

# PROGRAMME PROJECT REPORT (PPR)

## **Name of the Programme: MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE (M.Sc in Environmental Science)**

**Duration:** Minimum 2 years  
Maximum 4 years

**Recognition:** This Programme was recognized by DEC-IGNOU and now by the UGC-DEB.

### **A. PROGRAMME'S MISSION, VISION & OBJECTIVES**

**Mission:** M.Sc in Environmental Science is a multidisciplinary, interesting and leading course designed to encourage aspiring students with a cutting edge training to innovate young minds power of thinking, cater them apt practical training and making them industry ready for a rewarding professional career.

The M.Sc Environmental Science programme aims at preparing environmental educators and other professionals including curriculum developers, environmental policy makers, planners, administrators, supervisors, industrialists, scientists and researchers. This Programme aims to providing opportunities for students to extend as well as deepen their knowledge and understanding of Environment, specialize in selected areas, and also develop research capacities, leading to specialization in environmental education.

Environmental Science programme is foundational environmental degree, enabling students to learn the science behind the Earth's amazing complexity and its environmental processes, and take a role in improving the future of our planet. Learners includes research experts and environmental practitioners who will share their practical and theoretical insights so that the degree with an understanding of how to measure, evaluate, and make decisions about environmental issues. The student will have the opportunity to learn sophisticated laboratory techniques and data analysis, such as the utilization of Geographical Information Systems. This programme encourages pursuing student's interests and shaping their ambitions. This post graduate degree offers meaningful opportunities to develop research, or to gain insights from industry leaders in the environmental private sector and non-governmental organizations.

This programme mission objectives are intended to

- Encourage scientific research and publication in the accredited scientific publications.
- Encourage participation in scientific forums and seminars.
- Follow up of latest scientific research and techniques in this field.

#### **Vision:**

- To prepare the students to become holistic persons with diverse learning experiences and productive thinking in a global society.
- Transforming the hidden potentialities of the students into realities.
- Innovative and transformative research in Environmental sciences.

- Excellent education for future scientists and for the general public.
- Service to humanity through expansion and dissemination of enviroscience knowledge.

## **OBJECTIVES**

- The main objectives of present programme has been prepared keeping in view of the course requirements for those candidates seeking Post-Graduate Distance Education in Environmental Science.
- Prepare and present portfolio of student work that demonstrates level of success in achieving learning outcomes for environmental science.
- Specific purpose of the course is to create awareness to students of Distance Education Council about status of environmental technology.
- The Environmental Science department is a community of learners and teacher-scholars, which has as its mission to help all its students gain an appreciation of enviro techniques, both as a science and as a humanistic study.
- The Environmental Science department will build a solid foundation of growth, skills and knowledge of technology adapted to the field of Environmental Sciences ,our passion for educating tomorrow's leaders is supported by our desire to provide a seam less education experience.

The importance's of environmental science are as follows:

- To clarify modern environmental concept like how to conserve biodiversity.
- To know the more sustainable way of living.
- To use natural resources more efficiently.
- To study the impact of pollution on Environment.
- To know the behavior of organism under natural conditions.
- To know the interrelationship between organisms in populations and communities.
- To aware and educate people regarding environmental issues and problems at local, national and international levels.

## **B. RELEVANCE OF THE PROGRAM WITH HEI'S MISSION AND GOALS**

Kuvempu University is an affiliating State University in Karnataka. Established in 1987, it is a University with a distinctive academic profile, blending in itself commitment to rural ethos and a modern spirit. It has 37 Post-Graduate departments of studies in the faculties of Arts, Science, Commerce, Education and Law. It also has 4 constituent colleges at Shankaraghatta and Shivamogga, and two outlying regional Post-Graduate Centres at Kadur and Chikkamagalur.

The Vision and Mission of the University are:

**Vision:** Kuvempu University shall strive to become an international centre of excellence in teaching and research to provide high quality value based education to all through various modes to meet the global challenges.

**Mission:**

Foster creativity in teaching, learning and research to build a knowledge base and promote quality initiative.

Provide access to education to all.

Develop human resources to meet the societal needs.

The Distance Education Programmes are a part of the University's outreach programmes for the rural masses and also to foster University-Society relationship with the motto of "**Education for All**", to provide quality education at the doorsteps of desirous individuals who want to take up higher education, for the discontinued who could not take up formal education, housewives and employees who want to improve and enhance their knowledge. The University firmly believes that education and seeking knowledge is a **Lifelong Learning** concept.

Offering higher education through Distance Mode is an important step taken by Kuvempu University so as to help the student community in their zeal to pursue higher education at UG and PG Level. The University felt the necessity of this when a large number of students, who wanted seats for PG. Studies, could not be accommodated in our regular P.G. Programmes. The University believes that Distance Education Mode is an equally good avenue to be made available to interested students. With these view, Kuvempu University started offering courses through distance mode since 2002-2003. At present it is offering 31 Programmes (earlier called Courses) in various faculties at the U.G., P.G. and PG Diploma levels. These courses were approved by the erstwhile DEC-IGNOU, and now by the UGC-DEB.

**Goals & Objectives of Distance Mode Programmes**

- Reach out to larger sections of society seeking non-formal education.
- Capacity Building using the non-formal mode platform.
- Concentrate on planning & constant upgrading of facilities to meet new challenges in education through Distance Mode.
- Provide counseling & consultancy to students.
- Offer area/ region wise educational requirements.
- Skill Development and Enhancement.
- To impart quality training through interactive learning module.
- Interactive Pedagogy of teaching-learning and flexible learning environment.
- Provide supportive academic environment and effective teaching.

**C. NATURE OF PROSPECTIVE TARGET GROUP OF LEARNERS:**

The target group of this programme are the persons working in academic, research and production wings of various government institutions, environment and its subsidiary labs and industries, who are working after their graduation. The diverse class of target group of learners can be considered for admission to M.Sc in Environmental Science

course are, passed out Science degree students, working professionals, safety officers, forest officers, engineers, government officials, home makers, environmentalist, scientists, industrialists, physically challenged people, Aspiring students with lower disposable income. It is highlighted that the study of Environmental Science helps provide students with important for its implications in health and environment. Environmental Engineering is a mixture of science and engineering principles to provide a better environment, to provide healthy water, air, and land for human habitation and for other organisms, and to remediate pollution sites. Furthermore, it also concentrates on finding the proper solutions in the field of public health, such as arthropod-borne diseases, implementing law which promote adequate sanitation in urban, rural and recreational areas.

#### **D. APPROPRIATENESS OF THE PROGRAMME TO BE CONDUCTED IN OPEN AND DISTANCE LEARNING MODE TO ACQUIRE SPECIFIC SKILLS AND COMPETENCE**

M.Sc in Environmental Science course is intended for professional's practitioners, researchers and students from wide range of backgrounds who aim to develop their knowledge and insights pertaining to the environment. The course is designed to provide critical and practical skills to analyse, evaluate, design and implement solution and strategies with regards to air, water, soil and health issues. This course comprises both theory and practical. Overall mission of M.Sc Environmental Science is effective delivering of curricula to students who completed their school educations. Along with development of scientific knowledge and biology underpinnings in students, providing nationally and internationally recognized innovative research programs under the multidisciplinary scientific skills is the major goal.

Further, the Programme develops ability to apply acquired knowledge and solve problems in new or unfamiliar surroundings within broader (or multi-disciplinary) contexts related to the area of study. The Programme will expose students to the diversity and variety of Environmental practices, policies, settings, and contexts in India. The Programme aims to build among our graduates capabilities for ongoing self motivated professional development. The Programme will strive to develop capabilities to plan independent interventions in various roles such as those of curriculum developers, textbook/ material developers, teachers, scientists and researchers. The programme would provide learners a wider and more comprehensive understanding of Environment as field of knowledge and would accommodate a wide variety of learning needs of learners.

