

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

STRUCTURE AT M.A./M.Sc. IN GEOGRAPHY TO BE
INTRODUCED FROM

From June, 1992 M.A./M.Sc. Part-I Semester-I	June, 1993 M.A./M.Sc. Part-II Semester-III
Gg.101 Principles of Economic Geography.	Gg.301 a) Fluvial Geomorphology b) Synoptic Climatology c) Agricultural Geog. e) Population Geography.
Gg.102 Principles of Population & Settlement Geography.	Gg.302 a) Coastal Geomorphology b) Applied climatology c) Geography of trade & transport d) Geography of Rural settlement.
Gg.103 Environmental Science.	Gg.303 a) Interpretation of Topographical maps and Village survey b) Project work.
Gg.104 Physical & Regional Geography of India.	Gg.304 a) Geography of Resources b) Political Geography.
Gg.105 Practicals in Human Geography.	Gg.305 a) Geography of Economic development b) Biogeography c) Geography of Health and Nutrition.
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<u>SEMESTER - II</u>	<u>SEMESTER - IV</u>
Gg.201 Principles of Geomorphology.	Gg.401 a) Tropical Geomorphology b) Monsoon climatology c) Industrial Geography d) Urban Geography.
Gg.202 Principles of Climatology.	Gg.402 a) Regional Planning b) Desertation.
Gg.203 Statistical Methods.	Gg.403 a) Practicals A) Interpretation of Aerial Photographs and Landsat imageries. B) Surveying : Dumpy level & Theodolite.
Gg.204 a) Regional Geography of U.S.A. b) Regional Geography of Japan.	Gg.404 a) Soil Geography b) Hydrology c) Development of Geographical thoughts
Gg.205 Practicals in Physical Geography. i) Geomorphology. ii) Climatology. iii) Tour Report.	Gg.405 a) Application of Computer in Geography b) Geography of Tourism.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

Structure at M.A./M.Sc. in Geography to be introduced from June, 1993.

M.A./M.Sc. Part-II Semester - III

- Gg. 301. Fluvial Geomorphology / Synoptic climatology / Agricultural Geography / Population Geography.
- Gg.302 Coastal Geomorphology / Applied Climatology / Geography of trade and transport / Geography of Rural settlement.
- Gg.303. Practical - Interpretation of Topographical maps and Village survey / Project Work.
- Gg.304 Geography of Resources / Political Geography.
- Gg.305 Geography of Economic Development / Geography of Health and Nutrition / Bio Geography.

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SEMESTER - III

1. Definition, nature and scope of fluvial geomorphology.
2. Length of overland flow and through flow, their nature and characteristic.
3. Stream flow - Velocity, Characteristics and distribution. Chezy's equation of stream flow velocity. Stream flow types - turbulent & laminar, Froude number and Reynold number.
4. Sediment transportation - Mechanism Critical tractive force, types of Load.
5. Morphology of stream channel. Hydranlic Geometry & channel patterns.
6. Drainage network hierarchy and drainage development.
7. Fluvial land forms - Flood plains, Deltas & Fluvial terraces, incised meanders.
8. River Metamorphosis - Long term and short term channel changes.

BOOKS :

1. Fluvial process in Geomorphology - Leopold, Wedman and Morgan.
2. Process in Geomorphology - Ritter.
3. Fluvial geomorphology - Gregory & Walling petter.

OR

SEMESTER - III

SYNOPTIC CLIMATOLOGY

1. Nature and Scope of Synoptic Climatology : Levels of climatological synthesis. The analytical view point in climatology. Comparison of synoptic and dynamic climatology.
2. Tropical weather and extra tropical weather systems : Air mass fronts, wave cyclone, cyclogenesis, tropical and extra tropical cyclone, Rossby waves, interaction between extra tropical and tropical weather systems, the western disturbances.
3. Local Weather : Forecasting of local weather, heat waves and cold waves, local forecasts.
4. Scientific weather forecasting : Station model, weather chart meteorological code and data exchange, analysis of weather charts, cloud formation, mechanism of rain formation.

5. Weather forecasting : Short, Medium and Long range weather forecasting, Numerical weather prediction.
6. Environmental pollution and WeatherForecasting : Nature of environmental pollution, Meteorological factors and pollutent dispersal, pollutent distribution models,marine meteorological forecasting, forecasting services to aviation, Benefits of Weather forecasting.
7. Weather forecasting in India.

OR

SEMESTER - III

Agricultural Geography.

1. Nature scope and significance of Agricultural Geog. Approaches to study of Agricultural Geography. Evolution of agriculture. Agriculture.
2. Place of Agriculture in world regional economies.
3. Determinants of Agricultural Patterns - Physical, Economic and Technological.
4. Study of the following agricultural types.
A) Subsistence farming, Intensive, Shifting.
B) Commercial farming
Plantation, Commercial grain farming and mixed farming, dairy farming, Truck farming.
5. Problems and prospects of agriculture in arid and semi arid regions in tropics.
6. Agricultural regions and regionalization, crop combination techniques. Agricultural regions of India.
7. Agricultural productivity, and Agricultural efficiency, level use survey and Planning.

