



ख्वाजा मुईनुद्दीन चिश्ती भाषा विश्वविद्यालय, लखनऊ, उत्तर प्रदेश (भारत)
Khwaja Moinuddin Chishti Language University, Lucknow, U.P. (India)

U.P. STATE GOVERNMENT UNIVERSITY,
(Recognised Under Section 2(f) & 12(B) of the UGC Act, 1956 & B.Tech. Approved by (AICTE))

**SDG 15: Life on Land
Academic Alignment**

S. No.	Department	Course (Degree)	Year/ Semester	Course Name	SDG 15 Relevance
1.	Zoology	B.Sc.	3 rd Year/ V Semester	Ecology & Wildlife	Focuses on protecting threatened species and preventing extinction. Covers the Red Data Book and the management of National Parks.
2.	Botany	B.Sc.	2 nd Year/ IV Sem	Plant Metabolism and Biodiversity	Teaches sustainable forest management, plant succession, and reforestation techniques to restore degraded land.
3.	Microbiology	B.Sc.	2 nd Year/ III Sem	Soil Microbiology	Directly addresses soil health. Teaches how microbes restore fertility and combat desertification through nutrient cycling.
4.	Civil Engineering	B. Tech.	2 nd Year/ IV Sem	Disaster Management and Building Material and Construction	Provides the engineering foundation to prevent soil erosion and land degradation during construction and infrastructure development.
5.	Civil Engineering	B. Tech.	3 rd Year/ VI Sem	Earth and Earth Retaining Structures	Discusses soil stabilization, soil nailing, and reinforcement techniques. These methods are used to prevent soil erosion and maintain land integrity.

6.	Law	B.A.LL.B	3 rd Year/ V Sem	Environmental Law	Focuses on the legal fight against poaching and trafficking of protected species, and the enforcement of the Forest Conservation Act.
7.	Law	LL.B.	3 rd Year/ VI Sem	Environmental Law	Focuses on the legal fight against poaching and trafficking of protected species, and the enforcement of the Forest Conservation Act.
8.	Pharmacy	B. Pharm	2 nd Year/ IV Sem	Pharmacognosy	Promotes the sustainable use of medicinal plants and ensures the equitable sharing of terrestrial genetic resources.
9.	Geography	B.A.	2 nd Year/ III Sem	Environment, Disaster Management and Climate Change	Bio-diversity and its conservation: Specifically covers biodiversity, sustainable development, and natural resource conservation. Includes case studies like the Tiger Project.



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B.Sc. (Microbiology)- Soil Microbiology

Programme/Class: Certificate	Year: Second	Semester: Third or Fourth
Subject: Microbiology		
Course Code: B080203T	Course Title: Microbial ecology and Bio control by Microorganism	
Course Outcomes:		Bloom's taxonomy
● CO1- Get acquainted with natural habitats of diverse protection.		K1, K4
● CO2- Understand how microbes interact among themselves and with higher plants and animals with the help of various examples.		K2, K4
● CO3- Become aware of the important role microbes play in biogeochemical cycling of essential elements occurring within an ecosystem and its significance.		K2, K5
● CO4- Gain in depth knowledge of different types of solid waste, liquid waste and their management.		K3, K5
● CO5- Get familiar with problems of pollution and applications of clear up technologies for the pollutants.		K3, K6
Credits: 4	GE-3 and 4/Minor Elective-3 and 4	
Max. Marks: 25+75	Min. Passing marks: as per rules	
Total No. of Lectures-Tutorials-Practical(in hours per week): L-T-P: 4-0-0		
Unit	Topics	Total No. of Lectures/ Units & Hours (60)
I	Interaction of Microorganisms Positive and negative interaction- Mutualism, Synergism, Commensalism, Competition, Amensalism, Parasitism, Predation, Microorganism of rhizosphere, rhizoplane and phylloplane, mycorrhiza (types and its applications).	15
II	Cycling of nutrients (Biogeochemical cycles) – Carbon cycle- Microbial degradation of cellulose, hemicellulase, lignin and chitin; Nitrogen cycle- Nitrogen fixation, ammonification, nitrification, denitrification and nitrate reduction, Phosphorous cycle- Phosphate Immobilisation and solubilisation and Sulphur cycle- Microbes involved in sulphur cycle.	15
III	Biodegradation and Bioremediation Types of bioremediation -microbial bioremediation, phytoremediation, and mycoremediation, Types of reaction in bioremediation, Factors affecting microbial bioremediation-Biotic or biological factors and Abiotic or environmental factors, Biodegradation of hydrocarbons, pesticides and herbicides	15

