

# Human Values and Professional Ethics

## UNIVERSITY GRANTS COMMISSION

### Ability Enhancement Compulsory Course (AECC – Environment Studies)

#### Unit 1 : Introduction to environmental studies

- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

(2 lectures)

#### 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)

#### 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)

#### 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 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)

#### 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)

#### 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. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

(7 lectures)

#### 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.
- Environmental movements : Chipko, Silent 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)

#### Unit 8 : Field work

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

(Equal to 5 lectures)

#### Suggested Readings:

- Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
- Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
- Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
- Glejck, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
- Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
- Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science*, 339: 36-37.
- McCully, P. 1996. *Rivers no more: the environmental effects of dams* (pp. 29-64). Zed Books.
- McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
- Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
- Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
- Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
- Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. *Environment*. 8th edition. John Wiley & Sons.
- Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. Tripathi 1992.
- Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
- Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
- Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
- Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
- Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
- Wilson, E. O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
- World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.

# **BANGALORE UNIVERSITY**

## **THREE YEAR UNDERGRADUATE PROGRAMME**

**(Courses effective from Academic Year 2014-15)**



## **SYLLABUS OF COURSES TO BE OFFERED**

Foundation Course: **Environment and Public Health**

## **Overview**

The physical environment in which people live is an important determinant of health. At certain levels of exposure, contaminants in our air, water, food and soil can cause a variety of adverse health effects. Environmental health is a component of the public health system and is committed to protecting the health of the public and enhancing quality of life by assessing, correcting, controlling, and preventing those factors in the environment that can adversely affect human health. The prevention of injury, disease and death that may result from interactions of people with their environment is the goal of the environmental health program. Responsible citizens owe it to our government to keep the environment pristine as much as possible. Our per capita energy consumption also has to match the energy demands for sustainable development. The curriculum aims at providing solutions to some of the grand challenges facing the nation.

## **Objectives and Expected outcome**

- Awareness of public health hazards posed by our environment, including physical features such as global warming, chemical features such as automobile emissions, contaminants in drinking water, and biological features such as putrefying organic matter.
- Impact of governmental policies and urbanization on degradation of the environment.
- Education, public- private partnership, corporate social responsibility (CSR) and change in management as way forward towards improving the Public Health thresholds.
- Educating the students on environmental policies with respect to water, air, forest and wildlife of the country.

**Every Semester, teaching will be spread over 16 weeks including two weeks for review.**

**BANGALORE UNIVERSITY**  
**FOUNDATION COURSE CBSS SYLLABUS FOR ALL UNDER GRADUATE**  
**PROGRAMME**

**EPH: ENVIRONMENT AND PUBLIC HEALTH**

General Course: UG

Course Structure: CBSS

Course: Foundation Course

Code Course Title: EPH : **Environment and Public health**

**Scheme of Examination and Credits**  
**Foundation Course (I.II.III and IV Sem)**

Paper No	Title of the paper	Type of paper	Hour/ week	Duration of exam in hrs	Exam Marks	IA Marks	Total Marks	Credits	
EPH	<b>Environment and Public health</b>	T	3	3	70	30	100	1	
	<b>Total marks and credits for I Sem</b>							100	1

**Scheme of Internal Assessment**

<b>Marks assigned</b>	30
Tests	10
Assignments/Field work	15
Attendance	05

**The internal assessment marks shall be based on tests, assignments/field work and attendance**

## **CBSS SYLLABUS FOR ENVIRONMENT AND PUBLIC HEALTH**

**1 Credits/Week= 3hrs/Week, 40hrs/semester**

**70 Marks**

### **Unit I - Linkages between Environment and Health**

**Hours**

Understanding linkages between Environment and Public Health: Effect of quality of air, water and soil on health. Perspective on Individual health: Nutritional, socio-cultural and developmental aspects, Dietary diversity for good health; Human developmental indices for public health.

**06**

### **Unit II - Climate Change and Implications on Public Health**

Global warming - Agricultural practices (chemical agriculture) and Industrial technologies (use of non-biodegradable materials like plastics, aerosols, refrigerants, pesticides); Manifestations of Climate change on Public Health- Burning of Fossil fuels , automobile emissions and Acid rain.