BOOKS :

1. Agricultural Geography - Jasbir Sing.
2. Agricultural Geography - Sioman.
3. Agricultural Geography - Masjit Husain.
4. Economic Geography - Alexandar.
5. Chisholm, M. : Rural settlement and Landuse - An Essay in location. Hutchinson and Co. London.
6. Chisholm M : Geography and Economics. Hutchinson and Co. London.
7. Courtenay : Plantation Agriculture.
8. Dunn, E.S. : The location of Agricultural production. Gainsville, University of Florida Press.

9. Dukham & Masefield : Farming Systems of the World.
10. Gregor, Howard F. : Geography of Agriculture. Themes in Research; Prentice Hall.
11. Grigg, D.D. : The Harsh Lands, Hutchison and Co. Pvt. Ltd.
12. Grigg D.D. : An Introduction to Agricultural Geography : Hutchinson and Co. Pvt. Ltd.
13. Haines, Michael : An Introduction to Farming systems. Longman, London.
14. Heatcote, P.L. : The Arid Lands, Their Use and abuse. Longman, London.
15. Tibery, B.W. : Agricultural Geography. Social and economic analysis Oxford University press.
16. Memoria, C.B. : Economic and Commercial Geography of India Shiva-Shiva Lal Agrawal & Co., Delhi.
17. Misra, R.P. : and Tiwari, P.S. Agricultural Geography, Heritage Publisher, New Delhi.
18. Morgan, W.B. & Munton R.J.C. : Agricultural Geography Methnen and Co. Ltd.
19. Noor Mohammad : Perspective in Agricultural Geography. Vol. I to V concept publishing co. New Delhi.

OR

SEMESTER - III

Population Geography.

Chapter : 1) Intreduction to population geography :- Definition and scope of population geography. The development of population geography as a scientific discipline and its relation to **other** disciplines. History and growth of population geography.

Chapter :-2) History of world population growth :-

- A) Palaeolithic to early historic period.
- B) Population of the ancient world.
- C) Population trends : ancient to modern times.
- D) Population growth in the modern period.

Chapter :- 3) Distribution and density of population :-

Distribution of world population, Density of world population factors affecting the density and distribution of population :-

- 1) Physical Geographic factors.
- 2) Social and economic factors
- 3) Demographic factors.

Chapter :4 Components of population growth :-

- 1) Fertility
- 2) Mortality
- 3) Mobility.

Levels and trends of fertility, Determinants of fertility. Levels and trends of Mortality, Mortality differentials, factors related to mortality.

Meaning, importance and history of migration. Types of migration, determinants of migration, laws of migration, consequences of migration. Factors affecting migration.

Chapter:- 5) Population theories 2) Optimum population theory.
3) The theory of demographic transition.

Chapter :- 6) Population composition :-

- a) Age composition, Age pyramids, Age groups, Age indices. Patterns of world's age structure.
- b) Sex composition, Definition, importance determinants, sex ratio at birth and death, sex selectivity among migrants, sex disparity, world patterns of sex ratio.

Cultural characteristics of population :- Religious composition, Marital status and educational composition. Occupational structure of population.

RECOMMENDED BOOKS :

- 1) United nations, The determinants and consequences of population trend's New York 1973.
- 2) Beaujeu Garnier J. 'Geography of population' New York, St. Martin's Press, 1966
- 3) Bogue, D.J. 'Principles of Demography' N.Y.J. Wiley and Sons inc, 1969.
- 4) Clarke J.L. Population geography Oxford, Pergamon Press, 1965.
- 5) Demko, Jetal 'Population geography' Mc. Graw Hill N.Y., 1970.
- 6) Chandane R.C. 'Introduction to population geography', 1983.
- 7) Chosh P.N. Fundamentals of Population geography Sterling Publishers private limited, New Delhi, 1985.

SEMESTER - III (2)

COSTAL GEOMORPHOLOGY

1. Geomorphic agents responsible for shore and coastline evolution :
 - I. Waves, currents, tides -
 - a) Waves : Waves in deep water, transformation of waves in shallow water, breaking of waves, wave refraction, concept of wave energy.
 - b) Currents : Wave induced currents, wind induced current, tide and river induced currents.
 - c) Tides : Range, type, environment.
 - d) Catastrophic processes : Isunamis, storm surges.
 2. Other geomorphic agencies-
 - a) Subaerial run-off,
 - b) Chemical processes,
 - c) Biological factors.
 - II. Shoreline movements.
 1. Eustatic movements, glacio-eustasy, tectonic eustasy.
 2. Isostatic movements.
 3. Characteristics of emerged and submerged coastlines.
 - III. Coastal Landforms :
 1. Cliffs and shore platforms,
 2. Beaches, spits and barriers,
 3. Coastal dunes,
 4. Mudflats, saltmarshes and mangroves,
 5. Estuaries and lagoons,
 6. Deltas,
 7. Coral reefs and atolls,
 - IV. Classification of coasts :
 1. Criteria for coastal classifications.
 2. Both coastal classification in detail.
 - V. Submarine Geomorphology :
 1. Continental margin
Relief, structure and sediment characteristics of the continental shelves and slopes.
 2. Ocean basins
Relief, structure and sediment characteristics of the ocean basin floor, the mid-ocean ridges and rises and the continental rises.
 3. Marginal trenches.