IV	Sewage/Waste Water Treatment Solid waste management: Source and type of solid waste, method of solid waste disposal (composting and sanitary landfill), Liquid waste management: composition and strength of sewage (BOD & COD), Preliminary treatment, Secondary (oxidation pond, trickling filter, activated sludge process and septic tank) or biological treatment, Waste water treatment of some industry, water recycling	15
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Suggested Readings:

1. Alexander M., Introduction to soil microbiology, Wiley Eastern limited, New Delhi.
2. Alexopoulos C.J. and MIMS C.W., Introductory Mycology, New age international, New Delhi.
3. Aneja K.R., Experiments in Microbiology, plant pathology, Tissue culture and Mushroom cultivation, New Age International, New Delhi
4. Hurst, C.J., Environmental Microbiology, ASM press, Washington D.C.
5. Mehrotra A.S., Plant Pathology, Tata Mcgraw Hill Publications limited, New Delhi.
6. Pelczar M.J., Chan E.C.S and Kreig N.R., Microbiology, Mcgraw-Hill Book Company, New York.
7. Prescott Lansing M., Harley John P. and Klein Donald A., Microbiology, WCB Mcgraw- Hill, New York.
8. Salle A.J., Fundamental Principles of Bacteriology, Tata Mcgraw-Hill Publishing Company Limited, New Delhi.
9. Stacey R.H. and Evans H.J., Biological Nitrogen Fixation, Chapman and Hall limited, London.
10. Stanier R.Y., Ingraham J.L., General Microbiology, Prentice Hall of India Private Limited, New Delhi.
11. Subbarao N.S., Soil Microroganisms and Plant Growth, Oxford and IBH Publishing Company, New Delhi.

This course can be opted as an elective by the students of following subjects: Open for all The eligibility for this paper is 10+2 with any subject

Suggested Continuous Evaluation Methods: • Seminar/ Presentation on any topic of the above syllabus • Test with multiple choice questions/ short and long answer questions Attendance

Course prerequisites: To study this course, a student must have had the subject ALL in class12th . The eligibility for this paper is 10+2 with any subject

Further Suggestions: It widens the scope for students to join Government and Non-Government organization upskilling the people at different levels as per their socio-economic structure

At the End of the whole syllabus any remarks/ suggestions:



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B.Sc. (Botany)- Plant Metabolism and Biodiversity

Programme/Class: Certificate	Year: Second	Semester: Third or Fourth
Subject: BOTANY		
Course Code: B040203T	Course Title: Plant Metabolism and Photosynthesis	
Course Outcomes: The student at the completion of the course will be able to: <ul style="list-style-type: none">● Get acquainted with natural habitats physiology of plants.● Understand how Role of various plant hormones in Plant growth and defence● Become aware of the important role water, light and various metabolite of plant.● Gain in depth knowledge of different types of physiological aspect of plant● Get familiar with problems of various abiotic factors that influences plant growth and development		
Credits: 4	GE 2/Minor Elective	
Max. Marks: 25+75	Min. Passing marks: as per rules	
Total No. of Lectures-60		
Unit	Topics	Total No. of Lectures/ Hours (60)
I	Plant metabolism and photosynthesis <ul style="list-style-type: none">● Respiration: Glycolysis, anaerobic respiration, TCA cycle, Electron transport system and their inhibitors. Mechanism of oxidative phosphorylation● Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo- phosphorylation, carbon assimilation pathways: C3, C4, and CAM (brief account)● Photorespiration and its significance.	20
II	Plant – Water relations <ul style="list-style-type: none">● Diffusion, imbibition and osmosis; concept & components of Water potential.● Absorption and transport of water and ascent of sap.● Transpiration –Definition, types of transpiration, structure and types of stomata, opening and closing mechanism of stomata.● Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.	15
III	Plant hormones and development <ul style="list-style-type: none">● Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.● Plant Secondary metabolite, alkaloid, terpenoid, phenol	15

	<ul style="list-style-type: none"> • Physiology of flowering -photoperiodism, • Role of phytochrome in flowering , Vernalization. 	
IV	Plant conservation <ul style="list-style-type: none"> • Plant Diversity • In-situ and Ex-situ conservation • Botanical gardens, Some Important garden, National parks • Wild life sanctuaries, Biosphere reserve, Germplasm bank 	10