Students completing this programme will be able to :

- Apply theoretical as well as practical knowledge in the various branches of Environmental Sciences.
- Channelize the background knowledge to take up their higher studies in emerging areas of Pollution, Environmental Education, Energy resources, Hydrology, Forest Conservation, Renewable resource, etc.

## E. INSTRUCTIONAL DESIGN:

### (i) Programme Formulation:

Proposal from the concerned PG department to commence the programme was placed before Monitoring Committee of the DDE/Syndicate. Then it will be referred to the BOS concerned for formulation and approval of the syllabus scheme pattern, time allotment for each paper, marks allotment, scheme of examination etc., then it was placed in the Faculty meeting and then Academic Council (the highest body) of the University for its approval. After approval by both the bodies, the programme was introduced. The academic advisory body of DDE refers the matter to the concerned subject/parent department council for preparation of study material. The concern subject faculty will coordinate with the DDE and the department council, as he/she is on the member in it. Workshops for preparing study material in SLM mode are regularly conducted (with the help of IGNOU experts).

(ii) **Curriculum design:** The Programme is of 2 years duration with annual examinations. The maximum period allowed is 4 years (double the duration). The Programme structure is as below.

Year	Courses	Marks		
		Term End Exams	Continuous Evaluation/ IA	Total
First Year	Course 1: Introduction to Ecology and Environment	85	15	100
	Course 2: Biodiversity and Natural resource conservation and management	85	15	100
	Course 3: Occupational health hazard, control and management	85	15	100
	Course 4: Environmental education, Environmental policy and legislations	85	15	100
	Practical I ( Based on Theory papers I &II)	75	-	75
	Practical II( Based on Theory papers III & IV)	75		75
	<b>Total marks</b>	<b>490</b>	<b>60</b>	<b>550</b>
Second Year	Course 5: Environmental pollution and monitoring	85	15	100
	Course 6: Environmental toxicology &Biostatistics	85	15	100
	Course 7: Environmental engineering and biotechnology	85	15	100
	Course 8: Global Environmental changes, Natural hazard and Impact assessment	85	15	100
	Practical III ( Based on Theory papers V & VI)	75	-	75
	Practical IV( Based on Theory papers VII &VIII)	75	-	75
	<b>Total marks</b>	<b>490</b>	<b>60</b>	<b>550</b>
<b>Total Marks - I Year &amp; II Year</b>		<b>980</b>	<b>120</b>	<b>1100</b>

**(iii) Medium of Instruction:**

The medium of instruction shall be English.

**(iv) Detailed syllabi:** Given as Appendix-01

**(v) Faculty and Supporting Staff Requirement**

Full time faculty and guest faculty in regular department will be involved in orientation counseling, and face to face programmes. Such programmes are scheduled during the vacation time of the regular department, which will meet the faculty availability and infrastructure need of ODL Programme. Coordinator of the programme, who is a regular faculty member and the Research and Teaching Assistant (RTA) will be in-charge of the Programme, who will address the day to day academic and learner/student support aspects of the Programme.

Regarding supporting staff, DDE has a separate and well equipped wing/office to take care of all the administration and delivery aspects of ODL Programmes.

There is a separate DDE wing in the Office of the Registrar (Evaluation) for all the evaluation and certification aspects headed by a Deputy/Assistant Registrar.

The DDE and Evaluation wings are fully computerized and technical staff assist in all the activities.

**(v) Instructional Delivery Mechanism**

Instructional delivery mechanism is through study materials prepared by the experts in the subjects concerned. Study materials (SLM) are prepared in-house by the faculty of the department and the faculty from sister universities.

The study material provided is the general guide and covers the course content in order the learner understand core content of the course concerned. Learner are advised to make use of the reference books in the list of books provided along with the syllabus.

**Contact Programme:** There will be a contact programme for a duration of 21 days normally. A minimum of 21 days for instruction by experienced and scholarly faculty will be arranged for each course. There shall be interaction built around lectures, discussions, individual and group activities. A test for theory in each paper and practical exams will be conducted for the candidates at the end of the contact/orientation programme.

**Student support service:** Students can interact with the Office/Faculty through e-mails and personal visits. SMS alert facility for the students regarding dissemination of information relating to conduct of PCPs/Orientation Programme and Production file submission deadlines etc. Student Support Service is provided through online mode and grievance handling mechanism is adopted with the help of supporting technical staff. All necessary and relevant information are uploaded in the dedicated website: [www.kuvempuuniversitydde.org](http://www.kuvempuuniversitydde.org). Internal Assignments with Guidelines, previous years question papers, notifications timetables and results are available from the website.

## **F. PROCEDURE FOR ADMISSIONS, CURRICULAM TRANSACTION AND EVALUATION:**

As outlined in Section-B, Kuvempu University has a policy to provide opportunity to maximum number of eligible and desirous candidate from all sections of the Society including a class having of low-level of disposable income, rural dwellers, women unskilled men minorities etc.

### **(i) Eligibility for the Programme**

Any candidate who has passed the three year science degree examination of this University or any University considered as equivalent there to and has secured not less than 40% of the marks in aggregate in the examination for the declaration of class is eligible for admission to the M.Sc. in Environmental Science.

All the candidates who fulfill eligibility criteria are admitted to the programme. If university decides for maximum number of candidates for Programme, admissions are made first come first basis.

### **(ii) Admission Process**

- Notification issued by the Directorate of Distance Education (DDE) in Regional and National News papers and in the official website.
- Uploading of the Application by the candidate through Online only.
- Payment of fee through online (various options like net banking etc.) or through banks/post offices using printout of the challan.
- Submission of the printout of the application by the candidate to DDE along with original documents for eligibility, date of birth etc.,and along with fee paid receipt.
- Verification of applications- for fulfillment of eligibility criteria (marks cards) documents, fee paid details.
- Approval of the admission and issue of self learning material (Study Materials) to the students.

### **(iii) Fee Structure**

Figures in rupees as prescribed for the academic year 2017-18

<b>SN</b>	<b>Fee Component</b>	<b>First Year</b>	<b>Second Year</b>
Admission Orientation/Practical's and Other Components			
1	Registration	2520	-
2	Admission	980	980
3	Orientation/ Tuition fee	3080	3080
4	Study materials	4480	4480
5	Liaison	140	140
6	Practicals	3080	3080
6	IA Books/Practical Books	490	490

7	Postage	420	420
8	UDF (DDE)	140	-
Examination , Certification and Other Components			
9	Examination	1450	1450
10	Practical Exam	485	485
11	PPC	-	365
12	Convocation	-	900
13	UDF (Exams)	250	140
<b>TOTAL (Rupees)</b>		<b>17,515</b>	<b>16,010</b>

