GOVERNMENT OF KARNATAKA

NATIONAL EDUCATION POLICY- 2020

(NEP-2020)

Report on

Proposed Curricular Framework for Ability Enhancement Compulsory Course (AECC) under NEP-2020

in

ENVIRONMENTAL STUDIES – (AECC)

Submitted to

Karnataka State Higher Education Council
Government of Karnataka
Bengaluru

7th June 2022

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Report on

Proposed Curricular Framework for Ability Enhancement Compulsory Course (AECC) under NEP-2020

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ENVIRONMENTAL STUDIES – (AECC)

Submitted by

Dr. N. Nandini **Chairperson, Subject Expert Committee - Environmental Science, NEP-2020** Professor, Dept. of Environmental Science, Bangalore University, Bengaluru	**Dr. Jayappa, M.** **Member Convenor, Subject Expert Committee - Environmental Science, NEP-2020** Special Officer, Karnataka State Higher Education Council Bengaluru and Coordinator, Environmental Science Committee, NEP 2020

and

Members of Subject Expert Committee - Environmental Science

1. **Dr. N. S. Raju**, Professor, Department of Studies in Environmental Science, University of Mysore, Mysuru.
2. **Dr. S. V. Krishna Murthy**, Professor, Department of PG Studies and Research in Environmental Science, Kuvempu University, Shankaraghatta.
3. **Dr. S. Suresha**, Professor and Head, Department of Environmental Science, Yuvaraja's College (Autonomous), University of Mysore, Mysuru.
4. **Dr. B. S. Prabhakar,** Associate Professor and Head, Department of Environmental Science, St. Joseph's College (Autonomous), Bengaluru.

7th June 2022

PREFACE

Education empowers life and life systems. A holistic education paradigm will effectively focus on developing knowledge, employable skill sets, appropriate attitudes and an overall personality. A graduate is the one who acquires the following attributes and employs them to benefit societies.

- Skills of identifying a problem and factors responsible for the problem
- Acquires and appreciates problem solving skills
- Logically employs problem solving tools, spatially and temporally
- Identifies timely needs of the community and contributes to them
- Takes the community together creating an equitable ecosystem
- Works towards creating employment opportunities and work domains for different skill sets and knowledge disciplines
- Blends with various social and economic situations making life happier for the self and of the communities
- Envisages and employs various attitudes and skill sets for the betterment of the Nation, blending local and regional variations

Environmental Science is a domain which seamlessly connects the sciences with day-to-day societal demands. Proposing and developing a curriculum for the subject of Environmental Science is unique in many ways. Mankind is facing serious environmental issues like climate change, desertification, deforestation, pollution, solid waste generation, natural and man-made disasters.

Improving the quality of life is a process of development which includes teaching, training and instruction. A competent subject expert committee was constituted by Karnataka State Higher Education Council, Government of Karnataka to achieve these objectives. The assigned task of this committee was to design curriculum structure for both

- ✓ Under-Graduate and Post-Graduate programmes of Environmental Science
- ✓ Environmental Studies – AECC for all Under-Graduate courses

The proposed curricular framework designed by this committee was headed by me with Eminent Educationalists in the field of Environmental Science.

NEP 2020 - SUBJECT EXPERT COMMITTEE – ENVIRONMENTAL SCIENCE		
Name	**Designation and address**	**Position**
Dr. N. Nandini	Professor Department of Environmental Science, Bangalore University Bengaluru	Chairperson
Dr. N. S. Raju	Professor Department of Studies in Environmental Science, University of Mysore, Mysuru	Member
Dr. S. V. Krishnamurthy	Professor Department of PG Studies and Research in Environmental Science, Kuvempu University Shankaraghatta	Member
Dr. S. Suresha	Professor and Head Department of Environmental Science, Yuvaraja's College (Autonomous) University of Mysore, Mysuru	Member
Dr. B. S. Prabhakar	Associate Professor and Head Department of Environmental Science, St. Joseph's College (Autonomous), Bengaluru	Member
Dr. Jayappa, M.	Special Officer Karnataka State Higher Education Council, Government of Karnataka	Member Convenor

Our Nation's vision for higher education through National Education Policy – 2020 is to transform it into a sustainable system. The Government of Karnataka is first State to launch the National Education Policy – 2020. The programme was launched virtually by Union Education Minister **Sri. Dharmendra Pradhan**. **Sri. Basavaraj Bommai,** the Honorable Chief Minister of Karnataka launched the policy of digitization, research and development that could help implement the new NEP-2020, which aims at bringing fundamental

changes in the education system. **Dr. C. N. Ashwath Narayan**, Minister for Higher Education and Chairman for Karnataka State Higher Education Council, Government of Karnataka, initiated the implementation of the National Education Policy, 2020 (NEP-2020) in Karnataka effectively, as a first State in the country by constituting various committees comprising of Education Experts. **Prof. B. Thimme Gowda**, Vice-Chairman, Karnataka State Higher Education Council, Government of Karnataka conducted several meetings with the committees constituted by Government.