Applied Climatology

1. Realms of Climatology.
2. Instrumentation and measurements in Applied Climatology.
3. Elements of Applied climatology : radiation, sunshine, light and cloudiness, soil temperature, humidity.
4. Micro climates : General characteristics, the role of surface cover and topography.
5. The mosaic of rural topoclimates : Climate and Scale, special climates, bioclimates, forest climates etc.
6. Climate and Agriculture : Climate crop relations, Weather hazards in agriculture, climate and animal husbandry, climate and agricultural development planning.
7. Climatic aspects of hydrological cycle : Use of Satellite data.
8. Man Made Climates : Urban climates, air pollution.
9. Selected weather applications : Weather analysis and forecasting, weather satellites, aviation and weather.
10. Climates of the future.

: BOOKS :

1. Man and His environment : Climate-David M. Gates.
2. Principles of Applied Climatology - Keith Smith.
3. Applied Climatology : An introduction - John F. Griffiths.
4. Climatology : Fundamentals and application - J.R. Mather.

Geography of Trade and Transport

1. Importance of transportation in the world and regional economics.
2. Modes of Transport factors associated with their growth. Comparison of different modes of transportation. Distributional patterns of different modes of transportation. Major sea routes and their significance in world economics.
3. Ports and Harbours - factors related to the growth of major - sea - ports (Physical and economic factors). Major sea-ports of the world.
4. Models of network changes.
 - i) Route development substitution model.
 - ii) Gravity model.

5. Importance of trade in the world and regional economics.
6. International trade. Types of trade, factors associated with the development of trade.
7. Theories of international trade.
8. Trading areas and economic blocks and their significance in the economic development.

BOOKS :

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|-------------------------------------|-----------------------|
| 1. Geog. of International Trade | - Taffee & Grawthier. |
| 2. Geog. of International Trade | - Thoman & condling. |
| 3. Railways & Geography | - O'Dell & Richards. |
| 4. Geog. of Air Transportation | - Sealy. |
| 5. Ports & Harbours | - Morgan. |
| 6. Transport Geography | - Janki. |
| 7. Geography of Economic activities | - Thoman. |
| 8. Transport and Trade | ▼ Barke M. |
| 9. Geog. of Transportation | - Pandey N.P. |

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OR

SEMESTER - III (2)

Geography of Rural Settlement.

1. Settlements as defined in different part of the world. Historical evolution of settlements; segnence of occupation from neo-neolithic to modern period and its impact on settlements. Geographical aspects and place names.
2. Selection of site and situation of settlement, study and implimention of weberian model. **in settlement** Geography. Geographical aspect and Nucleation Disperion, Growth, and Distribution of settlements.
3. Theories of land-use intensity of use, labour cost, Marketing of products, models put forward by Von Thunen, and Recards.
4. Rural economic activities, fuctional analysis of service centres. Centrality, hierachy of such entres relation to central place theory.
5. Morphology of Indian Villages.
6. Rural transformation - factors influencing rural transformation in India.
7. Demographic characteristics of rural settlements causes and consequences of migration, rural rural seasonal migration, commuting patterns.

8. Rural house types in India functional utilization of houses in India. Impact of Geographical aspect on building material in Maharashtra.
9. Rural planning Roll of Government in rural planning in India.

BOOKS :

1. R.L. Shingh - Reading in rural settlement Geography.
The National Geographical society of India
Varanashi.
2. R.B.Mandal - Introduction to Rural Settlement.
3. F.S. Hudson - Geography of Settlements.
4. Chisholm Michael - Rural Settlement and land use.

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SEMESTER - III (3)

Course :- PRACTICAL : INTERPRETATION OF TOPOGRAPHICAL MAPS
VILLAGE SURVEY / PROJECT WORK.

A) INTERNSHIP OF TOPOGRAPHICAL MAPS :

- i) Cartographical appreciation of the Indian (S.O.I.) and Foreign U.K. (O.S.), U.S.A. (Geological survey) topographical maps :- Numbering technique, Scales, Grid reference, signs and symbols, colour style.
- ii) Interpretation : Meaning and importance of map interpretation.
- iii) Interpretation of S.O.I. topographical maps with special reference to correlation between different phenomena.
- iv) Interpretation of the U.K. (O.S.), and U.S.A. (Geological survey) topographical maps with special reference to physiographic and cultural features.

