Teaching Plan

Name of the Faculty: Dr. Arpana Sharma

Name of the Course: C.B.C.S. B. Sc. (Hons.) Mathematics

Semester : II Sec (if any): None

Title of the Paper : C4- Differential Equations

Month	Topics Covered	References
January February March April	Differential equations and mathematical models, order and degree of a differential equation, exact differential equations and integrating factors of first order differential equations, reducible second order differential equations, application of first order differential equations to acceleration-velocity model, growth and decay model. Introduction to compartmental models, lake pollution model (with case study of Lake Burley Griffin), drug assimilation into the blood (case of a single cold pill, case of a course of cold pills, case study of alcohol in the bloodstream), exponential growth of population, limited growth of population, limited growth with harvesting. General solution of homogeneous equation of second order, principle of superposition for a homogeneous equation, Wronskian, its properties and applications, Linear homogeneous and non-homogeneous equations of higher order with constant coefficients, Euler's equation, method of undetermined coefficients, method of variation of parameters, applications of second order differential equations to mechanical vibrations. Equilibrium points, interpretation of the phase plane, predator-prey model and its analysis, competing species and its analysis, epidemic model of influenza and its analysis, battle model and its analysis.	**1. Belinda Barnes** and **Glenn R. Fulford**, *Mathematical Modeling with Case Studies, A Differential Equation Approach Using Maple*, Taylor and Francis, London and New York, 2002. 2. **C. H. Edwards** and **D. E. Penny**, *Differential Equations and Boundary Value Problems: Computing and Modeling*, Pearson Education, India, 2005. 3. **S. L. Ross**, *Differential Equations*, John Wiley and Sons, India, 2004.

Note: The first test will be conducted at the end of February and second at the start of April. The assignment will be given in the 3rd week of March and submission date will be at the end of March.

The schedule of Practicals may also be provided

Teaching Plan

Name of the Faculty: Dr. (Ms). Shalu Chandra

Name of the Course and Subject: B.Sc (H) Mathematics (Environmental Science)

Semester: II Sec (if any):

Title of the paper: Ability enhancement credit course (AECC Jan- May 2016)

Month	Topics Covered	References
January	**Unit 6 : Environmental Policies & Practices** • Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture • Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. •Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context. **(7 lectures)** **1 lecture per week field trip/presentation**	Bharucha, E. 2003, Textbook for Environmental Studies, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environmental Education and Research, Pune. 361. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders. Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. Ecology, Environment and Resource Ecology, Environment and Resource Conservation. Anamaya Publishers.
February	**Unit 5 : Environmental Pollution** •Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution •Nuclear hazards and human health risks• Solid waste management: Control measures of urban and industrial waste. • Pollution case studies. **(8 lectures)** **1 lecture per week field trip/presentation**	-do-
March	**Unit 7 : Human Communities and the Environment** • Human population growth: Impacts on environment, human health and welfare.• Resettlement and rehabilitation of project affected persons; case studies.• Disaster management: floods, earthquake, cyclones and landslides. (**6 lectures)** **1 lecture per week field trip/presentation**	-do-
April	**Unit 7 : Human Communities and the Environment** • Environmental movements: Chipko, Silent	-do-

	valley, Bishnois of Rajasthan.• Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. • Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi). (**6 lectures)** **1 lecture per week field trip/presentation** The tentative date of assignment/test/project Assignment: 15 March 2016 Submission: March 2016 Test/Presentation: 25 February 2016	

Note: The tentative date of assignment/test/project may also be provided.

The schedule of Field trip may also be provided.

Teaching Plan

Name of the Faculty: Dr. Mukesh

Name of the Course : B.Sc. (H) Mathematics

Semester: II Sec (if any): -

Title of the paper: Ability enhancement credit course (AECC Jan- May 2016)

Month	Topics Covered	References
January	Air pollution Water Pollution Types, causes, effects and controls **(4 lectures)** **1 lecture alternate week field trip/ presentation**	Bharucha, E. 2003, Textbook for Environmental Studies, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environmental Education and Research, Pune. 361. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.

		Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. Ecology, Environment and Resource Ecology, Environment and Resource Conservation. Anamaya Publishers.
February	Soil pollution Noise Pollution Types, causes, effects and controls **(4 lectures)** **1 lecture alternate week field trip/ presentation**	-do-
March	Nuclear hazards and human health risks**(4 lectures)** **1 lecture alternate week field trip/ presentation**	-do-
April	Solid waste management: Control measures of urban and industrial waste & case studies. **(4 lectures)** **1 lecture alternate week field trip/ presentation**	-do-

The tentative date of assignment/test/project

Assignment: 15 March 2016

Test/ Presentation: 25 February 2016

Teaching Plan

Name of the Faculty: Ms. Geetanjali Sageena

Name of the Course: B.Sc. (H) Mathematics

Semester: II Sec (if any): -

Title of the paper: Ability enhancement credit course (AECC Jan- May 2016)

Month	Topics Covered	References
January	Unit 1 : Introduction to environmental studies Multidisciplinary nature of environmental studies;• Scope and importance; Need for public awareness. **(2 lectures)** **1 lecture per week field trip/ presentation**	Bharucha, E. 2003, Textbook for Environmental Studies, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environmental Education and Research, Pune. 361. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.

		Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. Ecology, Environment and Resource Ecology, Environment and Resource Conservation. Anamaya Publishers.
February	Unit 2 : Ecosystems What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem:• food chains, food webs and ecological succession. Case studies of the following ecosystems : a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **(6 lectures)** **1 lecture per week field trip/ presentation**	-do-
March	Unit 3 : Natural Resources : Renewable and Non-renewable Resources Land resources and landuse change; Land degradation, soil erosion and desertification.• Deforestation: Causes and impacts due to mining, dam building on environment, forests,• biodiversity and tribal populations. Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts• over water (international & inter-state). Energy resources : Renewable and non renewable energy sources, use of alternate energy• sources, growing energy needs, case studies. **(8 lectures)** **1 lecture per week field trip/ presentation**	-do-
April	Unit 4 : Biodiversity and Conservation Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones• of India; Biodiversity patterns and global biodiversity hot spots India as a mega-biodiversity nation; Endangered and endemic species of India• Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife	-do-

	conflicts, biological• invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and• Informational value. **(8 lectures)** **1 lecture per week field trip/ presentation**	

The tentative date of assignment/test/project

Assignment: 15 March 2016

Test/ Presentation: 25 February 2016

Teaching Plan

Name of the Faculty : Dr. Ritu Arora

Name of the Course : B.Sc. (H) Mathematics

Semester : II Sec (if any) :

Title of the Paper : Real Analysis

Month	Topics Covered	References
January	Algebraic and Order Properties of *R*, d-neighborhood of a point in *R*, Idea of countable sets, uncountable sets and uncountability of *R*. [1]: Chapter 1 (Section 1.3), Chapter 2 (Sections 2.1, 2.2.7,2.2.8) Bounded above sets, Bounded below sets, Bounded Sets, Unbounded sets, Suprema and Infima, The Completeness Property of *R*, The Archimedean Property, Density of Rational (and Irrational) numbers in *R*, Intervals. [1]: Chapter 2 (Sections 2.3, 2.4, 2.5.)	1. R.G. Bartle and D. R. Sherbert, *Introduction to Real Analysis* (3rd Edition), John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002. 2. Gerald G. Bilodeau , Paul R. Thie, G.E. Keough, *An Introduction to Analysis,* Jones & Bartlett, Second Edition, 2010. 3. Brian S. Thomson, Andrew. M. Bruckner, and Judith B. Bruckner, *Elementary Real Analysis,* Prentice Hall, 2001.

February	Limit points of a set, Isolated points, Illustrations of Bolzano-Weierstrass theorem for sets. [1]:Chapter 4(Section 4.1) Sequences, Bounded sequence, Convergent sequence, Limit of a sequence. Limit Theorems, Monotone Sequences, Monotone Convergence Theorem. Subsequences, Divergence Criteria, Monotone Subsequence Theorem (statement only),	
March	Bolzano Weierstrass Theorem for Sequences. Cauchy sequence, Cauchy's Convergence Criterion. [1]: Chapter 3 (Section 3.1-3.5) Infinite series, convergence and divergence of infinite series, Cauchy Criterion,Tests for convergence: Comparison test, Limit Comparison test, Ratio Test, Cauchy's nth root test,	
April	Integral test, Alternating series, Leibniz test, Absolute and Conditional convergence. [2]: Chapter 6 (Section 6.2)	

Note : Assignment will be given in 3rd week of February to be submitted by 1st week of March. Test will be conducted in last week of March.