in preferably English language within 50 pages including diagrams and plates.

Report writing format will be provided from the department and the students have to submit both hard copy and soft copy (.pdf format) of the report at the department before the examination duly certified by the field supervisor (s) and authenticated by the Head of the Department.

Reading book list

1. Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications.
2. Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.
3. Evans M., 1988: "Participant Observation: The Researcher as Research Tool"

4. Mukherjee, Neela 1993. Participatory Rural Appraisal: Methodology and Application. Concept Publs. Co., New Delhi.
5. Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Publs. Co., New Delhi
6. Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
7. Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
8. Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
9. Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/Hunt.
10. Wolcott, H. 1995. The Art of Fieldwork. Alta Mira Press, Walnut Creek,

GEOUMIC: Techniques in Demography

Course Objectives:

1. This course intends to orient the students towards interdisciplinary perspectives on population issues at different geographical scales.
2. It will acquaint the candidate to appreciate the role of spatial perspectives towards showcasing population changes and its impact on the economy, society, environment and politics at diverse geographical spheres.

Course Learning Outcomes:

1. After taking this course, a candidate should be able to appreciate the active role of population geography as a distinct field of human geography.
2. Student should be conversant with different sources of demographic data, and well versed with debates on population-development linkages.
3. Students should be able to examine the different components of population change, its drivers, and their consequences upon contemporary socio-economic, environmental, and political changes.

Course Contents:

1. Field Sources of Data: India (Census, Vital Statistics and NSS).
2. Population Dynamics: Distribution, Growth, Fertility, Mortality, Dependency and Migration.
3. Population Composition: Gender Composition; Rural and Urban Composition; Literacy.
4. Population Projection: Arithmetic, Geometric, Regression.
5. Data collection: Preparation of questionnaire for data collection through direct contact and online mode.

Reading book list

1. Birdsell, N., Kelley, A.C., and Sinding, S.W. 2001. Population Matters: Demographic Change, Economic Growth, and Poverty in Developing World, Auckland: Oxford University Press.
2. Clarke, J.I. 1972. Population Geography. 2nd edition, Oxford: Pergamon Press.
3. Dyson, T. 2010. Population and Development: The Demographic Transition, London: Zed Books.
4. Jeffery, R., and Jeffery, P. 1997. Population, Gender, and Politics: Demographic Change in Rural North India, Cambridge, UK: Cambridge University Press.
5. May, J.F. 2012. World Population Policies: Their Origin, Evolution, and Impact, Washington DC: Springer.

7. Newbold, K.B. 2010. Population Geography: Tools and Issues, New York: Rowman and Littlefield Publishers Inc.
8. Poston, D.L., and Bouvier, L.F. 2010. Population and Society: An Introduction to Demography, New York: Cambridge University Press.
9. Poston, D.L., and Micklin, M. (eds.) 2005. Handbook of Population, New York: Kluwer Academic.
10. Preston, S., Heuveline, P., and Guillot, M. 2000. Demography: Measuring and Modelling Population Processes, Oxford: Wiley-Blackwell.
11. Seigal, J.S., and Swanson, D.A. (eds.) 2004. The Methods and Materials of Demography. 2nd edition, San Diego, CA: Elsevier Academic Press.
12. Srinivasan, K. 2017. Population Concerns in India: Shifting Trends, Policies, and Programs, New Delhi: Sage.
13. Weeks, J.R. 2008. Population: An Introduction to Concepts and Issues. 10th edition, Belmont, CA: Thomson Wadsworth.

GEOUMIC: Advance Statistical Methods in Geography (For Research)

Course Objectives:

4. This course studies the concept of statistics and its geographical applications.
5. It lays the foundation of quantitative techniques to the students for spatial analysis.
6. It will enhance the ability to interpret data statistically.

Course Learning Outcomes:

4. The students will learn various statistical skills.
5. The students will know how the statistical theories and functions will be applied in geography.
6. The students will learn about the significance test to strengthen their argument with facts and represent data.

