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UNIVERSITY OF MUMBAI
No.UG/ 338 of 2006.

CIRCULAR :-

The Heads/Directors, recognized Institutions under Faculty of Science and the Principals of the affiliated colleges in Science are hereby informed that the recommendation made by the Dean of Faculty of Science has been accepted by the Academic Council at its meeting held on 7th June, 2006 **vide** item No. 4.12 and subsequently approved by the Management Council at its meeting held on 16th June, 2006 **vide** item No.13 and that in accordance therewith the Diploma in Environmental Technology under the Faculty of Science is instituted by the University from the academic year 2006-2007.

Further that in exercise of the powers conferred upon the Management Council under Section 54(1) and Section 55(1) of the Maharashtra Universities Act 1994. it has made the Ordinances 5650 and 5651 and Regulations 5520, 5521, 5522, 5523, 5524, 5525, 5526, 5527, 5528, 5529, 5530, 5531 and 5532 including syllabus relating to Diploma in Environmental Technology under the Faculty of Science is passed as per Appendix and that the same has been brought into force with effect from the academic year 2006-2007.

MUMBAI-400 032
28th August, 2006

Malekar
for REGISTRAR

To,

The Director/Heads, recognized Institutions under Faculty of Science and the Principals of the affiliated colleges in Science.

A.C/4.12/07.06.2006
M.C.13/16.06.2006

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No.UG/ 338-A of 2006, MUMBAI-400 032 28th August, 2006

Copy forwarded with compliments to the Dean, Faculty of Science, for information

Malekar
for REGISTRAR

...2/-

Enclosure to Item No. 4.12

7.6.06

UNIVERSITY OF MUMBAI

ORDINANCES, REGULATIONS AND SYLLABUS FOR DIPLOMA COURSE IN ENVIRONMENTAL TECHNOLOGY

(With effect from the academic year 2006-2007)

University of Mumbai

ORDIANCES, REGULATIONS AND SYLLABUS FOR

Diploma in Environmental Technology

(Facuity of Science)

5651

O .... **Title : Diploma in Environmental Technology : Dip. Env. Tech.**

5651

O ..... **Eligibility :** The following candidates are eligible for admission

A degree in an appropriate subject (Botany, Zoology, Microbiology, Biochemistry, Biotechnology, Biological Science, Chemistry, Environmental Science, Geology and Physics of the University of Mumbai or equivalent degree from any other University/Institute/autonomous college

5520

R. ... **Duration :** The duration of the course is 2 semesters.

5521

R..... **Intake capacity : 30**

5522

R ..... **Structure of course**

3.3. Course Content

3.3.1 Two-semester course (full time)

Semester	Core subjects	Elective subjects	Contact hours per subject	Credits per subject	Total contact hours	Total Credits
I	3 and 1 Laboratory	-	30	2	120	8
II	2 and 1 laboratory	1	30	2	120	8

A minimum of 16 credits are required for consideration of the class or GPA. The students may take more electives to increase their knowledge and the additional credits will be mentioned in their certificates.

5523

R .....Grade Point Average

The University has introduced a 4-point grade scale for Dip. Ind. Tox. The overall GPA includes both institutional and transfer work. The students performance will be monitored continuously through quiz/assignment/ participation in class discussions/attendance and the end-term semester examination for all theory and practicals. The weightage will be 50 % for continuous evaluation and 50 % for the end-term examination.

For each of the grades below, the grade carries quality point weights.

Grade	**Marks out of 100**	**Quality Points**
A+ -Outstanding	90-100	4
A - Excellent	80-89	3.75
B+-Very good	70-79	3.5
B-Good	60-69	3
C-Satisfactory	51-59	2
D-Passing	50	1
F-Failure	49 or less	0
WF-Withdrew Failing		0

Grade Point Averages are calculated at the end of each term after grades have been processed and after any grade has been updated or changed. Individual assignments/quiz/surprise tests are all based on the same criterion as given above. The instructor should convert his marking into the quality points.

5524

R.... **How to Calculate a GPA**

The Grade Point Average (GPA) is calculated by dividing the number of hours scheduled in all subjects attempted in which a grade of A, B, C, D, F or WF has been received into the number of quality points earned on those hours scheduled.