<p>Suggested Readings:</p> <p>1-Hopkins, W.G. & Hiiner, N.P. Introduction to Plant Physiology (3rd ed.) 2004, John Wiley & Sons.</p> <p>2-A Handbook On Mineral Nutrition And Diagnostic Techniques For Nutritional Disorders Of Crops (pb)ISBN : 9788177543377Edition : 01 Year : 2011Author : Pathmanabhan G , Vanangamudi M , Chandrasekaran CN , Sathyamoorthi K , Babu CR , Babu RC , Boopathi PNPublisher : Agrobios (India)</p> <p>3. Jain, V.K. Fundamental of Plant Physiology (7th ed.) 2004. S. Chand and Company.</p> <p>4. Salisbury, F.B. & Ross, C.W. Plant Physiology (4th ed.), 19992, Wadsoworth Publishing Company.</p> <p>5. Panday, S.N. & Sinha, B.K. Plant Physiology (4th ed.), 2006, Vikas Publishing House Pvt. Ltd.</p> <p>6. Mukherjee, S. & Ghosh, A. Plant Physiology (2nd ed.), 2005, New Central Book Agency.</p> <p>7. Chaudhuri, D., Kar, D.K., and Halder, S.A. Handbook of Plant Biosynthetic Pthways 2008, New Central Book Agencies.</p> <p>8. Voet, D. and Voet, J.G., Bio-Chemistry (3rd ed.), 2005, John Wiley & Sons.</p> <p>9. Mathews, C.K., Van Holder, K.E. & Ahren, K.G. Bio-Chemistry (3rd ed.), 2000, Pearson Education.</p> <p>10. Lehninger Principles of Biochemistry. Sixth Edition. 2013. David L. Nelson, Michael M. Cox. Freeman, Macmillan.</p> <p>11. Srivastava, HN. 2006. Pradeep's Botany Vol. V. Pradeep Publications, Jalandhar.</p> <p>12Verma, SK. Plant Physiology and Biochemistry. S. Chand & Sons, New Delhi.</p> <p>13. Buchanon, Gruissen and Jones. Plant Physiology & Biochemistry: Biochemistry and Molecular Biologyof plants, 2000, I.K. International.</p> <p>14. Ramesh Gupta. Efficacy, Safety and Toxicity brings together all current knowledge regarding nutraceuticals and their potential toxic effects. 2016. Elsevier.</p> <p>15. Harborne,J.B.1973 .Phytochemical Methods. John Wiley & Sons, New York.</p> <p>16. Watson, J. D., Baker T.A., Bell, S. P., Gann, A., Levine, M., and Losick, R., 2008 Molecular Biology of the Gene 6th edition. Cold Spring Harbour Lab. Press, Pearson Pub.</p>		
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<p>Course prerequisites: To study this course, a student must have had the subject ALL in class12th . The eligibility for this paper is 10+2 with any subject</p>
<p>Further Suggestions: It widens the scope for students to join Government and Non-Government organization upskilling the people at different levels as per their socio-economic structure</p>



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B. Tech (Civil Engineering)- Building Material and Construction

BUILDING MATERIAL AND CONSTRUCTION

SUBJECT CODE: CE 304

Unit	Topic
I	Cement – compounds and proportions, types of Portland cement, pozzolanic cement, high alumina cement and other types, hydration mechanism and hydration products, setting and hardening, curing, strength of hardened cement, grade of cement, tests on cements, relevant BIS codes.
II	Aggregates - properties of coarse & fine aggregates, tests on aggregates, relevant BIS codal provisions; Concrete: Ingredients of concrete, properties of fresh and hardened concrete, strength of concrete, W/C ratio & porosity, additives and their types, concrete mix design.
III	Special concretes - Reinforced cement concrete, polymer concrete, fiber reinforced concrete, ferrocement, light weight concrete, roller compacted concrete, ready mix concrete, self compacting concrete, high performance concrete, bacterial concrete,
IV	Bricks & Stones: Forms of bricks, properties of bricks and stones, tests on bricks and stones, relevant BIS codes; Timber: structure of wood, defects in timber, seasoning, preservation; Plywood and its manufacturing.
V	Other materials: Flyash, paints & varnishes, gypsum, tar, bitumen & asphalt, nano materials, smart materials, composit materials, geosynthetics, heat & sound insulating materials, water proofing materials