#### **Financial Assistance:**

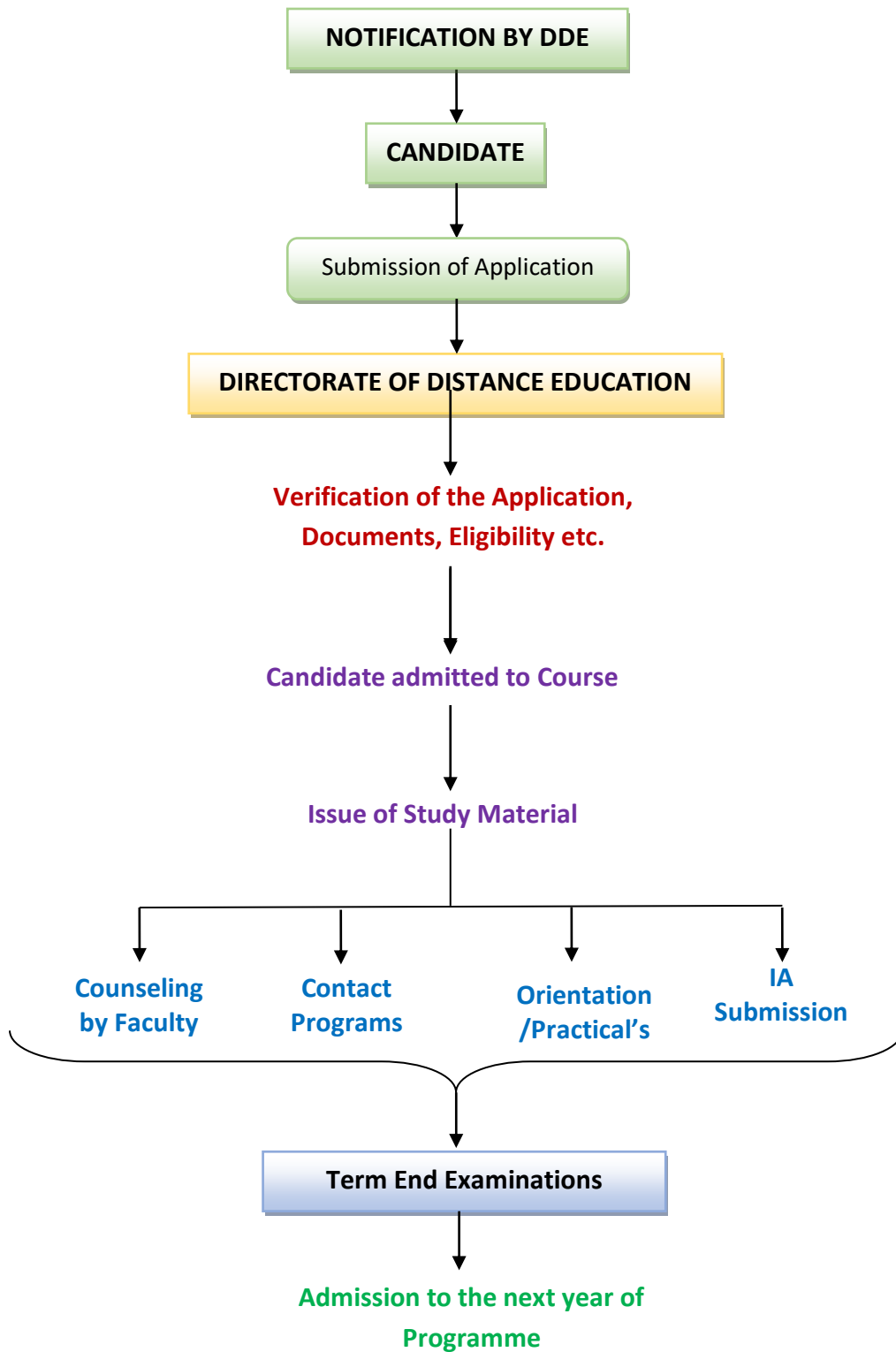
- SC/ST and OBC Students can avail scholarship/fee reimbursement from the concerned State Departments/Agencies
- Fee Concession to Physically Handicapped Candidates.
- Fee concession to Employees of the University and their dependents.
- Fee concession to Ex- servicemen.
- Scholarships and education supports extended by various Governmental and Non-Governmental agencies.

#### **Academic and Activity Planner**

Calendar Year-I		
1	Issue of Notification	July / August
2	Commencement of Online Admissions	July / August
3	Last Date for submission of online applications by the students without Late Fee	October 31
4	Last Date for submission of online applications by the students with late fee	December 31
5	Issue of Study Material and Assignment Books (immediately after verification of the applications)	July to December
Calendar Year-II		
6	Issue of assignment topics Commencement of Counseling sessions	December - January
7	Commencement of Face-to-Face (Orientation) Sessions	February –March
8	Completion of all Orientation Sessions	April 30
9	Last date for Submission of Internal Assignments/ Project Reports	April 30
10	Tentative date for commencement of Examination.	May / June
11	Declaration of Examination Results	August / September

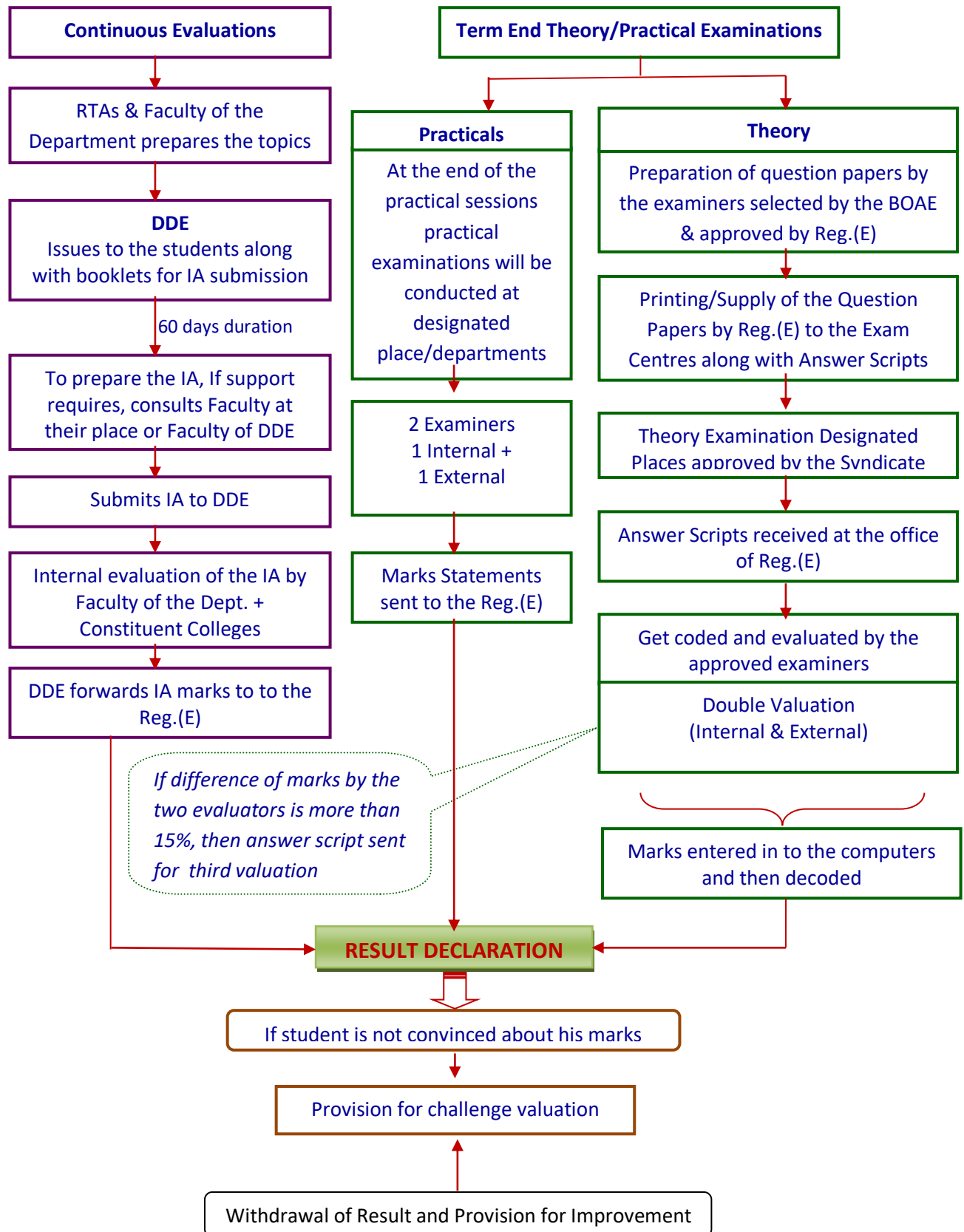


## Generalised Academic Flow Chart for the Distance Mode Learners



**(i) Evaluation of Learner Progress**

Evaluation Process is given here in the form of Flowchart. This Flowchart is common to all Programme at UG, PG and PG Diploma level offered by the University.