NOTE : Students should maintain the Journal.

B) VILLAGE SURVEY / PROJECT WORK :

- i) Village survey : for village survey a batch should consist of not more than 5 students, per teacher.
The student should study the following aspects of a village :
Physical, Social and cultural.
- ii) Project Work : For project work a batch should consist of not more than 5 students, per teacher.
A student should select a suitable topic in consultation with teacher (Guide) concerned.
Village survey / project work report should be submitted at the end of the semester.

NOTE :- 40% marks each for part A, and Part B respectively for final examination and 10% Internal marks each for part A & B, respectively.

REFERENCE BOOKS :

1. Government of India 1980 Publication - Survey of India, Map catalogue, Dehradun.
2. R.Singh & L.Singh Kanaujia (1973) - Map work & practical Geog. central Book Depot, Allahabad.
3. R.L. Singh (1979) - Elements of Practical Geography, Kalyani Publishers, New Delhi.
4. A.H. Meux (1981) - Reading topographical Maps Hodder & Stoughton, London.

5. G.H. Dury (1971) - Map Interpretation - Sir Isaac Pitman & Sons Ltd. London.
6. K.Rammurthy (1982) - Map Interpretation, Rex printers, Mylapare Madras - 4.
7. Upton W.B. - Land forms & topographic Maps.
8. Prof. B.G. Tamaskar & Dr. V.M. Deshmukh. - Geographical Interpretation of Indian topographical maps, orient Long man Ltd. Bombay.

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OR

GEOGRAPHY OF RESOURCES.

1. The concept of Resources :
 - i) Defination, Nature of resources
 - ii) The Functional or operational theory of Resources.
 - iii) Methods of the study of resources (Principle of resource adequacy and resource scarcity)
 2. Resource Utilization :
 - i) Role of nature, culture and technology if resource utilization and development with reference to developing and developed countries.
 - ii) Resource utilization and Ecological crisis.
(Dichotomy of Exploitation verses conservation).
 3. Classification of Resources and Regions :
 - i) Different methods of classification.
 - ii) Defination of resources region.
 - iii) Major resource regions of the world regions of increment, efforts, retarded development, arrested development, resource scarcity and lasting difficulty.
- Study of major resources: Land, Soil, and water.
4. Land.
 - i) Claiment of land - (Agriculture, mining, Forest, settlements)
 - ii) Defination and objectives of land use, Classification.
 - iii) Land use classification in India.
 - iv) Land Degradation - Meaning, types and causative factors.

5. Soil : i) Soil, as a media for plant growth, soil-water-plant relationship. ii) Soil degradation, concept of soil loss equation (USLE)
6. Water : i) Rainfall as the prime source of water, and estimation of volume of rainfall. ii) Claiment of water - Agriculture, Industry, Domestic and energy iii) Water quality; suitable for drinking, irrigation and industries. iv) problems of water logging.
7. Conservation and Management : Land use planning, water management, Conservation of soil.

BOOKS :

1. B.S.Negi - Geography of resources (Second edition)
Pub. Kedarnath Ram Naik, Meeraj (U.P.)
2. A. Ramesh Editor - Resource Geography - Contribution to indian Geography, Vth, 1984, Heritage Publishers, New Delhi.
3. R.B. Mandal - Recenct trends and concepts in V.N.P.Sindha (Edi.)- Geography volume IInd, 1980. concept publishing company, New Delhi.
4. Erich W. Zimmerman - Introduction to world resources. Harper and Row Publishers, New York, London.
5. R.B. Mandal - Landutilization theory and practice, 1982. concept publishing company, New Delhi.
6. N.C. Gautam and L.R.A. Narayan - Wastelands in India. Pink Publishing House, Mathura.
7. Turk and Turk - Environmental Science. Saunders College Publishing, New York, London.
8. Ronald U.Cooke - Trends in Geography. Pergamon press-Oxford, New York.
9. Gerald W.Olson - Soil and the environment Publisher - chapman and Hall New York, London.
10. K.L. Rao - India's Water Wealth.
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OR

SEMESTER - III (4)

POLITICAL GEOGRAPHY

1. An Introduction to political Geography : i) Definition, nature and scope of political Geography. ii) Relationship of political Geography to Geopolitics and other social Sciences.
2. Approaches to the study of political Geography : i) Three Schools of politico-geographical thought - Political landscape, political ecology, organismic, schools.
ii) Critical study of the historical, morphological, functional, Unified Field Theory (S.B. Jones), Power analysis, approaches.
3. Political process and the states : i) State formation and Nation building (Centripetal and centrifugal forces)
ii) Classification of States - based on evolutionary process, evolutionary stage, Government form, political ideology, location, and extent. iii) Formation of the Indian federation.
4. International boundaries : i) Definition, function and classification of boundaries. ii) Territorial waters (concept, zones & claims. iii) Problems of landlocked states. iv) Indian boundaries and disputes Internal & External.
5. Global Strategic views : A critical study and validity of
i) Mackinder's heartland theory
ii) Mahan's idea of sea power and
iii) Alexander 'be seversky's view of Air power .
6. International Relations : i) colonialism and Neocolonialism
ii) The political Geography of the present international organization.
iii) Political, Economic and military groupings of States.
7. Politico - Geographical problems in the world : i) Population explosion. ii) International migration iii) National minorities. iv) Integration and disintegration of countries - (European, Asian).