The Chairpersons of Board of Studies, Board of Examiners (Environmental Science) and Subject Experts teaching under-graduate and post-graduate courses of various Universities in the State of Karnataka, who participated actively in this process are - **Dr. N. S. Raju**, Professor, Department of Studies in Environmental Science, University of Mysore, Mysuru; **Dr. B. S. Prabhakar**, Associate Professor and Head, St. Joseph's College (Autonomous), Bengaluru; **Dr. J. Narayana**, Professor, Department of Environmental Science, Kuvempu University, Shankaraghatta; **Dr. K. L. Prakash**, Professor, Department of Environmental Science, Bengaluru University, Bengaluru; **Dr. G. V. Venkataramana**, Professor and Chairman, Department of Studies in Environmental Sciences, University of Mysore, Mysuru; **Dr. S. Srikanta Swamy**, Professor, Department of Environmental Science, University of Mysore, Mysuru; **Dr. Yogendra, K.,** Associate Professor, Department of Environmental Science, Kuvempu University, Shankaraghatta; **Dr. Prakash Kariajjanavar**, Assistant Professor, Department of Environmental Science, Gulbarga University, Kalaburagi; **Dr. B. C. Nagaraja**, Professor and Chairman, Department of Environmental Science, Bengaluru University, Bengaluru; **Dr. J. S. Chandrashekar**, Assistant Professor and Chairman, Department of Environmental Science, Karnataka State Open University, Mysuru; **Dr. T. S. Harsha**, Assistant Professor, Department of Environmental Science, Karnataka State Open University, Mysuru; **Dr. Basavarajappa, S. H.,** Assistant Professor, Department of Environmental Science, Kuvempu University, Shankaraghatta; **Dr. M. R. Ebenezer Wilson**,

Associate Professor, St. Joseph's College (Autonomous), Bengaluru; **Dr. Helen Roselene**, Associate Professor and Head, Department of Environmental Science, Mount Carmel College (Autonomous), Bengaluru; and **Dr. K. Harish Kumar**, Assistant Professor, Department of Environmental Science, Government First Grade College, Hosakote; **Dr. Kumar, M.**, Faculty, Department of Environmental Science, Bangalore University, Bengaluru; **Dr. Alaknanda J. Adur**, Associate Professor and Head, Department of Environmental Science, Surana College, Peenya, Bengaluru; **Sri. Sachin A. Rosario**, Assistant Professor, St. Joseph's College (Autonomous), Bengaluru. This work progressed under the guidance of **Sri. L. S. Ramesh**, Special Officer, Karnataka State Higher Education Council, Government of Karnataka, initially and later steered by **Dr. Jayappa, M.**, Special Officer, Karnataka State Higher Education Council, Government of Karnataka.

The valuable support from subject experts **Dr. B. S. Prabhakar**, Associate Professor and Head, St. Joseph's College (Autonomous), Bengaluru and **Dr. Kumar, M.**, Faculty, Department of Environmental Science, Bangalore University, Bengaluru, in compiling the report and overall editing is appreciated.

I take this opportunity to express my gratitude to the authorities of Karnataka State Higher Education Council, Government of Karnataka for giving us an opportunity to be a part of curriculum framework design and implementation of NEP-2020.

- **Prof. N. Nandini**
Chairperson
Subject Expert Committee – Environmental Science
Karnataka State Higher Education Council
Government of Karnataka

ENVIRONMENTAL STUDIES

ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)

This module consists of 3 units, covering 40 lecture hours which are classroom based and 5 hours of field work intended to create awareness, enhance knowledge, develop skills and attitudes necessary to understand the Environment in its totality and enables students to participate proactively for the cause of the environment.