**08**

### **Unit III – Diseases in Contemporary Society**

Definition- need for good health- factors affecting health. Types of diseases - deficiency, infection, pollution diseases- allergies , respiratory, cardiovascular, and cancer Personal hygiene- food - balanced diet. Food habits and cleanliness, food adulterants, avoiding smoking, drugs and alcohol.

Communicable diseases: Mode of transmission -epidemic and endemic diseases. Management of hygiene in public places - Railway stations, Bus stands and other public places. Infectious diseases: Role of sanitation and poverty case studies on TB, diarrhea, malaria, viral diseases .Non-communicable diseases: Role of Lifestyle and built environment. Diabetes and Hypertension.

**10**

## **Unit IV - Perspectives and Interventions in Public Health**

Epidemiological perspectives — Disease burden and surveillance; Alternative systems of medicine - Ayurveda, Yoga, Unani, Siddha and Homeopathy (AYUSH); Universal Immunization Programme (UIP); Reproductive health-Youth Unite for Victory on AIDS (YUVA) programme of Government of India. Occupational health hazards-physical-chemical and biological. Occupational diseases- prevention and control.

**08**

## **Unit V - Environmental Management Policies and Practices**

Municipal solid waste management: Definition, sources, characterization collection and transportation and disposal methods. Solid waste management system in urban and rural areas. Municipal Solid waste rules.

Policies and practices with respect to Environmental Protection Act, Forest Conservation Act, Wild life protection Act, Water and Air Act, Industrial, Biomedical and E waste disposal rules.

**08**

## **Assignment /Field Work**

- Examining local cuisines for dietary diversity.
- Examining National Health Survey data e.g. National Family Health Survey, Annual Health surveys.
- Survey of Immunization coverage in a particular area.
- To establish if there is a relation between GDP and life expectancies/Health parameters.
- Survey of Respiratory allergies.
- Examining household/institutional/market/neighborhood wastes and their disposal mechanism.
- Survey of households along the Arkavathi and Cauvery River for life expectancy and common ailments and diseases.
- Determine the extent of use of paper and suggest means of reducing the use of paper and paper products.
- Documentation of festival/fasting and mapping of agro-ecological cycles.
- Definitions of poverty - Governmental policies on poverty mitigation - facts and fiction.
- Health indicators vis- a-vis income groups.
- Deforestation and flooding - myth or fact?
- Smoking and Lung Cancer
- Estimation of water-demands of a city/town.
- Adapting water-harvesting technology - survey, sustainability.

- Quantitative relation between bio-resource and consumer products - bathing soap, paper, furniture & construction as related to trees.
- Differential access to water - demand and actual access.
- Transport losses in water supply.
- Storage losses in food grain.
- Study of sewage treatment plants.
- Social perspective - child-health and small scale industries.
- Document infant immunization.
- Studying effective programme implementation - Reproductive health.
- Opportunities of physical activities in neighborhood - Study of built environment - Land-use pattern in Urban Settlements.
- Air quality in Delhi.
- Changing transport means in Delhi - CNG.
- Rituals and environmental pollution e.g. water, noise, air.
- Dialogue with doctors and paramedics.
- Methods of consultation of doctors.
- Population pressure/growth and resource degradation.
- Nutritional disorders/deficiencies in different populations groups-surveys.
- Compose and enact street plays. Create posters/ audio-video materials/ greeting cards highlighting environmental issues.
- Collecting information on medicinal plants.
- Collecting information from elders and other prominent persons.
- Occupational hazards and health issues.
- Water-borne diseases - exacerbation by irrigation projects.
- Alternate medicines - use of therapies for different diseases categories.
- Lifestyle diseases.
- Pollutants in air/water/soil and their effect on health.
- FDI in specific manufacturing Industries and local health problems.
- Differential pricing policy of petroleum products and environmental pollution - case studies.
- Wildlife Protection Act - case studies.
- Bhopal Gas Tragedy- Science, Laws and Public Health
- Changing Human Development Indices over time – in India/other countries.
- Supply, demand and gap filling –role of ground water