### Internal Assessments:

- As a part of continuous assessment the candidates will have to complete assignments in the booklets provided by DDE and submit them to the Directorate of Distance Education within the specified date. The Topics & Instructions for I.A. will be notified in the Students Corner section of the website and also issued to the students directly or through Student Counseling Centres.
- It is mandatory to submit the I.A. in the same year of registration. However, if the candidate failed to take up the theory examination, for any reason, such candidate can submit the I.A. in the next year with prior permission from the DDE.
- All students are expected to complete the above assessments before taking the Term end Examination.
- There is no provision for resubmission of I.A.

**Provision for class tests and workout exercises:** during Counseling and Face-to-Face (Orientation/Contact) programmes.

### (ii) Term End (written) Examination:

**Duration:** Duration: 3 hours, **Maximum marks:** 85

#### Theory Questions pattern

Section	Type of Questions	Marks	Total
A	Five Short answer type with internal choice	5x3	15
B	Five short answer type questions out of 7	5x6	30
C	Three long answer type questions out of 4	3x10	30
D	One long answer type questions out of 2	1x10	10
<b>Total</b>			85

#### Practical Questions pattern

Section	Type of Questions	Marks	Total
Practical	Major Experiment	15x1	15
	Minor Experiment	10x1	10
	Identification & Comment on	5x6	30
	Viva-voce	10	10
	Class Record	10	10
<b>Total</b>			75

**Declaration of class:** At the completion of course evaluation (the Programme) the class will be awarded on the basis of the aggregate of marks at both previous and final examinations taken together.

Pass Class : 40% of marks or above but below 50% of marks.  
Second class : 50% of marks or above but below 60% of marks.  
First Class : 60% of marks or above.

Separate Ranks and Medals are awarded to ODL Learners. Policy for awarding ranks and medals are same as the one followed for the Regular Programme.

**Reappearing for Exams:** The unsuccessful candidates at the P.G. Examinations of a particular year are required to reappear for those papers/examinations only as per the syllabus of that year. The repeaters are therefore advised to preserve the syllabus and study material until they pass the final year of the course.

Candidates will have to complete all the exams within double the durations of the course (and not the number of attempts). The double the duration is reckoned from the year of registration.

A candidate is permitted to register for the final year examination irrespective of the number of courses failed at the previous theory exams.

### (iii) Other Policy/Provisions

**Renewal of Registration:** Students of II year who have failed to pay the II year programme fee in the respective year are permitted to renew their registration by paying the specified course fee along with registration renewal fee and continue their programme. However they should complete the programme with in the maximum permissible period i.e., 4 years.

**Bonafide student certificate:** Those candidates who require Bonafide Certificate/ Study Certificate can obtain by submitting a written request or a filled in prescribed application form (available from the KUDDE website) along with a fee of Rs. 100/- paid either through Bank Challan or Demand Draft.

**Change of Address:** Any change in the address of the students should be intimated to the Directorate with a fee of Rs. 100/- paid through a challan of Electronic Transfer. No change of address will be entertained once the students receive their examination hall ticket. The Directorate of Distance Education is not responsible for missing correspondence due to change of address without getting address changed at DDE.

**Name Correction:** Change of Name, if any required, candidate has to make a written request along with relevant documents as proof of change of name, and by paying specified fee.

**Duplicate Registration Card:** For issue of duplicate Admission/Registration/ Enrollment card- Rs. 200/- will be charged.

**Transfer Certificate:** A Transfer Certificate is not required for admission to any of the KUDDE courses. The Directorate will also not issue Transfer Certificate at the time of completion of the course. However, for Lateral Entry admissions a migration and transfer certificate will be required from such students.

**Change of Examination Centre:** DDE will not entertain any change of exam centre unless there is a proof of change of address and it is permissible.

**Discrepancies in Marks cards and certificates:** In case of any discrepancies observed in the marks card/ certificates etc., candidates have to bring it to the notice of the Director, DDE through a written request within a period of 3 months from the date of issue of the document.

**Miscellaneous:** All the original certificates submitted by the candidates in connection with their admission, registration will be returned to them from the Office of the DDE along with the registration certificate. In case any of their certificates are not received back, they must bring the same to the notice of The Director, DDE, Kuvempu University, immediately. The original records will be maintained for a minimum period of three months. If the candidates ask for the originals before three months, their requests will not be entertained.

**Preservation of Answer Scripts / IA Scripts:** The answer scripts of Theory Exams will be preserved for a maximum duration of 6 months from the date of announcement of results/ revaluation / challenge valuation results. Any query or request for verifications may be submitted, through a written request, within the notified period only.

Similarly, written IA Scripts of the students will be preserved for a period of six months from the date of announcement of the results (First announcement of results). Any discrepancy observed regarding IA marks may be informed to DDE through a written request within three months from the date of issue of results. Later request may not be accepted.

Students are advised to refer the website for notifications regarding preservation of various documents, issued from time to time.

Notwithstanding any conditions mentioned above the University reserves the right to change, alter, and amend any of the above clauses/conditions. In matters of fees for unforeseen issues / certificates/ endorsements the University may fix the amount subject to the existing fee structure or change it from time to time.

**Post-Examination Related Issues:** For all matters regarding post-examination Certifications - such as, issue of Convocation (Degree) Certificates, Duplicate Marks Cards, Provisional Pass Certificate (PPC), Name Correction, Consolidated Marks Cards, removal of NCL, Academic Transcript, verification of genuineness of Marks Cards and Certificates, and Processing Certificates - enquiries can be made directly at the Office of Registrar (Evaluation). Candidates are informed to contact, for any related information/clarifications, the Helpdesk at the O/o Registrar (Evaluation) by telephone and e-mail ID given the website.

## **G. REQUIREMENT OF LABORATORY SUPPORT & LIBRARY RESOURCES**

The Kuvempu University has well established laboratory space to meet the curriculum requirements of the programs.

A well established library facility shall be made available with the support of the university library. In the campus we have modern and well equipped building of library in Kuvempu University offers excellent infrastructure facilities in reading, browsing and reference to the students, teachers and research scholars. The library has kept pace with modernization by introducing CD ROM data base, internet and e-mail facilities. It is also a nodal centre for INFLIBNET, access is available to 10,000 + e-journals online under the UGC- infonet Consortia. There is a well developed digital library and campus network interconnecting all the Post-Graduate departments and offices in the campus.

Further, the DDE will made special effort to upgrade the existing DDE Library exclusively for distance learners with an emphasis on distribution of information and course material online by making use of the state-of-art information and communication technologies.

**Library Card:** Candidates who are desirous to avail themselves the facilities of Kuvempu University Main Library on the campus will be permitted. They have to obtain a separate Library / ID Card on payment of Rs. 100/- (through Challan of Electronic Transfer). However, no books will be issued to them.