BOOKS :

1. R.D. Dixit - Political Geography. Tata Mc.Graw Hill Publishing company, Ltd, New Delhi.
2. R.D. Dixit - Political Geography of Federalism (1975) The Macmillan company of India Ltd. New Delhi.

3. R.L. Dwivedi - Fundamentals of political Geography (1990)
Chaitanya publication house, Allahabad.
4. Richard Muir - Modern Political Geography (1975)
The Macmillan press Ltd. London.
5. Harm J.De. Blij - Systematic political Geography - Second Edi.
John Wiley & Sons.
6. L. Carlson - Geography and world politics.
Palit and Dutt Publisher, Dehradun.
7. Isaih Bowman - Problems in Political Geography - Vol.
I & II (1989) Printwell pub.- Jaipur.
8. O.H.K.Spate - Changing map of Asia.
9. Janaki V.A. - Some aspects of political Geography in India.
10. N.J.G. Pounds - Political Geography, second edition.
1972, McGraw Hill. Company.
11. K. Satyamurthy - Political Geography of India.

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SEMESTER - III (5)(i)GEOGRAPHY OF ECONOMIC DEVELOPMENT

1. Geography and economic growth.
Historical review of the world's economic development.
Criteria for measuring economic development.
2. Patterns of economic development in the contemporary world developed, developing and under-developed areas of the world.
Factors leading to unequal development in Maharashtra.
3. Problems of developing and under-developed countries.
4. Models of economic development :
 - i) Demographic Transition model and classification of countries according to Demographic stages.
 - ii) John Friedmann's centre - periphery model of development.
 - iii) Clark and Fisher's Economic sector model.
 - iv) Rostow's model of economic growth.
 - v) Edward Taaffe's four stage model of the spatial pattern of development.
5. Growth poles and regional development : Growth pole theory of Perroux, Boudville and R.P. Misra.
6. Case studies (A) (I) Developed regions poor in natural resources - Japan.
II) Developed regions rich in natural resources - U.S.A.
(B) Case studies :
 - (I) Developing regions Potential rich in natural resources - India.
 - (II) Developing regions rich in natural resources - Brazil.
7. Inter regional and International Trade and Economic development.
Balance of payment. Trading block.

REFERENCE BOOKS :

1. Bradford, M.G. and Kent W.A. (1984) : "Human Geography"
Oxford University Press.
2. Cairncross, A.K. Factors in Economic Development.
3. Cole, J.P. (1983) : Geography of World Affairs, Butterworths,
London.
4. Fryer, D.W. : World Economic Development.
5. Furtado, C. (1964) : Regional Development in Brazil.
6. Ginsburg, Norton (ed.) : Essays on Geography and Economic Development

7. Hodder, B.W. (1968) - Economic Development in the Tropics.
8. Haggett, Peter (1975) : Geography A Modern Synthesis.
Harper and Row publishers, London.
9. Sundaram K.V. (1983) : Geography of under development.
concept Publishing Co., New Delhi.
10. World Development Report , Published for the world Bank,
Oxford University Press.

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SEMESTER - III (5) (ii)

GEOGRAPHY OF HEALTH AND NUTRITION

1. Defination, Nature and scope of Geography of Health & Nutrition geography, Concepts; ecology; responsibility and indicators, or health.
2. Environment and Health : Phisical, biological and human environment. Hazards and Influences of environment.
3. Landscape epidemiology : Regions, Transmissible disease systems, geography of disease diffusion, types of diffusion, routes of transmission. The landscape epidemiology approach.
4. The Pollution Syndrome : Toxic hazards of natural and economic origins, chemical pollution, Radioactive pollution, Globalization and perception of Health Hazards.
5. Classification of diseases, Geographical distribution and description of diseases - Small chickenpox, Cholera, Malaria, AIDS, Diarrhoeal, Industrial, lung, disease, Cancer, Diabetes, mellitus, Deficiency diseases.
6. Nutrition and manutrition :
Geography of food and culture, Nutrition and health, classification of foods, balanced diet, Nutritional diseases.
7. Health education and communication. Helth planning and management. Health care systems in India. International health care systems.
8. Demography and family planning :
Demographic cycle, population trends in India, need of family planning, contraceptive methods, Sociology of family planning.