## References

1. Indian Academy of Paediatrics. (2011). *Guidebook on Immunization*. mfc bulletin, 45-50.
2. Nandini N, Sunitha N. and Sucharita Tandon, (2007), Environmental Studies, Sapna Book House, Bangalore
3. Michel, Mckinney, Robert and Logan (2007). Environmental Science – Systems & Solutions. Jones & Barlett Publishers, Canada.
4. Minkoff, E., & Baker, P. (2003). *Biology Today: An Issues Approach* (3 ed.).
5. Park, K. (2011). *Preventive and Social Medicine*. Benarsi Das Publications, (pp. 16- 19,24-27).
6. Public Health Nutrition in Developing Countries Part-2). Wood head Publishing India.
7. Sadgopal, M., & Sagar, A. (2007, July-September). Can Public Health open up to the AYUSH Systems and give space for People's views of health and disease?.
8. Sekhsaria, P. (2007). Conservation in India and the Need to Think Beyond 'Tiger vs. Tribal'. *Biotropica*, 39(5), 575-577.
9. Tyler Miller and Scott E. Spoolman 'Environmental Science' (2012) 13<sup>th</sup> edition First Indian Reprint Chapters 14-17 (total pages 108) Cengage Learning, New Delhi. [www.cengage.co](http://www.cengage.co).
10. UNDP. (2013). The Human Development Report, The Rise of the South: HumanProgress in Diverse World. New York: UNDP, (also available in Hindi),
11. Wani, M., & Kothari, A. (2007, July 15 ). Protected areas and human rights India: the impact of the official conservation model on local communities. *Policy Matters*, 100-114.

## E-resources:

1. [www.traditionalmedicine.nic.in](http://www.traditionalmedicine.nic.in)
2. [www.moef.nic.in](http://www.moef.nic.in)
3. [www.iucn.org/india/](http://www.iucn.org/india/)
4. [www.who.int](http://www.who.int)
5. [www.wwfindia.org](http://www.wwfindia.org)
6. [www.unep.org](http://www.unep.org)

## **FOUNDATION COURSE**

### **BA CHOICE BASED CREDIT SYSTEM (SEMESTER SCHEME) w.e.f 2014-2015**

#### **INDIAN CONSTITUTION AND HUMAN RIGHTS** **(Compulsory Paper) for all U.G. Courses**

##### **Chapter I: Indian Constitutional Philosophy**

- a) Features of the Constitution and Preamble
- b) Fundamental Rights and Fundamental Duties
- c) Directive Principles of State Policy

##### **Chapter II Union and State Executive, Legislature and Judiciary**

- a) Union Parliament and State Legislature: Powers and Functions
- b) President, Prime Minister and Council of Ministers
- c) State Governor, Chief Minister and Council of Ministers
- d) The Supreme Court and High Court: Powers and Functions

##### **Chapter III: Concept and Development of Human Rights**

- a) Meaning Scope and Development of Human Rights
- b) United Nations and Human Rights – UNHCR
- c) UDHR 1948, ICCPR 1996 and ICESCR 1966

##### **Chapter IV: Human Rights in India**

- a) Protection of Human Rights Act, 1993 (NHRC and SHRC)
- b) First, Second and Third Generation Human Rights
- c) Judicial Activism and Human Rights

#### **READINGS**

Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi

SubashKashyap, Indian Constitution, National Book Trust

J.A. Siwach, Dynamics of Indian Government &  
Politics D.C. Gupta, Indian Government and Politics

H.M.Sreevai, Constitutional Law of India, 4<sup>th</sup> edition in 3 volumes (Universal Law Publication)

V.N.Shukla, Constitution of India (Eastern Book Co)

J.C. Johari, Indian Government and Politics Hans J.

Raj Indian Government and Politics M.V. Pylee,  
Indian Constitution

Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi

Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

S.K. Kapoor, Human Rights

## **BREAK UP OF INTERNAL ASSESSMENT MARKS**

<b>Tests</b>	<b>15 marks</b>
<b>Attendance</b>	<b>5 marks</b>
<b>Assignments</b>	<b>10 marks</b>
<b>TOTAL</b>	<b>30 MARKS</b>

**Syllabus and Scheme for MruduKousalya at UG level**

**IV Semester B.A, B.Ss, B.C.A, B.Com, BBM or BHM**

**No. of Credits: 2**

**Max Marks: 70**

**No. of Hours: 42**

**Internal Assessment: 30**

**Personality Development**

**Introduction:**

Personality Development is a development of the organized pattern of behaviours and attitudes that make a person distinctive. It is concerned with the views of others and how they realize you and what they see in you. It occurs by on-going interaction of temperament, character and environment. Erik Erikson provided an insight full description as to how personality develops based on his extensive experience. He has identified eight phases of the socialisation process of an individual. Five of them occur during infancy, childhood and adolescence. Personality Development is different from self-development which is generally perceived as same. They are related to each other.