## H. COST ESTIMATE OF THE PROGRAMME AND THE PROVISIONS

Cost Estimated of the Programme is based on following components  
– calculated for an admission of 100 Students:

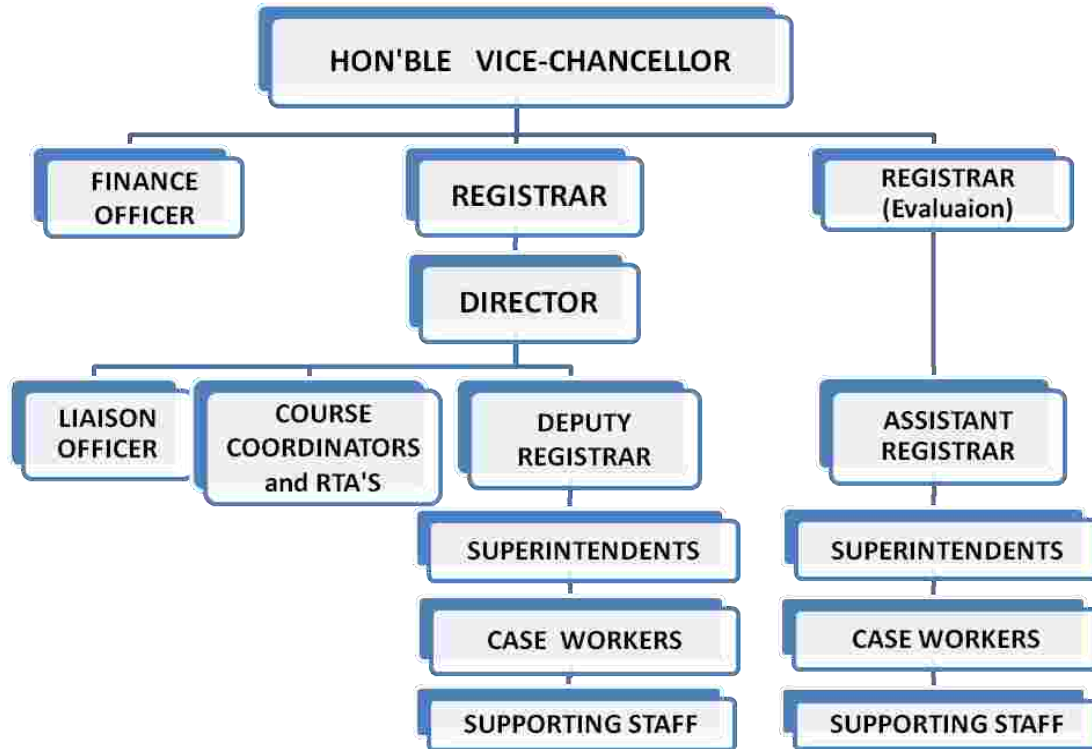
SN	Component	Estimate in Lakh Rs.
1	Study Material Development – Course Writer honorarium, Review vetting, editing, SLM conversion etc	4.48
2	Printing and Distribution of SLM	2.69
3	Publicity, Awareness Information Decimation Programmes*	0.07
4	Conduction of Counselling, Orientation/Face to Face/ Practical Sessions etc.	5.78
5	Student Support Services*	0.25
6	TA/DA Meeting Expenses*	0.13
7	Continuous Evaluation / IA	0.15
8	Examination and Certification	1.63
9	Office Automation/ICT/ Communication Related Infrastructure*	0.25
10	Library*	0.22
11	Staff Salaries/ Remunerations/ Other Honorariums – Teaching, Non-Teaching/Technical/Supporting*	0.78
12	Office Infrastructure*	0.20
13	Laboratory Development and Expenditures	0.46
14	Learner Centre Expenses*	0.17
15	Others – Office Contingence, Post/Courier, Vehicle Maintenance, Fee reimbursement and such others.*	0.34

Note: \* costs that will be incurred collectively for all the Programmes, but given here are the fractions of the total, considering 100 students admission to the Programme.

# I. QUALITY ASSURANCE MECHANISM AND EXPECTED PROGRAMME OUTCOMES

## (a) Organizational Structure, Management and Monitoring Mechanism

The Organizational Structure of the Kuvempu University Directorate of Distance Education (KUDDE) is given below in the form of flowchart.



For the administrative and policy decisions, and reviewing and monitoring of the ODL activities, Kuvempu University has a Monitoring Committee (MC) Chaired by the Honorable Vice-Chancellor. The Registrar, Registrar (Evaluation), Finance Officer, Deans of all the Faculties, Chief Librarian, One Syndicate Member, One Academic Council Member and the Regional Director of the IGNOU, are its members. The Director, DDE is the Organising Member. The operational plans, goals and policies are decided by the MC, and all the decisions and policy matters are placed before the Monitoring Committee before implementation. The Committee normally meets twice a year to review the ODL Programmes and activities.

Academic Advisory Committee (AAC) of the DDE will review the academic programme performance, content delivery mechanism. Issues regarding course content and syllabi revision of all the Programme offered in ODL mode are discussed and decided in AAC. The Registrar will be the Chairman of the AAC, and Registrar (Evaluation), Chairpersons of all BOSs of the concerned Departments will be the members. The Director/ Deputy Director of the DDE is the Organising Member.

All the major decisions including financial, planning and implementation which are discussed in the MC meeting are placed before the Syndicate of the University and after its approval they will come into force.

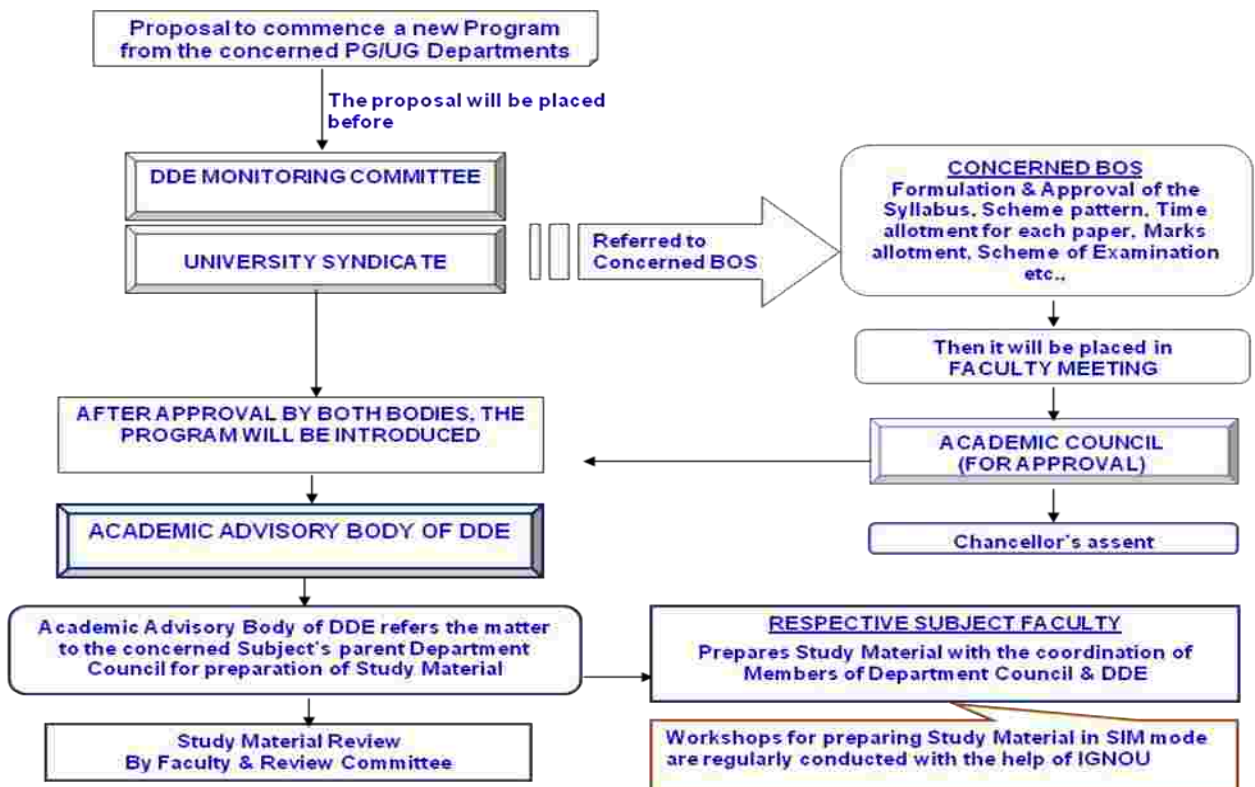
The decisions taken by the AAC are placed through the concerned bodies like, BOS/ Examination wing (for evaluation and certification issues) and finally placed before the Academic Council of the University for its approval.

For the internal quality assurance mechanism there is a Internal Quality Assurance Cell of the University.