Text/Reference Books

1. Building Materials by S K Duggal
2. Shetty, M.S (2002), Concrete Technology, S. Chand & Company Ltd.

3. Sharma &Kaul (1998), Building Construction, S.Chand& Company Pvt, New Delhi.
4. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards (post 2000)



B. Tech (Civil Engineering)- Disaster Management

COURSE OBJECTIVES

1. This course deals with the identify and formulate environment problems
2. To give ability to economic, societal and environment impact assessment.
3. To give an ability to apply engineering project management principles and environmental related problems

COURSE OUTCOMES

After studying this course, students will be able to:

CO-1	To understand the calculation of risk and frequency
CO-2	To know the different type of disaster
CO-3	To know the disaster impact on social and economical
CO-4	Understanding the disaster risk reduction method
CO-5	To understand the impact of disaster on engineering project



B. Tech (Civil Engineering)- Earth and Earth Retaining Structures

COURSE OBJECTIVES

1. To impart the basic knowledge, skills and attitudes of designing the earth retaining walls
2. To various ground improvement techniques; of analysing the bearing capacity of soil.

COURSE OUTCOMES

After studying this course, students will be able to:

CO-1	Design and analysis of earth dam
CO-2	Different type of method for stabilized earth retaining walls
CO-3	Understanding the methods of soil nailing
CO-4	Understanding the basic concept of soil reinforcement technique
CO-5	Analysis of footing and bearing capacity of soil



B.A. LL.B. - A DOUBLE DEGREE INTEGRATED COURSE

VIth Semester

Paper: Core
Credit: 4

Paper Code: BALLB601
Marks 30 Internal + 70 End Semester

Paper I

Environmental Laws

UNIT-I: Environmental Law

(Lectures-10)

- Introduction; Environment: Meaning. Environment Pollution: Meaning and Issues
- Constitutional Guidelines Right to Wholesome Environment: Evolution and Application, Environment Protection & Public Interest Litigation
- Environmental Laws: India and International; Law of Torts; Law of Crimes; Public Nuisance;
- Emergence of Environmental Legislations

UNIT-II: Prevention and Control of Water, Air, Noise and Land Pollution

(Lectures-10)

- The Water (Prevention and Control of Pollution) Act, 1974.
- Water Pollution: Definition Central and State Pollution Control Boards: Constitution, Powers and Functions
- Functions Water Pollution Control Areas, Sample of effluents: Procedure; Restraint Order, Consent requirement: Procedure, Grant/Refusal, Withdrawal, Citizen Suit Provision
- Air (Prevention and Control of Pollution) Act, 1981
- Air Pollution: Definitions.
- Central and State Pollution Control Boards: Constitution, Powers and Functions. Air Pollution Control Areas. Consent Requirement: Procedure. Grant/Refusal. Withdrawal. Sample of Effluents: Procedure; Restraint Order. Citizen Suit Provision
- Noise Pollution Control Order, 2000 d. Land Pollution

UNIT-III: Environmental Law, Forest & Wildlife

(Lectures-10)

- Environmental (Protection) Act, 1986: Environment, Environment Pollutant, Environment Pollution"
- Powers and Functions of Central Govt.
- Important Notifications U/s 6: Hazardous Substance Regulation, BioMedical Waste Regulation and Coastal Zone Management, Environment Impact Assessment, Public Participation & Citizen Suit Provision
- Laws Related to Forest: Forest Act, 1927. Kinds of forest – Private, Reserved, Protected and Village Forests The Forest (Conservation) Act, 1980 iv. Forest Conservation vis-a vis Tribals' Rights
- The Wild Life (Protection) Act, 1972: Authorities to be Appointed and Constituted under the Act. Hunting of Wild Animals. Protection of Specified Plants. Protected Area. Trade or Commerce in Wild Animals, Animal Articles and Trophies; Its Prohibition

UNIT-IV: International Environment Law & Issues

(Lectures-10)

- Introduction to International Environmental Laws: Environmental Law: Human Rights Perspective, Stockholm Declaration: Brief overview, Rio-Declaration: Brief Overview iv. Important Doctrines: Sustainable Development– Meaning and Scope Precautionary Principle: Polluter pays Principle-Public Trust Doctrine, UNEP, Climate Change Mitigation.
- National Green Tribunal: Constitution, Functions and Powers

Books:

- Shyam Diwan & Armin Roseneranz. Environmental Law and Policy in India, Oxford University Press, 2nd Edition.
- P. Leelakrishnan, Environmental Law in India, Lexis Nexis, .
- S. C. Shastri. Environmental Law, Eastern Book Company.
- Gurdip Singh. Environmental Law in India, MacMillan Publisher.
- Benny Joseph, Environment Studies, Tata McGraw Hill, New Delhi.