But eastern philosophy in general and Indian spirituality in particular understands personality from a different context. Swami Vivekananda says, "Personality Development in the real sense refers to deeper level of a person". Hence, he opines that a study of personality should start from a clear grasp of nature of our mind, and how it functions. Mind has four fold functions like manas, buddhi, chitta and ahamkara. He has identified four essential qualities for personality development. They are faith in oneself, think positive thoughts, attitude towards failures and mistakes, self-reliance & renunciation and service.

**Unit:1 18 HRS**

**Self-Awareness:** Meaning of self-awareness-Components -Improving self-awareness- Benefits of Understanding self

**Goal setting:** Meaning of goal and goal setting – Short, medium and long term goals- Importance of goal setting- Choices/selection of setting goals-Steps for goal setting –SMART goals.

**Creativity: Meaning of Creativity - Difference with Innovation-Barriers to creativity-Steps to stimulate creativity-Understanding and importance of human values-Difference with ethics, Ideals in life – Becoming a role model**

**Unit 11 12 HRS**

**Interpersonal Skills**—Meaning of Interpersonal skills- Need to develop Interpersonal skills- Components of Interpersonal skills- Techniques required to improve skills- Benefits of effective interpersonal skills

**Stress Management:** Meaning of stress- Factors causing stress- Positive and negative types of stress- Effects of stress on body and mind-Stress removal techniques.

**Unit 12 12 HRS**

**Time Management:** What and why of Time Management – Necessity and benefits of time management – Tools of time management-How to manage time wisely

**Leadership Development:** Meaning and Importance-Types of leadership styles-Theories of leadership

**Pedagogy:**

1. Activities exercises and assignments have to be given not less than 40% weightage
2. Appropriate Case studies could be used
3. You tube videos to be used effectively

**References:**

1. Vikas (Life skills Manual) : Published by:Member Secretary & Executive Director,KarnatakaJnanaAayoga (Karnataka Knowledge Commission) Govt of Karnataka ,Copy Right:2010 Karnataka JnanaAayoga
2. ManikaGhosh, "Positivity -A way of Life", Published by Orient Blackswan Pvt Ltd
3. Swami Vivekananda,"Personality Development", Published by Ramakrishna Math And Ramakrishna Mission (December 2011)

**Eligibility for teaching:**

This subject could be thought by all teachers who have undergone some training or other in the given topics. Regular trainers could also be explored

# BANGALORE UNIVERSITY

Soft Skills ('Mrudu Kousalya') Paper  
3<sup>rd</sup> Semester, B.Sc/BCA from 2015-16

## CULTURE, DIVERSITY AND SOCIETY

2 Credits

Max. Marks: 100

Hours of Teaching: 42

### Objectives

- To help B.Sc. and B.C.A. students gain a better understanding and comprehension of Indian culture, diversity and society.
- To instil in the students a healthy respect for the rich diversity in Indian society and culture.
- To help them understand the problems of rural society.
- To develop in them the secular values of tolerance, communal amity and peaceful co-existence.
- To help them address the contemporary challenges before Indian society like communalism, ethnocentrism and gender discrimination.
- To remind the youth that they have a key role to play in the promotion of national integration, and in promoting the unity and integrity of the country.

### Syllabus

#### Unit-1: Understanding the Diversity of Indian Society (12-14 Hours)

• Geographical diversity.	5 Hrs.
• Religious diversity.	3 Hrs.
• Cultural diversity.	2 Hrs.
• Unity in Diversity.	2 Hrs.

#### Unit-2: Family, Caste, Village and Women in India (12-14 Hours)

• Family as a basic institution of Indian Society; Indian family in transition.	3 Hrs.
• Social stratification and disparities; the Caste System and its evils; the predicament of the weaker sections: Scheduled Castes and Tribes; Backward Classes and Religious Minorities.	4 Hrs.
• Rural society and its problems; Rural-Urban migration.	3 Hrs.
• Gender Discrimination; Violence against women; Measures to improve the status of women.	3 Hrs.