**(b) Programme Development and Approval Processes.**

Proposal from the concerned PG/ UG department to commence a new Programme will be placed before Monitoring Committee of the DDE/ Syndicate. Then it will be referred to the BOS concerned for formulation and approval of the syllabus, programme structure, time allotment for each paper, marks allotment, scheme of examination etc., then it will be placed in the Faculty meeting and then Academic Council for its approval. After approval by both the bodies, the programme will be introduced. The Academic Advisory Body of DDE refers the matter to the concerned Subject's/ parent Department Council for preparation of Study Material. The concern subject Faculty will coordinate with the DDE and the Department Council, as he/ she is one of the member in it. Workshops for preparing Study Material in SLM mode are regularly conducted (with the help of IGNOU experts) and preparation of course material in SLM mode is in progress.

The various steps involved in programme development, approval and implementation are depicted in the flowchart given below.





## **(a) Programme Monitoring and Review**

As a part of the regular monitoring mechanism, feedback from the Learners is obtained at the end of each of the face-to-face programmes - both through discussion and through written feedback form. Feedback form includes mainly three aspects – about appropriateness/ usefulness of learning (study) materials, effectiveness of orientation/ face-to-face programmes and internal assessments/continuous assessment process. Learner can give their opinion, suggestions and complaints, if any, through the feedback form. Issues raised in feedback are addressed at appropriate level.

There is also Student Support Service and Grievance Cell in DDE in order to address the day-to-day issues faced by the Learners. The Research and Teaching Assistants at DDE and the Coordinator in the concerned the subjects are available for the learner support services. These apart, regular meetings of concerned faculty are conducted in order to plan the orientation and practical session's activity.

It is the policy of the KUDDE to make available the expert faculty of the PG Departments/ Colleges (for UG) and experts from the sister universities in the state who are regular faculty in the respective subjects for the ODL programmes. The same is followed for the Learner Support Centres (LSC). Programme delivery/academic activities at the LSC are also monitored from the Headquarter.

DDE is organizing Coordinators Meet every year wherein all the issues related to ODL programmes – academic, examination, learners related and administration are discussed and remedial measures are considered under the ODL framework of the university. During the Meet academic activities/learners' issues at the LSC are also reviewed.

**Program Outcomes:** The programme aims to cater learners to acquire and demonstrate competency in Environmental Science skills, making them Knowledgeable and competent to make a prospective career in Industry as well as in research in the area of Environmental Science.

### Detailed Syllabi of M.Sc. in Environmental Science Programme

#### FIRST YEAR

##### Course 1: Introduction to Ecology and Environment

**Unit 1.** Ecology: Introduction, Definition, Divisions, Applications and History of ecology.

**Unit 2.** Ecosystems: Introduction, Definition, Structure, Types, components, Functions, Energy flow, trophic levels, food chains, food web, Ecological pyramids, Productivity, Homeostasis and feedback mechanism.

**Unit 3.** Major ecosystems of the world: Introduction, Classification, Tundra, Alpine, coniferous forest, temperate forest, deciduous forest, tropical rain forest, desert, aquatic ecosystem; pond and Estuaries.

**Unit 4** Population Ecology: Introduction, Definition, Characteristics, density, natality, mortality, life table, age structure, population dispersal, concept of density dependent and independent action in population.

**Unit 5.** Community ecology: Introduction, Concepts, Characteristics, Structure, Classification, Composition, Succession; causes, trends, types and process. Ecological niche, Interspecific interaction; mutualism, commensalism, exploitation-predator prey relationships, Amensalism, Competition, Allelopathy.

**Unit 6.** Major aquatic ecosystems of the world: Introduction, Divisions, Physico-chemical characteristics of freshwater bodies, lentic and lotic ecosystem; characteristics, biotic communities, Marine ecosystem, physico-chemical characteristics of marine environment, zonation, stratification, marine communities, reservoir ecosystem, biotic communities of reservoir ecosystem.

**Unit 7.** Evolutionary Ecology: Introduction, Characteristics of Niche, microhabitat, diurnation, aspection, shelter and vegetation, Niche segregation, adaptations, Behaviour adjustments, inheritance, Interspecific competition, Competitive exclusion principle, species diversity, non heritable variations, polymorphism, genetic drift, mutations, cultural evolution.

##### **COURSE- II: Biodiversity and Natural Resource Conservation and Management**

**Unit 1.** Introduction to Biodiversity and Conservation: definition, importance of Biodiversity, Biodiversity for sustainable development, Convention on Biological Diversity, Composition, Biodiversity Conservation; Centers of diversity, Mapping of Biological Resources for Conservation, In-situ conservation, Ex-situ Conservation, Biodiversity assessment; Biodiversity Assessment Project (BAP), Global biodiversity assessment project.

**Unit 2.** Characterization of Biodiversity: Ecological Diversity; Elements and Interactions, Ecological Processes, Ecological Dynamics, Genetic Diversity; Variation within Species, Problems of Genetic Uniformity, Understanding Genetic Diversity.

**Unit 3.** Magnitude and Loss of Bio diversity: Current Magnitude of Biodiversity, Loss of Biodiversity; the causes and processes of loss of biodiversity, Root Causes of Biodiversity Loss, Introduced species, Over-exploitation of plant and animal species, Pollution of soil, water, and atmosphere, Global climate change, Industrial agriculture and forestry, Extinction;

Mass Extinction Rates, Humanity's Contribution to Species Extinctions, Endemic Species, The Erosion of Biodiversity; Direct and Indirect Causes.

**Unit 4.** Impact of human activity on biodiversity: Habitat destruction, Over harvesting, Desertification, Environmental Pollution, Introductions of non-native (alien) species.

**Unit 5.** Biodiversity of selected Indian ecosystems: Wetland ecosystems, Forest Ecosystems, Marine Environment, Species Diversity; Endemic Species; List of Endemic species, Threatened Species, Protected Areas Network; Development and History, Protected Areas of the Western Ghats, International Programmes and Conventions, Convention on International Trade in Endangered Species (CITES), World Heritage Convention, Convention on Biological Diversity, Ramsar (Wetlands) Convention.

**Unit 6.** Natural Resources conservation and Management: natural resources, definition, classification of natural resources, conservation and management of natural resources, land use and abuse, rural land use planning, urban land use planning, management of land water requirements and uses, problems and management of water, future needs and alternate sources of water, Agriculture, forestry, Importance of forests, depletion of forests, management of forests range land, Important of range land, depletion and degradation of range land management. Wild life: Importance of wild life, Abuse and depletion of wildlife, wildlife management minerals and their characteristics, development and conservation of minerals, efforts to conserve mineral resources, conventional and exhaustible energy sources, non-conventional inexhaustible energy sources conservation of energy.

**Unit 7.** Alternative sources of energy: Energy situation in India, Renewable sources of energy solar energy, use of solar energy for electricity production, utilization of solar energy in India, utilization of solar energy for various purposes, biomass and biogas uses of biogas wind energy, utilization of wind energy in India, uses of wind energy limitations of wind energy from the sea, wave energy, tidal energy, ocean thermal energy conversion Geothermal Energy, nuclear energy.

### **Course- III : Occupational Health Hazard, Control and Management**

**Unit 1.** Basic principles of environmental health-physiological responses of man to environmental stresses-causes and effects of pollution.

**Unit 2.** Principles of occupational health, the relationship between occupation, hygiene, safety and diseases- occupational limit, hazards and safeguards.

**Unit 3.** Industrial hygiene, importance and maintenance, polices and acts for workers well being.

**Unit 4.** Health and safety at work: Dust pollutants, Asbestos, Metals, gas and Vapour pollutants, Biological agents, Tobacco Smoke, Mechanical and electrical hazards, Health and safety at work.

**Unit 5.** Food poisoning and food hygiene: Introduction to microorganisms, Types of food poisoning, Bacterial food poisoning. Surveillance of food-born infectious and intoxication. Sources and routes of contamination. Susceptible foods. Personal hygiene. Purchase and storage of food, preparation, cooking and serving. Design and construction of food premises. Selection and care of equipment, cleaning, disinfection and sterilization.