For example, a student had the following schedule. The tutor determines the total number of quality points and the GPA as given below:

Subject-Hours-Grade	Quality Points for the subject
Subject I-3-A	3*4=12
Subject II-4-C	4*2=8
Subject III-3-B	3*3=9
Subject IV-1-A	1*4=4
Subject V-3-B	3*3=9
Total Hours = 14	Total Quality Points = 42

Sum of Quality Points / Total Number of Hours = GPA = 42 / 14 = 3.0 .	The student gets B grade.

5525

R .....Repeated Subject work

If a student repeats a subject, only the grade of the most recent attempt of the subject will used for the purpose of calculating the GPA. This is true even if the second attempt is lower than previous attempts. On the student's transcript previous attempts are marked with an 'E' to indicate the "Earlier" grades are included in the from GPA calculations.

5526

R... Cumulative Grade Point Average

Each Semester Grade Point Average is calculated by dividing the total of product of grade point and subject credit by sum of all subject credits as given above. This gives the aggregate performance of student in each semester. A similar measure calculated cumulatively gives Cumulative Grade Point Average (CGPA) giving the aggregate performance of student up to that semester.

$$CGPA = \frac{\sum_{i}^{N} C_i . GP_i}{\sum_{i}^{N} C_i}$$

- N is the number of subjects,
- C_i is credits for the i^{th} subject,
- GP_i is grade points for the i^{th} subject, and,
- $CGPA$ is the cumulative grade point average.

In all cases where selection is to be done -award of prizes/placement etc., selection is based on CGPA unless some other measure is advocated under the conditions of the award. A student gets rigorous academic input here over the curriculum. The University expects absolute academic honesty from all the students. In the exams/assignments/ tutorials/project a students must report his/her own work/ analysis and conclusions. Whenever he/she uses other's work he/she must give proper citation references. An honest mediocre work with your best efforts is tolerated rather than reporting stolen work of someone that is plain academic plagiarism. Academic dishonesty /adoption of unfair means in examinations/ assignments/ class tests etc. will attract severe punishment including expulsion from the course.

5527

R. .....Every candidate registered for the Dip. Tox. shall be required to pass a theory examination which will be held in two parts: Part I – to be hereinafter referred to as Semester I and Semester II examinations. The Semester I will be normally of 15 weeks classroom teaching/lectures duration and the examination for this semester will be held during/after 16th week after the commencement of Semester I. Semester II will also be normally of 15 weeks classroom teaching/lectures duration and the examination for this semester will be held during/after 16th week after the commencement of Semester II:

5528

R.... Electives

At the beginning of the second semester, the Head will notify to the candidates a subject or subjects of Electives, in the first week of commencement of the semester, and if the number of subjects so notified is more than one, then every candidate registered for the degree will have to notify to the Head in writing the subject which the candidate desires to offer for the semester examination under the subject head "Elective", from among the subjects notified by the Head . A comprehensive list of elective subjects is provided. If the candidate fails to pass in the subject of Elective, the candidate will have to select a fresh Elective subject from amongst the subjects notified by the Head in that year for subsequent examination.

552'

R..... No candidate will be admitted to the Semester I examination unless he produces a satisfactory testimonial of having passed the qualifying examination referred to in O..... , having kept one term, to the satisfaction of the Head of the Institute/Department. To be eligible for admission to the Semester II examination, a candidate must have kept two terms to the satisfaction of the Head.

553C

R..... Successful candidate shall be awarded the combined GPA in the final degree certificate jointly on the basis of the results of the Semester I and Semester II examinations.

5531

R..... The syllabus of the course for Semester I and Semester II examinations is laid down as follows:

Semester I – Each subject is 2 credits and 30 hours contact

1. Survey of Environmental Technology

A history of Environmental Technology will be presented with emphasis on the current applications of the best available technology for industries and municipalities. The diverse environmental career opportunities should be presented through field trips

2. Quantitative Methods for Environmental Analysis (Laboratory)

. Designed for environmental technology students. Emphasis is on mathematical skills essential in scientific applications. Mathematical and statistical skills using a scientific calculator and computer will be used to assess current environmental data sets. Conclusions will be drawn based on these data assessments.

3. Occupational Health and Safety

This course covers the Occupational Health and Safety Act (OSHA); accident recording and investigation; safety programming and system safety; personal protective equipment; confined space, fire protection in a work environment, pertinent environmental legislation and HAZWOPER (Hazardous Waste Operations and Emergency Response) and 40-hour OSHA training. *Prerequisite: None / 3 credits.* Offered in the Spring and Summer.