<b>Unit-3: Contemporary Challenges before Indian Society</b>	<b>(12-14 Hours)</b>
• Communalism and Religious Fundamentalism.	2 Hrs.
• Regionalism and Ethnocentrism.	2 Hrs.
• Globalization and mono-culturalism; <i>McDonaldization</i> .	2 Hrs.
• Child labour; Migrant labour; Bonded labour; Contract labour.	4 Hrs.
• Mass Media and its impact on society.	2 hrs.

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### **Reference List**

- Beteille, Andre, *Social Inequality*, New Delhi, OUP, 1974.
- Bose, N.K., *Culture and Society in India*, Bombay, Asia Publishing House, 1967.
- Deshpande, Satish, ed., *The Problem of Caste*, Orient Blackswan, 2014.
- Dube, S.C., *Indian Village*, London, Routledge, 1955.
- Dube, S.C., *Society in India*, New Delhi, National Book Trust, 1990.
- Jodhka, Surinder, *Village Society*, Orient Blackswan, 2012.
- Lannoy, Richard, *The Speaking Tree: A Study of Indian Society and Culture*, New Delhi, OUP, 1971.
- Majumdar, D.N., *Races and Cultures of India*, Bombay, Asia Publishing House, 1958.
- Mukherjee, D.P. *Diversities*, Delhi, People's Publishing House, 1958.
- Satyamurty, T.V., *Region, Religion, Caste, Gender and Culture in Contemporary India*, New Delhi, OUP, 1996.
- Srinivas, M.N., *India: Social Structure*, New Delhi, Hindustan Publishing Corporation, 1980.

### **Scheme of Examination**

End-Semester Examination:	70 marks
Internal Assessment:	30 marks (Test/s: 20 marks; Seminar: 5 marks; Project: 5 marks)
<b><u>Total:</u></b>	<b><u>100 marks</u></b>

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### **Question Paper Pattern for End-Semester Examination**

- 40 Multiple-Choice Questions x 1 mark = 40 marks
- 15 Multiple-Choice Questions x 2 marks = 30 marks  
**Total** = **70 marks**

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### **Eligibility for Teaching**

The Paper shall be taught by a qualified Post-Graduate teacher from the Arts/Social Sciences/Humanities faculty, preferably from the Department of Sociology. If the Sociology teachers are available in the college, it shall be taught by them. If the Sociology teachers are not available, other faculty from the Arts/Social Sciences/Humanities can teach the paper.

# BANGALORE UNIVERSITY

## Soft Skills ('Mrudu Kousalya') Paper

3<sup>rd</sup> Semester B.A./B.Com./B.B.M./B.H.M. from 2015-16

### SCIENCE AND SOCIETY

2 Credits

Max. Marks: 100

Hours of Teaching: 39-42

### Objectives

We inhabit a world today that is shaped significantly by Science and Technology(S&T). S&T has enriched our lives and proved to be beneficial in our livelihoods. At the same time, many of the products of S&T pose challenges, and in ways, even threaten the existence of societies. This course, meant for students of the humanities/commerce streams, is to provide an overview of the nature of S&T and its interaction with society. It is meant to provide a broad introduction to the most significant discoveries and inventions of modern science that have changed our lives and to bring into focus the need for developing a critical appraisal of the issues related to the connection of S&T with society.

### Notes to the Instructor(s)

1. All the units under this syllabus may be taught by any qualified science Post-Graduate teacher. However, the units may be taught in collaboration with the concerned faculty.
2. **Unit I (A):** A brief introduction to science and the practice of the scientific method as it has come to be understood in the 20<sup>th</sup> century, with a historical outline that provides a flavor of the developments that led to modern science and the contributions of different civilizations in this direction.
3. **Unit I (B):** A discussion on how the discoveries of science transform to technologies and also how technologies have enabled to ask new scientific questions with suitable examples.
4. **Unit II:** This unit explores through specific examples, the discoveries in science that have profoundly impacted civilizations. It is to provide some basic information and introduce some of the consequences of the products of these discoveries on the safety of humans.
5. **Unit III:** This unit is to explore the impact of S&T on socio-economic sphere and the lives of individuals. It will also delve into environmental issues concerned with the deployment of technologies on a large scale.