**Unit 6.** Communicable diseases: Introduction, Viruses, Bacteria, Rickettsiae, Chlamydiae, Eumycetes, Protozoa, Sources of infection, means of disease production, means of control of disease, Diseases of public health significance, Epidemiology.

**Unit 7.** Radiation and health: Introduction, Definitions, The nucleus, Stability and instability, Measurement, Nuclear power, Radioactive waste disposal, Biological effects of radiation, Radiation effects and their monitoring.

## **Course – IV: Environmental Education, Environmental Policy and Legislation**

**Unit 1.** Environment and development, Importance of Environmental Education, Meaning and Scope, Aspects of Environmental Education, Importance of Environmental education, Background and Principles, Educational Principles, Objectives of Environmental Education, Cognitive, Affective, Psychomotor, The goals of environmental education, Recommendations concerning Environmental Education, Recommendations on Formal Education needs , School Level, University Level, Mass Media, Role of NGO, Strategies at National, Regional and International Levels.

**Unit 2.** Introduction, Aims of Environmental management, Indian concern for Environmental management, Environmental problems in India, Key Concepts of Environmental Management, Environment management concepts, Philosophical, Ethical and Technical Principles of Ethical Management, Characteristics of Environmental Management, Some Environment Management Approaches, Standard setting, Environmental legislation and punitive control, Economic policies, Environmental Organization, Information exchange and surveillance, Environmental baseline, reconnaissance of impact and studies, Environmental Impact Assessment, Environmental education.

**Unit 3.** Determinants of priorities in the framework of environmental management, Environmental components, Environmental priorities, Importance of environmental management, Neglect of environmental management, Management of environmental education, Interpretation of objectives, Planning, Organizing, Staffing, Directing, Coordination, Reporting, Budgeting, Environmental management education : an India experience, Environmental Management and International security, Emerging Perceptions, Policy Options.

**Unit 4.** Environmental Legislations in India, Wildlife Protection Act, 1972 amended 1991, Forest (Conservation) Act, 1980, The Air (Prevention And Control of Pollution) Act, 1981, The Air (Prevention And Control of Pollution) Rules, 1982, The Motor Vehicles Act, 1988, Water (Prevention and Control of Pollution) Act, 1974, The Environment (Protection) Act, 1986.

**Unit 5.** Introduction, The Scheme, The specific objectives of the scheme, Mechanism of the scheme, How to obtain the licence to use Ecomark, Fees, The Public Liability Insurance Act, 1991, The Public Liability Insurance Rules, 1991.

**Unit 6.** Need for Environmental laws, Environmental Laws, Why and What for, Indian perspective, Global issues, Indian constitution and Environment, Pre British, British and Post British, Govt. environmental policies and legislative frame work in the country, Constitutional and Legislative Provisions, Governmental responses to Environmental concerns, National committee on Environmental planning (NCEP), Environmental awareness at Stockholm and Earth summit, Declaration of the United Nations Conference on the Human Environment (Stockholm conference), The Earth Summit.

**Unit 7.** Role of Indian judiciary in the protection of environment, The Important Case studies, The Bhopal Case, The Bhopal Act Judgement, The Shriram gas leak case, The Narmada Valley Project, The Tehri Dam Project, Mr. Salman Khan & the Black buck, Navin

Chemicals Manufacturing and Trading Company Ltd. v/s New Okhla Industrial Development Authority, Chaitanya Pulversing Industry v/s KSPCB, M.C. Mehta v/s Union of India, Administrative agencies of environmental protection , Implementation problems: lack of infrastructure, political will, vested interests, apathy and ignorance, Lack of public participation of environmental protection.

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## **PRACTICAL – I : Practical based on theory Course I & Course II**

### **Biological Aspects of Environment.**

1. Ecological adaptations-
  - a. Study of hydrophytes
  - b. Study of Xerophytes
  - c. Study of Epiphytes
  - d. Study of Mesophytes
2. Community studies using quadrates.
3. Study of common weeds and pests.

### **Bio-indicators in Water Bodies**

4. Identification and diversity study of Plankton in the pond and lake water bodies.

<b>i) Phytoplankton</b>	<b>ii) Zooplankton</b>
<ol style="list-style-type: none"><li>a. Chlorococcales</li><li>b. Diatoms</li><li>c. Desmids</li><li>d. Blue green algae</li></ol>	<ol style="list-style-type: none"><li>a. Crustaceans</li><li>b. Protozoans.</li><li>c. Cladocerans</li></ol>

5. Estimation of Dissolved oxygen in the given water samples.
6. Estimation of Biological oxygen demand in the given water samples.
7. Estimation of Chemical oxygen demand, in the given water samples.
8. Estimation of Organic matter of the in the given water samples.
9. Estimation of free-carbon dioxide in the given water samples.
10. Bacterial examination of Drinking Water – E. Coli and MPN test.

## **PRACTICAL – II : Practical based on theory Course III & Course IV**

1. Sampling techniques for water.

### **Water analysis**

#### **Physical parameters.**

2. Determination of colour, turbidity in the water samples by Nephelo-turbidity method.
3. Estimation of pH, Electrical conductivity and total dissolved solids in the water samples.

#### **Chemical analysis of water by Titrimetric methods**

4. Estimation of Calcium in the given water samples.

5. Estimation of Magnesium in the given water samples.
6. Estimation of Total hardness in the given water samples.
7. Estimation of Total alkalinity in the given water samples.
8. Estimation of Acidity in the given water samples.
9. Estimation of Chloride in the given water samples.

#### **Spectrophotometric methods**

10. Estimation of Sulphate in the given water samples.
11. Estimation of Phosphate in the given water samples.
12. Estimation of Nitrate and Nitrite in the given water samples.
13. Estimation of Iron in the given water samples.
14. Estimation of Fluoride in the given water samples.

## **SECOND YEAR**

### **Course-V: Environmental Pollution and Monitoring**

**Unit 1. Air Pollution:** Sources of major air pollutants (SO<sub>2</sub>, NO<sub>2</sub>, O<sub>3</sub>, Co and HF); Chemistry of secondary pollutants; Air pollution and meteorology; Photochemical smog and acid rain; Indoor Air Pollution; Effect of gaseous air pollutants on plants; Effect of gaseous air pollutants on animals; Air pollution tolerance index; Air quality standards.

**Unit 2. Water Pollution:** Sources of water pollution; Classification of water pollutants; Water quality standards; Water pollution control; Ganga action plan; Marine pollution.

**Unit 3. Soil Pollution:** Sources of soil pollution; Heavy metals : sources and effect on biological systems; Pesticides : sources and effect on biological systems; Detrimental effects of soil pollutants on soil micro biota : Soil pollution control.

**Unit 4. Radioactive Pollution:** Sources and classification of Radioactive pollutants; Effect of radioactive pollution on biological system.

**Unit 5. Noise Pollution: Sources and measurement of noise pollution; Noise exposure levels and standards; Noise pollution control and abatement measures.**

**Unit 6. Principles of Air Monitoring :** Air sampling methods; Air sampling instruments and sampling operations; Site selection and sampling periods ; Stack sampling.

**Unit 7. Principles of Water Quality Monitoring :** Methods of water sampling; Water sampling instruments; Physicochemical analysis of water; Bacteriological sampling and analysis of water quality; Site selection and methods of soil sampling; Physicochemical analysis of soil Bacteriological analysis of soil.

### **Course-VI : Environmental Toxicology and Bio Statistics**

**Unit 1. General Aspects of Toxicology:** Concepts of dose-response relationship; Chronic toxicity Short-term lethality and acute toxicity; Median tolerance limit; Risk assessment; Toxicity testing: Holistic and numeric approach; Drug toxicity and drug abuse; Metal toxicity in animals; Teratogenicity and carcinogenicity; Practical problems in toxicity testing.