1. Environmental Studies (AECC) is made compulsory core module syllabus framed by UGC for all the Indian Universities/Colleges as per the directions given by the Honorable Supreme Court, which believed that, conservation of environment should be a national way of life and to be included into the education process. As suggested by NEP-2020 State Level Environmental Science Subject Expert Committee, Chairpersons of Board of Studies, Board of Examiners and subject experts it is proposed to implement the details listed in the tabular column below, **mandatorily**.

Environmental Studies (AECC) - Ability Enhancement Compulsory Course		**Semester in which the course is to be taught**
Streams	**B.Sc/BA/BCA/BSW/BFA and other streams of Humanities and Science**	**I**
	B.Com, /B.B.A/BBA (T&T)/BFT and other streams of Commerce and Management	**II**

2. This pattern helps in distributing the workload of teachers of Environmental Studies to both **I and II semesters** enabling the distribution of the **teaching workload of an institution for full academic year**; ensures distribution of examinations into two semesters; also provide scope for a full-time teacher of the subject.
3. **Qualifications to teach Environmental Studies (AECC):** A candidate with minimum qualifications of M.Sc. in Environmental Science subject

only is eligible to teach Environmental Studies (AECC) at the under graduate level in all types of Universities, Deemed Universities, Autonomous Institutions, Government, Aided and Private Colleges in the State of Karnataka. Preference may be given to candidates with UGC-NET/K-SET/Ph.D. in Environmental Science.

However, when such candidate is not available, teachers of the subjects listed below are to be preferred to teach **ONLY ENVIRONMENTAL STUDIES – AECC** paper in the following order:

i. **Biological Sciences**:
   Botany/Zoology/Microbiology/Biotechnology/Life Sciences

ii. **Chemical Sciences and Earth Sciences**:
   Chemistry/Geology/Earth Sciences

The teachers **NOT ELIGIBLE** to teach Environmental Studies (AECC) paper are - Humanities (Economics, Geography, History, Sociology, Political Science, Rural Development, Philosophy and others) Commerce, Management, English & others languages, Communication, Performing Arts, Fine Arts, Social work, Women Studies, Psychology, Home Science, Fashion Technology, Travel & Tourism and other similar subjects.

4. **Pattern of Examination**: Total marks – 50 (Internal Assessment - 20 marks and Final Examination - 30 marks).

5. **Final Examination Question Paper Pattern (Short answer and essay type)**
   a. Section - A (5 questions x 2 marks = 10 marks) – 5 questions out of 7
   b. Section - B (4 questions x 5 marks = 20 marks) – 4 questions out of 6

6. **Duration of the examination**: 1 hour 30 minutes (1½ hours)

7. **Teaching hours and credits**: 3 hours of teaching per week and 2 credits.

ENVIRONMENTAL STUDIES

ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)

Number of Theory Credits	Number of lecture hours + field work
2	**45**

Content of ENVIRONMENTAL STUDIES – AECC		**45 Hours**
Unit 1	**Introduction to Environmental Studies:** Multidisciplinary nature of environmental studies. Scope and importance; Concept of sustainability and sustainable development. **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 Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **Natural Resources: Renewable and Non-Renewable Resources** Land resources and land-use 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.	**15**
Unit 2	**Biodiversity and Conservation:** Levels of biological diversity: Genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and	**12**

	global biodiversity hotspots. 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. **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.	
Unit 3	**Environmental Policies and 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. **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	**18**

	cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi). Field work (5 hours)	

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Subject Expert Committee Members actively participated in the preparation of proposed curriculum of Environmental Studies (AECC) for all the under-graduate courses in the Universities/Colleges in the state of Karnataka.

Several meetings were conducted virtually and physically with Environmental Science Subject Committee Experts; and the proposed curriculum was approved by the Chairpersons of Board of Studies and Board of Examiners of various Universities and Colleges of Karnataka State.

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Members Present			
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Dr. N. S. Raju	Professor, Department of Studies in Environmental Science, University of Mysore, Mysuru	Member	
Dr. S. Suresha	Associate Professor and Head Department of Environmental Science, Yuvaraja's College (Autonomous), University of Mysore, Mysuru	Member	
Dr. B. S. Prabhakar	Associate Professor and Head Department of Environmental Science, St. Joseph's College (Autonomous), Bengaluru	Member	
Dr. Jayappa, M.	Special Officer, Karnataka State Higher Education Council, Government of Karnataka	Member Convenor	
Members Absent			
Dr. S. V. Krishnamurthy	Professor, Department of PG Studies and Research in Environmental Science, Kuvempu University, Shankaraghatta	Member	Absent