Course Contents:

6. Spatial and non-spatial statistical data; Measurement of inequality (Location Quotient, Lorenz curve and Gini-coefficient) and geographical application.
7. Probability theory, Permutation and Combination, Probability density functions with respect to Normal, Binomial and Poisson distributions.
8. Hypothesis testing, degree of freedom, level of significance, types I and II errors, Parametric and Non-parametric test (chi-square, students' t and ANOVA)
9. Spatial clustering: Nearest Neighbour analysis, Spatial relationship: Join Count statistics, Spatial auto-correlation, Moran's I
10. Making Indicators scale free, Standard score, Computation of Composite Index

Reading book list

1. Bart James E. and Gerld M. Barber, 1996. Elementary Statistics for Geographers, The Guilford Press, London.
2. Briggs, W. 2016. Uncertainty: The soul of modeling, probability & statistics. Springer International Publishing. doi:10.1007/978-3-319-39756-6.
3. Cressie, N.A.C. 1991. Statistics for Spatial Analysis, Wiley, New York.
4. Davis, John C. (2002). Statistics and Data Analysis in Geology (third edition), John Wiley & Sons.
5. Eldon, D. 1983. Statistics in Geography: A Practical Approach, Blackwell, London.
6. Gregory, S. 1978. Statistical Methods and the Geographer (4th Edition), Longman, London.Hill, New York.
7. Mathews, J.A. 1987. Quantitative and Statistical Approaches to Geography: A Practical Manual, Pergamon, Oxford.

8. McGrew, Jr. J.C. and Monroe, C.B. (2000). An Introduction to Statistical Problem Solving in Geography (second edition), McGraw Hill, Boston.
9. Nussbaum, E. M. 2015. Categorical and Nonparametric Data Analysis: Choosing the Best Statistical Technique. New York: Taylor & Francis. doi:10.1007/978-3-319-39756-6
10. Rohatgi, V. K. and Saleh, A. K. 2015. An Introduction to Probability and Statistics, John Wiley & Sons, New Jersey.
11. Tayler, P.J. 1977. Quantitative Methods in Geography: An Introduction to Spatial Analysis, Houghton Mifflin Company Boston, London.
12. Wei, W.S. 1990. Time Series Analysis: Variate and Multivariate Methods, Addison Wesley Publishing.
13. Yeates, Mauris, 1974. An Introduction to Quantitative Analysis in Human Geography, Mc Graw Hill, New York.

Skill Enhancement Course (SEC)

GEOUSEC101: Geography of Tourism

Course Objectives:

1. This course intends to orient the students towards interdisciplinary perspectives on tourism issues at different geographical background.
2. It will acquaint the students to appreciate the role of geographers towards the development of tourism and its impact on the economy, society and environment at diverse geographical spheres.

Course Learning Outcomes:

1. After taking this course, a candidate should be able to participate the active role of population geography as a distinct field of tourism geography.
2. Student should be conversant with different sources of tourism aspects, and well versed with the development linkages.
3. Students would be able to examine the different tourism sites with contemporary socio-economic and environmental changes and development.

Course Contents:

1. Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson.
2. Type of Tourism: Nature, Cultural, Medical and Pilgrimage Tourism
3. Recent Trends of Tourism: International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings Incentives Conventions and Exhibitions (MICE)
4. Impact of Tourism: Economy; Environment; Society
5. Tourism in India: Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas; National Tourism Policy

Reading book list

1. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.

2. Hall, M. and Stephen, P. (2006) *Geography of Tourism and Recreation – Environment, Place and Space*, Routledge, London.
3. Kamra, K. K. and Chand, M. (2007) *Basics of Tourism: Theory, Operation and Practise*, Kanishka Publishers, Pune.
4. Page, S. J. (2011) *Tourism Management: An Introduction*, Butterworth-Heinemann, USA. Chapter 2.
5. Raj, R. and Nigel, D. (2007) *Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective* by, CABI, Cambridge, USA, www.cabi.org.
6. Singh Jagbir (2014) “Eco-Tourism” Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com)
7. *Tourism Recreation and Research Journal*, Center for Tourism Research and Development, Lucknow.