Prof. C.P. Singh

Prof. Manish Singh

Dr. Amit Singh

Prof. Masood Alam



B.A. (Pharmacy)- Pharmacognosy

BP 405 T PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

L T P
3 1 0

45Hours

Scope: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.

Objectives: Upon completion of the course, the student shall be able

- to know the techniques in the cultivation and production of crude drugs
- to know the crude drugs, their uses and chemical nature
- know the evaluation techniques for the herbal drugs
- to carry out the microscopic and morphological evaluation of crude drugs

Course Content:

10 Hours

UNIT-I

Introduction to Pharmacognosy

- Definition, history, scope and development of Pharmacognosy
- Sources of Drugs – Plants, Animals, Marine & Tissue culture
- Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).

Classification of drugs

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs

Quality control of Drugs of Natural Origin

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT-II

10 Hours

Cultivation, Collection, Processing and storage of drugs of natural origin

Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications.

Polyploidy, mutation and hybridization with reference to medicinal plants
Conservation of medicinal plants

UNIT-III

07 Hours

Plant tissue culture

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

Applications of plant tissue culture in pharmacognosy. Edible vaccines

UNIT IV

10 Hours

Pharmacognosy in various systems of medicine

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V

08 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

Plant Products

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

Primary metabolites

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes : Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids(Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs:

Novel medicinal agents from marine sources

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BP408 P

PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)

L T P
0 0 4

4 Hours/Week

- Analysis of crude drugs by chemical tests: (i) Tragacanth (ii) Acacia (iii) Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
- Determination of stomatal number and index
- Determination of vein islet number, vein islet termination and palisade ratio.
- Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
- Determination of Fiber length and width
- Determination of number of starch grains by Lycopodium spore method
- Determination of Ash value
- Determination of Extractive values of crude drugs
- Determination of moisture content of crude drugs
- Determination of swelling index and foaming

Recommended Books: (Latest Editions)

- W.C. Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
- Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
- Text Book of Pharmacognosy by T.E. Wallis
- Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
- Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
- Essentials of Pharmacognosy, Dr. S.H. Ansari, 11th edition, Birla publications, New Delhi, 2007
- Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
- Anatomy of Crude Drugs by M.A. Iyengar

(Handwritten signatures and notes)
for - Maryam
Shivanand
Baniya



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B.A/ B. Sc. (Geography)- Environment, Disaster Management and Climate Change

Programme/Class: Diploma/BA/B.Sc.	Year: Second	Semester: Third
Subject: Geography		
Course Code: A110301T	Course Title: Environment, Disaster Management and Climate Change	
Course outcomes: Students will be able to understand		
<ul style="list-style-type: none">• The course aim is to give basic understanding of concept Environment, Climate Change and Disaster Management.• Understanding of the concept of appraisal and conservation of Environment and Natural Resources.• It will help in developing understanding about various Impacts of Climate Change.• This course shall introduce the basic concepts related to disaster Management.• This paper shall help in understanding Global effort in field of disaster management.		
Credits: 6	Course Type-Core Course	
Max. Marks: 100 (30+70)	Min. Passing Marks:40	
Total No. of Lectures-Tutorials-Practical (in hours per week): L- 2 P-4/w		
Unit	Topics	No. of Lectures Total=90
I	Concepts & components of Environment, Ecology and ecosystem. Indian traditional Knowledge in Environment and disaster Management. Bio-diversity and its conservation, sustainable development.	23
II	Ganga Action Plan, Tiger project, Tehri dam & Narmada Valley project. Science of Climate Change: Understanding Climate Change; Green House Gases and Global Warming.	23
III	Global Climatic Assessment – IPCC, Impacts of Climate Change, National Action Plan on Climate Change.	22

IV	Disasters, Hazards, Risk, Vulnerability, Type of Disasters, Disaster Management, Disaster Management Cycle. Flood, Drought, Cyclone, Earthquake, Tsunami, Landslide, Chemical and Nuclear Disasters. Do's and Don'ts During Disasters.	22
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Suggested Readings:

1. Casper J.K. (2010). *Changing Ecosystems: Effects of Global Warming*. New York, USA: InfobasePub.
2. Hudson, T. (2011). *Living with Earth: An Introduction to Environmental Geology*. Delhi, India: PHI Learning Private Limited.
3. Miller, G.T. (2007). *Living in the Environment: Principal, Connections, and Solutions*. Belmont, Australia: Brooks/ Cole Cengage Learning.
4. Singh, R.B. (1993) *Environmental Geography*. Delhi, India: Heritage Publishers.
5. UNEP. (2007). *Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme*. UK: University Press, Cambridge.
6. Government of India. (2011). *Disaster Management in India*. Delhi, India: Ministry of Home Affairs.
7. Singh, Savendra (2019) *Pryavaran Bhugol*, Pravalika Publication, Allahabad
8. Kapur, A. (2010). *Vulnerable India: A Geographical Study of Disasters*. Delhi, India: Sage Publication.
9. Singh, Savendra (2019) *Apada Prabandhan*, Pravalika Publication, Allahabad.
10. Ramkumar, M. (2009). *Geological Hazards: Causes, Consequences and Methods of Containment*. New Delhi, India: New India Publishing Agency.
11. Climate Change: Understanding Climate Change; Green House Gases and Global Warming; Global Climatic Assessment-IPCC
12. Climate Change and Vulnerability: Physical Vulnerability; Economic Vulnerability; Social Vulnerability.
13. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health
14. Adaptation and Mitigation: Global Initiatives with Particular Reference to South Asia.
15. The Climate Change Policy Framework: Global Initiatives UNFCCC and COPs; National and Local Action Plan on Climate Change.
16. Government of India. (2008). *Vulnerability Atlas of India*. New Delhi, India: Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India
17. Modh, S. (2010). *Managing Natural Disaster: Hydrological, Marine and Geological Disasters*. Delhi, India: Macmillan.
18. Bansal SC, (2020) *Jalvayuvigyan evam Samudra Vigyan*, Meenakshi Publication, Meerut.
19. Bansal SC, (2019) *Prayavarn ek adhyan*, Meenakshi Publication, Meerut.

This course can be opted as an elective by the students of following subjects: Open for all

Suggested Continuous Evaluation Methods:

Assignment / test / Quiz (MCQ) / Seminar/ Presentations



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B.A./B. Sc. (Geography)- Sustainable Development

Programme/Class: B.A./B.Sc.	Year: II	Semester: IV
Subject- Geography		
Course Code: A020404T	Course Title: Sustainable Development	
Course outcomes: <ul style="list-style-type: none">• Understand the impact of the acquired knowledge in societal and environmental contexts, and demonstrate the knowledge of need for sustainable development.• Gain knowledge about Sustainable Development Policies and Programmes		
Credit: 4	Course Type - General Elective 1	
Max. Marks: 100 (30+70)	Min. Passing Marks:40	
Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4 /w		
Unit	Topics	No. of Lectures Total=60
I	Sustainable Development: Definition, Components, Limitations and Historical Background, The Millennium Development Goals: National Strategies and International Experiences,	15
II	Sustainable Regional Development: Need and Examples from different Ecosystem	15
III	Inclusive Development: Education, Health; Climate Change: The Role of Higher Education in Sustainable Development; Human Rights to Health: Poverty, Diseases; the challenges of Universal Health Coverage; Policies and Global Cooperation for Climate Change	15
IV	Sustainable Development Policies and Programmes: The Proposal for SDGs at Rio+20; illustrative SDGs; Goal Based Development; Financing for Sustainable Development,	15

	Principles of Good Governance; National Environmental Policy, CDM	
<p>Suggested Readings:</p> <ol style="list-style-type: none"> 1. 1Agyeman, Julian, Robert D. Bullard and BOB Evans (eds) (2003) Just Sustainabilities: Development in an Unequal World, London,: Earthscan 2. Baker, Susan (2006) Sustainable Development, Milton Park, Abingdon, Oxon, New York Routledge 3. Brosius, Peter (1997) Endangered Forest, endangered People: Environmentalist Representations of indigenous Knowledge “, Human Ecology 4. Lohman, Larry (2003) “ Re- imagining the population Debate”, Corner House Briefing 28 <p>Robbins, Paul (2004) Political Ecology: A Critical Introduction, Blackwell Publishing</p>		
<p>Suggested Continuous Evaluation Methods:</p> <ul style="list-style-type: none"> • Test with multiple choice questions / short and long answer questions 		