**Unit 2. Uptake of toxic substance by animals:** Accumulation and chemical localization of toxic substances by animals; Detoxification and excretion of toxic substances by animals; Metabolism of toxic substances by animals

**Unit 3. Toxic effects of pollution on terrestrial animals;** Toxic effects of pollutants on aquatic animals; Effect of pollutants on plants communities; Effect of pollutants on plankton and microorganisms; Chemical hazard assessment and communication.

**Unit 4. Environmental factors in human health;** Disease causing infectious organisms (virus, bacteria and parasites), teratogens and mutagens; Detailed account of AIDS and sexually transmitted diseases (STD); Causes and consequences of hazardous wastes in soil, water and air with respect to human health; Environmental health management.

**Unit 5.** Introduction to Biostatistics, scope, limitations of statistics and statistical method V/s Experimental method. Collection of data: Sampling and sampling designs, classification and tabulation, Diagrammatic and graphic presentation of data.

**Unit 6. Descriptive statistics** – Introduction, measure of central location, mean, mode, Median, measure of shapes. Properties of mean, measure of spread, variance and standard deviation, co-efficient of variation and matrices. Probability; concept, laws, discrete probability distributions.

**Unit 7. Distributions:** Binomial poison and normal distribution.  $X^2$ , t, and F distribution. Function of cumulative distribution.

## **Course-VII: Environmental Engineering and Biotechnology**

**Unit 1. Waste water treatment:** Small scale sewage treatment (Septic tanks and Cesspools); Waste water treatment: Large scale sewage treatment (Primary, Secondary and Tertiary treatments).

**Unit 2. Waste water treatment models;** Ground water remediation; Water softening; Water demineralization; Desalination; Ion-exchange and reverse osmosis; Disinfection of water Ozonation and chemosterilization of water.

**Unit 3. Improvement of air quality-** basic principles; Particulate removal- use of air filters and negative ion generators; Control of gaseous pollutants; Biofiltration; Indoor air quality control; Basic principles of solar energy utilization; Solar energy collectors; Concept of solar passive houses; Solar desalination; Solar greenhouse technology.

**Unit 4. Vermiculture technology;** Wastes as a source of microorganisms; organic compost and process of composting; Factors affecting the process of composting; Microbes in biogas production; Microbes in hydrogen and hydrocarbon production.

**Unit 5. Biodegradation of petroleum** (hydrocarbon); Microbial degradation of xenobiotics; Microorganisms in abatement of heavy metal pollution; Aeromicrobiology : Aeroallergens and aeroallergy; Microbial pathogens in human health: Causes, control and rehabilitation strategies.

**Unit 6. Environmental biotechnology:** Scope and applications; Concepts of cleaner technology; General principles, tools and techniques of biotechnology; Application of plant tissue culture technology for micropropagation of stress tolerant plants; Application of immunofiltration, immuno precipitation and DNA probing methods for detection of microbial pathogens in aquatic environment.

**Unit 7. Microbes and their genetic engineering for degradation of pollutants;** Application of microbes as biofertilizer; Application of microbes as biopesticides; Microbes in biomining, biohydrometallurgy and biomineralization; Principles and applications of biosensors for



detection of pollutants; Anaerobic biotechnology for sustainable waste treatment; Oil spills: Causes and recovery; Use of super bugs for removal of oil spills.

## **Course-VIII: Global Environmental Changes, Natural Hazards and Impact Assessment**

**Unit 1. Global warming:** Basic principles of green house effect; Causes and consequences of global warming; Global warming potential of green house gases; Realized and effective warming; Climatic feedback mechanisms.

**Unit 2. Evolution of stratospheric ozone layer;** Stratospheric ozone depletion- causes and consequences; Theories and mechanism of ozone depletion; Impact of ozone depletion on plants, animals and man kind; Global efforts for abatement measures.

**Unit 3.**Earthquakes; Desertification; Tropical cyclones and western disturbances; Volcanoes; Fire and famines; Floods and storms; El Nino; Prediction and perceptions of natural hazards; Management of natural hazards; Disaster management.

**Unit 4.** Pollution threat to Taj Mahal; Bhopal Gas tragedy; Chernobyl accident; Pollution of Ganges; Tehri dam, Narmada dam.

**Unit 5. Environmental impact assessment:** Basic concepts and significance; Impact assessment methodologies; EIA guidelines-1994; Environmental risk assessment.

**Unit 6.** Procedure for reviewing environmental impact analysis; Environmental impact statement; Prediction and assessment of impact on air environment ; Prediction and assessment of impact on water environment; Prediction and assessment of impact on noise environment; Prediction and assessment of impact on biological environment; Prediction and assessment of impact on cultural and socio-economic environment Eco-tourism; Restoration and rehabilitation technologies

**Unit 7.** Environmental impact of traditional and modern agricultural systems; Environmental impact of tourism; Introduction to environmental planning; Land use policy for India; Environmental priorities in India and sustainable development; Environmental economics : Cost- benefit analysis; Guidelines for environmental audit; Urban and rural planning in India and land use pattern.

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### **Practical III: Practical based on theory Course V & Course VI**

#### **Soil Analysis**

1. Determination of pH in the soil samples.
2. Estimation of Chloride content in the given soil samples.
3. Estimation of Alkalinity in the given Soil samples.
4. Determination of organic matter in the given soil samples.

#### **Toxic metal analysis**

5. Estimation of Barium in the given samples
6. Estimation of Cadmium in the given samples.
7. Estimation of Copper in the samples.
8. Estimation of Nickel in the given samples.

#### **Toxicity causing plants**

Castor bean (*Ricinus communis*)  
 Lantana (*Lantana camara*)  
 Vinca sp.  
 Chrysanthemum sp.  
 Coffee plant (*Coffea arabica*)  
 Agave sp.  
 Anthurium sp.  
 Ficus sp.  
 Castor bean  
 Parthenium  
 Jatropha  
 Nerium

#### **Toxic Animals**

Ant  
 Bee  
 Wasp  
 Scorpion  
 Scalopendra (Millipede)  
 Sea anemone  
 Spider

#### **Biostatistics**

1. Tabulation of the given data
  - a. Semi textual
  - b. Tabular form
2. Graphical presentation of the given data
  - a. Line graph
  - b. Bar chart
  - c. Area graph
  - d. Pie chart
3. Calculation of Arithmetic mean and Standard Deviation.
4. Calculation of Geometric mean.
5. Construction of Bivariate frequency table.
6. Calculation of Mode in a discrete series.

- 7 Calculation of Coefficient of variation for the given data.
- 8 Calculation of Standard error for the given data.

## **Practical IV: Practical based on theory Course VII & Course VIII**

### **Solid waste management**

1. Solid waste management – collection and physico- chemical analysis of solid wastes.
2. Characterization of wastes.
3. Determination of density of solid waste.
4. Preparation of solid waste leachate.
5. Estimation of Chloride in the given solid waste leachate
6. Estimation of Phosphate in the solid waste leachate by using spectrophotometer.
7. Estimation of Residual Chlorine in the given water samples.
8. Determination of quantity of settleable solids in the given water samples
9. Estimation of Hydrogen Sulphide in the given water pollution.

#### **Comment on**

Earthquakes  
 Volcanoes  
 Ozone hole  
 Greenhouse effect/global warming  
 Elnino  
 Floods  
 Forest fire  
 Cost- benefit analysis  
 EIA Case studies  
 Oil spills  
 Bio-fertilizers  
 Ganga Action Plan  
 Bhopal gas Tragedy  
 Chernobyl disaster

#### **Treatment units**

High volume air sampler  
 Electrostatic precipitators  
 Cyclone collectors  
 Oxidation ponds  
 Activated sludge process  
 Trickling filter  
 Septic tanks  
 Imhoff tank  
 Grit chamber  
 Jar's Apparatus  
 Rapid sand gravity filter

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