BOOKS :

1. G.Melvyn Howe (1977) : A world Geography of Human diseases.
Academic press, London.
2. J.E. Part and K. Park (Ninth and Twelfth edition):
(1983 & 1989) Textbook of preventive and social
medicine,
M/5 Banarsidds Bhanot, Jabalpur.
3. R.P. Misra (1970) : Medical Geography of India. National
Book Trust India, New Delhi.
4. Melinda Meade, John Florin (1988) : Medical Geography
and Wilbert Cyesler.
The Guilford press,
Newyork.

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SEMESTER - III (5) (iii)

BIOGEOGRAPHY ..

1. Biogeography : Scope and development
Biosphere, Phytogeography, Zoogeography.
Scope and objective, Relation with other sciences,
History of Biogeography.
2. Factors influencing the Biota -
Physiographic factors,
Climatic factors,
Biotic factors.
3. Plant dispersal and floristic regions-
Wind dispersal, Water dispersal, Dispersal by animals
Dispersal by man, Mechanical dispersal;
Floristic regions of the world.
4. Zoogeographical regions of the old world-
Palasarcctic, Ethiopian and Oriental regions.
5. Zoogeographical regions of the New world-
Australion, Nearctic, Neotropical regions.
6. Migration of animals-
Causes of migration,
Theories regarding migrations of Birds,
C. Darwins Theory of organic evolution.
7. Wildlife : Managment and conservation-
Significance of wildlife conservation,
Causes of depletion of wildlife,
Legislative measures for protection,
Wildlife in India,
Wildlife management.

: REFERENCE BOOKS :

1. Essential of Biogeography - H.S. Mathur.
2. Fundamentals of Biogeography - H. Robinson.
3. Dynamic zoogeography - Miklos D.F. Udvardy.
4. Biogeography - Joy Tivy.
5. Ecology - O.P. Odum.
6. Zoogeography - Darlington.
7. Biogeography - Nigel Pears.
8. Environmental biology - S.C. Varma.
9. Plant geography - Bharucha.
10. Zoogeography - Bharucha.

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NORTH MAHARASHTRA UNIVERSITY, JALGAON.

M.Sc. (Sem.I & II) Revised syllabus to be implemented from the academic Year 1992-93.

MATHEMATICS

UNIVERSITY COURSES

Semester - I

- | | |
|--------|--------------------------|
| MT 101 | : Advanced Calculus. |
| MT 102 | : Topology I |
| MT 103 | : Algebra I |
| MT 104 | : Differential Equations |
| MT 105 | : Classical Mechanics |

OR

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| MT-106 | : Computer Programming (Fortran-77) |
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Semester - II

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| MT 201 | : Measure and Integration |
| MT 202 | : Topology II |
| MT 203 | : Algebra II |
| MT 204 | : Complex Analysis |
| MT 205 | : Mathematical Methods I |

OR

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| MT 206 | : Programming and Numerical Methods. |
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SEMESTER-I

MT-101 : Advanced Calculus-

Functions of Several variables :

Linear transformations of Euclidean n-space Differentiability of functions of several variables. The Chain rule, Partial functions, Inverse and Implicit function theorem, Jacobians, Derivatives of higher order.

Integration of differential forms -

Integration, Primitive mappings, Partitions of Unity, Change of variables, differential forms, Basic K.forms and their product, Change of variable. Simplexes of chains, Stoke's Theorem, Closed and Exact forms, Vector Analysis, Integrals of 1 form and 2 forms in R^3 . Stoke's Formula, Divergence Theorem.

Prescribed Books :-

1. Walter Rudin : Principles of Mathematical Analysis.
(Mc Graw Hill, International Student, 3rd Edition)

Recommended Books :-

- 1) T.M. Apostol - Mathematical Analysis (Revised Edition)
(Addison-Wesley).
- 2) M. Spivak - Calculus of Manifolds.
(W.A. Benjamin, Inc. New York).
- 3) Nickerson, Spencer and Steenrod - Advanced Calculus.
- 4) A. Devincenzi - Advanced Calculus (Holt, Rinehart and Winton).

MT-102 : Topology-I

- 1) Partially ordered sets, well ordered sets, Axiom of Choice, Zorn's Lemma, Well ordering principle.
- 2) Metric spaces, Open spheres, Open sets, Topological Spaces.
(Omit 19,20 Simmons book).
- 3) Sequences of Metric spaces, Cauchy sequences, Convergence.
- 4) Completions, Baire's theorem, Completion of Metric Spaces.
- 5) Continuity, homeomorphism, isometry.
- 6) Compactness, Totally bounded sets, Arzela Ascoli theorem.
- 7) Contraction principle, Existence theorem for differential equations.
- 8) Connectedness, finite product of connected spaces.

REFERENCES :-

- 1) G.F. Simmons : Introduction to topology & modern analysis,
Mc Graw Hill. (Tokio-Japan)
- 2) R.P. Munkres Topology, A first course.
(Prentice Hall of India, New Delhi) (1984).
- 3) J. Dieudonne : Foundations of modern analysis (Revised edition)
(Academic Press).
- 4) Royden H.L. Real analysis.