GEOUSEC202: Quantitative Geography

Course Objectives:

1. This course studies the concept of statistics and its geographical applications.
2. It lays the foundation of quantitative techniques to the students for spatial analysis.
3. It will enhance the ability to interpret data statistically.

Course Learning Outcomes:

1. The students will learn various statistical skills.
2. The students will know how the statistical theories and functions will be applied in geography.
3. The students will learn about the significance test to strengthen their argument with facts and represent data.

Course Contents:

1. Quantification in Geography: Geographical Data Matrix, Significance of Statistical Methods in Geography; Sources of Data, Scales of Measurement (Nominal, Ordinal, Interval, Ratio).
2. Concept of population: Variables and attributes, discrete and grouped variables, Frequency distribution table, significance of tabulation and diagrammatic representation.
3. Descriptive statistics: techniques in measuring central tendency, dispersion and skewness of geographical data.
4. Bivariate analysis: Application of correlation and regression analysis in geography. Importance of residual analysis. Association and Correlation: Rank Correlation, Product Moment Correlation, and Simple Regression.
5. Sampling: Probability and Non-probability sampling methods, uses and limitation; Sampling error.

Reading book list

1. Bart James E. and Gerld M. Barber, 1996. *Elementary Statistics for Geographers*, The Guieford Press, London.
2. Briggs, W. 2016. *Uncertainty: The soul of modeling, probability & statistics*. Springer International Publishing. doi:10.1007/978-3-319-39756-6.
3. Cressie, N.A.C. 1991. *Statistics for Spatial Analysis*, Wiley, New York.
4. Davis, John C. (2002). *Statistics and Data Analysis in Geology* (third edition), John Wiley & Sons.
5. Eldon, D. 1983. *Statistics in Geography: A Practical Approach*, Blackwell, London.

6. Gregory, S. 1978. *Statistical Methods and the Geographer* (4th Edition), Longman, London.Hill, New York.
7. Mathews, J.A. 1987. *Quantitative and Statistical Approaches to Geography: A Practical Manual*, Pergamon, Oxford.
8. McGrew, Jr. J.C. and Monroe, C.B. (2000). *An Introduction to Statistical Problem Solving in Geography* (second edition), McGraw Hill, Boston.
9. Nussbaum, E. M. 2015. *Categorical and Nonparametric Data Analysis: Choosing the Best Statistical Technique*. New York: Taylor & Francis. doi:10.1007/978-3-319-39756-6
10. Rohatgi, V. K. and Saleh, A. K. 2015. *An Introduction to Probability and Statistics*, John Wiley & Sons, New Jersey.
11. Tayler, P.J. 1977. *Quantitative Methods in Geography: An Introduction to Spatial Analysis*, Houghton Mifflin Company Boston, London.
12. Wei, W.S. 1990. *Time Series Analysis: Variate and Multivariate Methods*, Addison Wesley Publishing.
13. Yeates, Mauris, 1974. *An Introduction to Quantitative Analysis in Human Geography*, Mc Graw Hill, New York.

GEOUSEC303: Basic Statistics in Geography

Course Objectives:

1. This course studies the concept of statistics and its geographical applications.
2. It lays the foundation of quantitative techniques to the students for spatial analysis.
3. It will enhance the ability to interpret data statistically.

Course Learning Outcomes:

1. The students will learn various statistical skills.
2. The students will know how the statistical theories and functions will be applied in geography.
3. The students will learn about the significance test to strengthen their argument with facts and represent data.