### Unit I: Introduction to Science:

**(13 Hours)**

A. What is Science & History of Science (4 hrs.)

- *What is Science? The revolutions in Physics - Contributions of Copernicus and Galileo; A brief history of the Renaissance in Europe; Age of Enlightenment; Industrial Revolution; Science in the 20<sup>th</sup> century.*

- *Modern Science and the Scientific Method* (2 hrs.)  
*A discussion on hypothesis, experimentation, criteria for experimentation, theorizing, and the open-ended nature of the scientific quest*

- *Science in other Cultures* (2 hrs.)  
*A brief exploration of science and technology in pre-modern era with emphasis on India in areas of Mathematics, Metallurgical Sciences, Medicine and Health*

**B. The interdependence of Science and Technology**

- *Molecular basis of disease and vaccination* (1 hr.)
- *Laser and photonics applications* (1 hr.)
- *Microscopy and applications* (1 hr.)

**C. Science and the Public** (2 hrs.)

- *Discussion on the need for an informed public in a democracy about S&T, Science policy and research funding, S&T and development*

**Unit II: Modern Science and its impact on Societies:** (13 Hours)

- *Theory of Evolution: A lecture summarizing the modern theory of evolution of species and its implications* (1 hr.)
- *Discovery of Antibiotics: What is an antibiotic and how does it work? A brief history of the discovery of antibiotics and its impact on health. Adversities due to misuse of antibiotics* (2 hrs.)
- *Soaps, Detergents, Polymers and Chemicals: Their use and abuse* (2 hrs.)
- *Atomic Energy : Introduction to fission and fusion reactions, atomic reactors and power plants; nuclear weapons; Chernobyl accident* (2 hrs.)
- *Space Sciences: History of space exploration; Sputnik and US space programme; Modern satellites, Applications in weather prediction and analysis; remote sensing with reference to Indian space programme.* (2 hrs.)
- *Genetics and human health: Introduction to gene, DNA and basis of heredity; some issues of health linked to genetics* (2 hrs.)
- *Nanotechnology, Smart materials: Introduction to nanotechnology and examples of some devices that use nanotechnology. A brief survey of smart materials* (2 hrs.)

**Unit III: Science, Life and Livelihoods:** (13 Hours)

- *India's agricultural productivity and dairy development: The Green and White Revolutions; The Gene Revolution and GM Crops* (3 hrs.)
- *Information Revolution: The impact of internet and web-based technologies* (2 hrs.)
- *Impact of high-tech devices on emotional, social and cognitive facets of humans* (2 hrs.)
- *Energy issues and renewable energy sources: solar, wind, bio-fuels* (3 hrs.)
- *Climate Change* (3 hrs.)

## **Reference List**

- Bala, Arun, 2008, *The Dialogue of Civilizations in the Birth of Modern Science*, New York, NY: Macmillan.
- Biswas, Arun Kumar (Edited), 2001, *History, Science and Society in the Indian Context : A Collection of Papers*, The Asiatic Society, xv, 474 p, ISBN : 8172361033.
- Fouad Abd-El-Khalick, 2005, *Developing Deeper Understandings of Nature of Science: The Impact of a Philosophy of Science Course on Pre-service Science Teachers' Views and Instructional Planning*, International Journal of Science Education , Vol. 27, Iss. 1.
- Russell, B., (1985), *The Impact of Science on Society*, Psychology Press.
- Singh, S., K. C. Garg, S. Pruthi, B. Dutt (2001) *Indicators of Indian Science and Technology*, (NISTADS), Allied Publishers.
- Stanford Encyclopedia of Philosophy: Helen Longino's "*The Social Dimensions of Scientific Knowledge*" (HTML) [www.http://plato.stanford.edu/entries/scientific-knowledge-social/](http://plato.stanford.edu/entries/scientific-knowledge-social/)
- ② University of California, Berkeley: Understanding Science: P. Godfrey-Smith's "*The Philosophy of Science*" (HTML) <http://undsci.berkeley.edu/article/philosophy>

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## **Scheme of Examination**

End-Semester Examination: 70 marks  
Internal Assessment: 30 marks (Test/s: 20 marks; Seminar: 5 marks; Project: 5 marks)  
**Total: 100 marks**

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## **Question Paper Pattern for End-Semester Examination**

- a. 40 Multiple-Choice Questions x 1 mark = 40 marks
- b. 15 Multiple-Choice Questions x 2 marks = 30 marks

**Total = 70 marks**

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