MT-103 : Algebra-I

Review of groups, subgroups, homomorphisms, Class Equation, Cauchy Theorem, Solvable groups, Sylow Theorems.

Rings, ideals quotient rings, Polynomial Rings, Euclidean domains, Principal ideal domains, Unique factorisation domains.

Noetherian rings, Hilbert Basis Theorem.

Prescribed books :-

1. N.S. Gopalkrishnan, University Algebra, Wiley-Eastern, 1988.

REFERENCES :-

1. I.N. Herstein, Topics in Algebra, Wiley-Eastern, 1988.
2. N.Jacobson, Basic Algebra, Vol.I
Hindustan Publishing Corporation, 1984.

MT-104 : Differential Equations-

1. Power Series Solution :-

Linear equations and power series, Ordinary points and singular points. Solutions near an ordinary point, Regular singular point, Indicial equation.

2. Legendre & Bessel's Functions & their applications.

3. P.D.E. of Second order :- Origin, applications in physics, characteristic curves of second ordered equations, characteristics of equations in three variables, solutions of linear Hyperbolic, parabolic and elliptic equations of separationm of variables.

Prescribed Books :-

1. Snedden : Elements of Partial differential equations.
2. Simmons : Differential Equations.

Recommended Books :-

1. Arfken : Mathematical Methods for Physics.
New York : Academic Press.
2. Cousant & Hilbert : Methods of Mathematical Physics.
Vol.I & Vol.II, New York, Interscience.
3. Churchill & Brown : Fourier Series & Boundary value Problem.

MT-105 Classical Mechanics

D'Alemberts Principle and Lagranges' equations and examples Hamilton's principle, Extension of Hamilton's principle to nonholonomic systems. Orthogonal transformations. The Cayley-Klein parameters and related quantities. Finite rotations. Rate of change of a vector. Intertia tensor and its eigenvalues. Moment of inertia, Principal axis transformation. The heavy symmetrical top with one point fixed.

Legendre transformations and the Hamiltons equations of motion, Darivation of Hamilton's equations from variational Principle. The principle of least action.

The equations of canonical transformation. Poisson bracket and other canontial invariants.

Prescribed Book :-

- 1) H.Goldstein : Classical Mechanics,
(Addison Welley) Chapters 1,2,4,5,8,9.

Recommended Books:-

1. Corben and Steble-Classical Mechanics
(John Wiley Press).
2. Landon and lifschitz - Mechanics.
(Pergamman Press).
3. Marion : Classical Dynamics (Academic Press).
4. Sudarsan & Mukunda - Classical Mechanics.

OR

MT-106 : Computer Programming in Fortran-77

The flow chart concept, Fortran-77 programming, Integer and real operations, control statements, structured if else-then, if-while statements, Do and Do while loops, Arrays, Input and output operations, Formats, Subroutines and function subprograms, logic and complex operations, Real operations in double precision, construction of some programs, Additional features of Fortran.

Prescribed Book :

1. SCHAUM SERIE : FORTRAN PROGRAMMING.

Reference Book :

1. V.Rajaramanna : Programming Fortran-77.

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SEMESTER - IIMT-201 : MEASURE & INTEGRATION

Cantor set, Cantor-like sets and Lebesgue function, Lebesgue outer measure. Measurable sets, algebra, Regularity of measure, complete measure, Measurable functions, Borel sets and Measurability.

Integration of non-negative functions of real variables. Fatou's lemma. Lebesgue monotone convergence theorem. The general integral, Lebesgue dominated convergence theorem. Comparison of Riemann and Lebesgue integrals.

Derivatives. Functions of bounded variation, Positive, negative and total variation, continuity a.e. and differentiability a.e. of a function of B.V. Properties of the function of B.V. Properties of the derivative of the function of B.V. Absolutely continuous functions Vitali covering theorem, Fundamental theorem of integral calculus L_p spaces. Holders and Minkinski's inequalities Completeness of L_p spaces.

Convergence in measure, Convergence in mean of order p , almost uniform convergence, Egoroff's theorem, Implications among these.

PRESCRIBED BOOKS :

1. Debarra, G. Measure theory and Integration. Wiley Eastern, New Delhi.
2. Rayden, H.L., Real Analysis, 3rd Edition, Maxwell-Mc Millan international Edition.

REFERENCE BOOKS :

1. Randall, J.L. : Basic Real and Abstract Analysis, Academic Press.
2. Sarason, S.K. : Measure theory and Integration, Mc Millan.

MT-202 : TOPOLOGY II

1. Topological spaces, Basis for topology. The order topology, Subspace topology. Closed sets and limit points, continuous functions, Homeomorphism. Product topology. The quotient Topology.
2. Connected spaces : Components and Path components, Local connectedness. Compact spaces, Local compactness, Nets, One point compactification.
3. The countability axioms. The separation axiom Urysohn lemma, Urysohn Metrization theorem.
4. Tychonoff Theorem, Completely Regular spaces.