Course Contents:

1. Frequency distribution: Grouped and ungrouped data, diagrammatic representation (Histogram, Frequency curve and Ogive); Central tendency: Mean Median and Mode, Estimation of Fractiles.
2. Dispersion: Absolute measures (Range, Quartile deviation, Mean deviation, Variance and standard deviation), Relative measures (Co-efficient of Variation, standard score).
3. Correlation: Product moment and Rank correlation, linear regression, estimation of residuals.
4. Representation of data in computer: Numbering Systems, Binary Arithmetic, preparation of graphs and charts.
5. Statics using MS Excel: Scatter diagram, trend line fitting and correlation; Time Series Analysis: semi-average, moving average and straight-line fitting method.

Class Record: Each student will submit a record containing five exercises:

1. **Construct a data matrix of about (10 x 10) with each row representing an aerial unit (districts or villages or towns). Histograms and frequency curve would be prepared on the entire data set interpreted for one or two variables.**
2. **Based on the above table, a frequency table, measures of central tendency and dispersion would be computed and interpreted for any two attributes.**
3. **Based on of the sample set and using two relevant attributes, calculate correlation and regression.**
4. **Definition and presentation of numbering and binary system in computer system.**
5. **Draw scatter diagram, trend line, find out correlation; Time Series Analysis: semi-average, moving average and straight-line fitting using MS Excel.**

Reading book list

1. Bart James E. and Gerld M. Barber, 1996. *Elementary Statistics for Geographers*, The Guilford Press, London.

2. Briggs, W. 2016. *Uncertainty: The soul of modelling, probability & statistics*. Springer International Publishing. doi: 10.1007/978-3-319-39756-6.
3. Cressie, N.A.C. 1991. *Statistics for Spatial Analysis*, Wiley, New York.
4. Davis, John C. (2002). *Statistics and Data Analysis in Geology* (third edition), John Wiley & Sons.
5. Eldon, D. 1983. *Statistics in Geography: A Practical Approach*, Blackwell, London.
6. Gregory, S. 1978. *Statistical Methods and the Geographer* (4th Edition), Longman, London. Hill, New York.
7. Mathews, J.A. 1987. *Quantitative and Statistical Approaches to Geography: A Practical Manual*, Pergamon, Oxford.
8. McGrew, Jr. J.C. and Monroe, C.B. (2000). *An Introduction to Statistical Problem Solving in Geography* (second edition), McGraw Hill, Boston.
9. Nussbaum, E. M. 2015. *Categorical and Nonparametric Data Analysis: Choosing the Best Statistical Technique*. New York: Taylor & Francis. doi:10.1007/978-3-319-39756-6
10. Rohatgi, V. K. and Saleh, A. K. 2015. *An Introduction to Probability and Statistics*, John Wiley & Sons, New Jersey.
11. Tayler, P.J. 1977. *Quantitative Methods in Geography: An Introduction to Spatial Analysis*, Houghton Mifflin Company Boston, London.
12. Wei, W.S. 1990. *Time Series Analysis: Variate and Multivariate Methods*, Addison Wesley Publishing.
13. Yeates, Mauris, 1974. *An Introduction to Quantitative Analysis in Human Geography*, Mc Graw Hill, New York.

GEOUSEC705: Research Ethics and Methodology (For Research)

Course Objectives:

1. This course attempts to introduce the students to the basic knowledge related to geographical field research design.
2. The course examines the questions related to data collection, methods and its analysis.
3. It also critically evaluates the dissertation based on field survey.

Course Learning Outcomes:

1. The students will be able to understand basic concepts of field research methods and research design in geography.
2. The students will be able to do field work through practical experience and get skills of data collection methods and processing and analysis of obtained data.
3. The students will be able to write dissertation based on field work on given topic.

Course Contents:

1. Introduction to Geographical Research: Concept, Significance, Types and Approaches to Research in Geography; Literature survey; Research Ethics; Limitations.
2. Research Design: Steps, Identification and formulation of Research Problem; Research questions; Aims and Objectives.
3. Data Sources and Methods of Data Collection: Nature of Data: Primary Data: Field survey, Selection of sample, Questionnaire, Interview, Observation, PRA; Secondary Data.
4. Data Analysis: Processing of data; tabulation, graphic presentation and analysis of data; qualitative and quantitative analysis, Referencing; Structure of dissertation.
5. Methods of writing notes, style of referencing, bibliography and appendices, abstract and Synopsis writing.

Reading book list

1. Black, James A. and Champion, D.J. 1976. *Methods and Issues in Social Research*, John Wiley and Sons, New York.
2. Bonnett, Alastair, R. 2008. *What Is Geography?* Sage, London.

3. Creswell, J. W. 2009. Research Design: Qualitative, Quantitative and Mixed Methods Approaches, Sage, California, USA
4. Gopal, Krishan and Singh, Nina, 2016. Researching Geography: The Indian Context. Routledge, Delhi.
5. Harris, C. 2001. Archival Fieldwork, Geographical Review, 91 (1-2), 328-334
6. Hart, C. 1999. Doing Literature Review: Releasing the Social Science Research Imagination, Sage, London
7. Hay. I. 2010. Qualitative Research Methods in Human Geography, 3rd ed. Oxford University Press, South Melbourne, Australia,
8. Lunsbury J.F. and Aldrich, F.T. 1979. Introduction to Geographic Field Methods and Techniques, Charles E. Merrill Publishing Company, Columbus.
9. Misra, R. P. 2015. Research Methodology: A Handbook, Concept Publishing Company, New Delhi.
10. Montello, Daniel R. and Sutton, P.C. 2006. An Introduction to Scientific Research in Geography, Sage Publications, London.
11. Oliver, Paul, 2004. Writing Your Thesis, Vistaar Publications, New Delhi
12. Preece, R. 1994. Starting Research: An Introduction to Academic Research and Dissertation Writing, Continuum, London.
13. Sharma, P.R., R. S. Yadava and Sharma, V.N. 2011. Research Methodology: Concepts and Studies, R. K. Books, New Delhi.
14. Stoddard, Robert H. 1982. Field Techniques and Research Methods in Geography, Kendall/Hunt for National Council for Geographic Education.

GEOUSEC806: Research Field Work (FOR RESEARCH)

Course Objectives:

1. To developed the ability in the field study and project work regarding the social and economic status of the study area.
2. To increase the hands on training and study in the problems of the regions.
3. Demonstrate the socio-economic and cultural pattern of the study area;

Course Learning Outcomes:

1. Understand the basic concepts of social and economic status of the study area
2. Reflection of problems of the area and proposal for development.

Course Contents:

1. Field project area selection: Selection of field study area based on geographical issues within an administrative boundary of rural or urban areas of plateaus or hill settings.
2. Duration of field project study: 15 days in a selected area and study in details as per daily schedule.
3. Project study and Data collection: On the basis of selected objectives collection of primary data through pre-scheduled questionnaire and secondary information from different offices.
4. Data compilation and mapping: Compilation of data as per requirement of the objectives and preparation of graphs and maps using statistical techniques and GIS.
5. Report writing: a) Introduction and relevance of the study, Literature review, Objectives, Methodology, Geographical background, Data analysis with graphs and maps, Summary, Major findings of the study and Bibliography. b) Report should be in type in preferably English language within 100 pages including diagrams and plates.

Reading book list

1. Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications.
2. Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.
3. Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in

4. Mukherjee, Neela 1993. Participatory Rural Appraisal: Methodology and Application. Concept Publs. Co., New Delhi.
5. Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Publs. Co., New Delhi
6. Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
7. Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
8. Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
9. Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/Hunt.
10. Wolcott, H. 1995. The Art of Fieldwork. Alta Mira Press, Walnut Creek, C

GEOUSEC807: Dissertation Presentation and Viva (FOR RESEARCH)

1. Report writing format will be provided from the department and the students have to submit both hard copy and soft copy (.pdf format) of the report at the department before the examination.
2. Certificate will be issued by the supervisor (s) and authenticated by the Head of the Department.
3. Student has to appear before the external examiner for presentation of the work and viva voce.