PRESCRIBED BOOK :

J.R. Munkres; Topology. (A first course)
Prentice Hall of India Ltd.

REFERENCE BOOKS :

1. K.D. Joshi ; Introduction to General Topology, (Wiley Estern)
2. Willard ; General Topology (Addison Wesley)
3. B.T. Simmon ; Fundamentals of Topology (Mc Millan International Edition)

MT-203 : Algebra-II

Modules ; Sub modules, R-homomorphism, Isomorphism, Direct sum of modules, Free modules, Rank, Projective modules.

Structure Theorems for finitely generated modules over a

Application to group theory, Jordan & Rational canonical forms, Local rings, Localization of rings and modules, Primary decomposition for modules.

Prescribed Books :-

N.S. Gopalkrishnan ; University Algebra (Wiley Eastern Ltd.)
commutative Algebra.
Oxonian Press Pvt.Ltd.

Reference Books :-

1. I.N. Herstein ; Topics in Algebra (IBH)
2. S.Lang ; Algebra (Addison Wesley).
3. Dr. Murili ; Introduction to Rings & Modules.

MT-204 : COMPLEX ANALYSIS

Topology of C , Open, connected subsets, Components of Open sets, Uniform convergence of sequences and series of functions, Wier-strass M-test, power series, radius of convergence.

Analytic functions, exponential functions, branch of logarithm, Cauchy Riemann equations, harmonic functions Harmonic conjugate.

Path, smooth path, piecewise smooth paths, conformal map, mobius transformation, Symmetry, principle and orientation principle.

Riemann - stieltjes Integral and complex integral. Line integral of a continuous function along rectifiable paths, Fundamental theorem of calculus for line integrals.

Power series, expansion of an analytic function, Fundamental theorem of Algebra, Liouville's theorem, Maximum modulus principle,

MT-204 : Com

index (winding number) of a curve around a point, Cauchy's theorem and Cauchy's integral formula, Morera's theorem.

Homotopic version of Cauchy's theorem and simple connectivity. Logarithmic derivatives of $f(z)$. The open mapping theorem, the argument principle, Meromorphic functions, Rouché's theorem.

Singularities, classification of singularities, Poles and essential singularities, singular point, Laurent's series development, Casorati-Weierstrass's theorem, Residues and evaluation of integrals, Schwarz's Lemma.

Prescribed books :

1. J.B. Conway : Functions of one complex variable (Springer-verlag Graduate text)
2. Walter Rudin : Real and Complex Analysis (McGraw Hill Book Company, New York).

REFERENCE BOOKS :

1. H. Silverman : Complex variables (Houghton Millan & Co.)
2. J.E. Marsden : Basic Complex Analysis (Freeman & Co.)
3. L.V. Ahlfors : Complex Analysis (Mc Graw Hill, New York)

MT-205 MATHEMATICAL METHODS-I

1. Linear Boundary Value Problem - Wave Equation, Heat Equation, Laplace's Equation in Cartesian, Cylindrical and Spherical co-ordinates.
2. Principle of Superposition. Series solutions, separation of variables, Certain types of initial value problems. General solutions of partial differential equations.
3. Orthogonality of functions in the space of piece wise continuous functions on an interval (a,b) .
Generalized Fourier series. Approximation in the mean
Closed and complete orthonormal sets, Sturm-Liouville Problems. Orthogonality of the eigen functions and their uniqueness.
4. Boundary value problems involving
 - (i) the wave equation
 - (ii) heat equation
 - (iii) Dirichlet problem.
5. Temperature in a long cylinder, Heat transfer at the surface of the cylinder, Vibration of circular membrane.

6. Dirichlet problems in spherical regions, study Temperatures in a hemisphere.

Prescribed Book :

R.V.Churchill & J.W.Brown,

Fourier Series and Boundary value problems.
(Mc Graw Hill International.)

Recommended Books :

1. Mary L.Bose - Methods of Mathematical Physics
2. N.N. Lebedev - Special functions & their applications.
(Prentice Hall)

MT-206 : PROGRAMMING AND NUMERICAL METHODS

Characterization of problems that can be solved by computers.

Model of Pascal Machine- concept of program and data, Input and output introductions.

Types, memory as specialized data storage unit, expressions, their types and properties of arithmetic and logical operators.

Problem reducing through decomposition, sequential decomposition, sequential compositions and conditional composition. Recursion and iteration, Primitive actions : assignment statements, input/output statements.

Programs based on sequential and conditional composition Functional abstraction and procedural abstraction. Among types and iterative programs, character strings, Scalar and Subrange types and case statement, Record types and files.

Organisation of a computer and its functioning. Role of operating system software. Concept of linking, Paradigms of programming in aid of problem solving.

Introduction to data structures - concept of Stacks, Queues and lists and their implementations, conversion of simple recursive procedures into iterative procedures.

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THE END