4. Environmental Chemistry

Discussion and study of the relationship between chemistry and contemporary environmental topics, including energy and the environment, air, soil, oil, solid and water pollution, agricultural chemistry.

Semester – II (Each subject 50 marks, 2 credits and 30 hour contact)

1. Introduction to Environmental Science

A study of environmental interactions, including population and cultural problems, resource utilization, and impacts upon biotic systems. Contemporary environmental problems and the application of science to their solution, Biology, natural history and conservation of marine mammals. Toxicology to marine species by industrial waste, mechanisms of toxicity.

2. Wastewater Treatment Plant Operation

Specific processes, problem-solving and operations in municipal wastewater treatment plants. Students are taught the operating parameters, data collection and analysis; the decision-making and process control of complex biological systems; and maintenance fundamentals.

3. Environmental Instrumentation

A variety of analytical techniques and instruments utilized in environmental chemical analysis. It is designed to couple theory of equipment operation with a basic understanding of the chemical principles involved. The laboratory time is divided between practical hands-on benchwork and field experiences.

Elective

One of the following electives should be taken

a) The Process of Environmental Management and Decision Making

An introduction into the process of environmental management and decision-making. This course will incorporate a modular approach in instructing students on issues of environmental protection throughout Cape Cod. Students will develop an understanding of the following environmental topics: natural resource protection, focusing on wetlands, habitat, land-use planning and conservation; watershed management and remediation, focusing on wastewater, water supply and storm water issues; environmental, health and safety, focusing on prevention, compliance and environmental mediation; zoning issues that affect all of the above.

b) **Physical Oceanography and Coastal Structures**

A study of the morphology, structure, origins and geology of ocean basins and continental margins, as well as the physical properties of sea water, including light and sound, heat budget, oceanic circulation, tides, waves and currents. Special emphasis will be placed on oceanographic research methods and technologies and on port, coastal and offshore structures, and the impacts of oceanic conditions upon those marine structures.

c) **Coastal Zone Management Laws and Regulations**

This introductory course will cover the issues and regulations related to the coastal environment and its resources. The course will use an interdisciplinary approach that will combine the scientific issues with their economic and social impact. Topics include fisheries management, aquaculture, coastal pollution, marine sanctuaries, wetland laws, marine mammal protection, coastal flooding and erosion, and sustainable development. Current research in these and related areas will also be examined.

d) **Introduction to Water: Concepts and Technologies**

A study of the physical and chemical properties, human uses, hydrology and ecology of groundwater, marine, estuarine, standing and flowing water systems, focusing on the science of current water-related issues and the methods and technologies used in their solution. The basic concepts of water quality monitoring, water supply, and wastewater technologies will be emphasized.

e) **Industrial Wastewater Treatment**

An overview of the basic concepts of physical and chemical treatment, the function of related equipment and support systems and the environmental responsibilities required to safely and properly operate, maintain and manage an industrial wastewater treatment facility. This course will cover typical industrial wastewater treatment processes; their purpose, their function, and their safe and efficient operation

f) **Water Supply**

A study of the principles and practice of water supply. This course will provide an introduction to the physical and chemical principles of drinking water supply, the functioning of related equipment and support systems, and the responsibilities required to safely operate and maintain a water supply system.

g) **Air Pollution Issues**

This course will introduce the concepts and terms essential to understanding the issues behind the need for air pollution control. Basic atmospheric processes will be presented as they affect delivery and dispersion of pollutants. The health effects of various pollutants and air toxics will be presented in order to understand the purpose of regulations. The increasing concerns regarding indoor air quality will be presented along with approaches to investigation and control.

h) Hazardous Waste Management

Determination, treatment and reduction of hazardous wastes and the federal regulations regarding handling of hazardous wastes, the risks to society from hazardous wastes, and treatment techniques employed to mitigate their effects. The techniques covered include thermal, physico-chemical, biological and landfill disposal as well as the ways and means of reducing the generation of hazardous wastes.

I) **Renewable Energy Sources**

An overview of renewable energies, including solar energy, wind power, hydropower, biomass, hydrogen and fuel cells. Students will learn the basic principles of each technology for new and existing construction. They will study government regulations, analyze renewable energy systems, calculate savings, backup energy, and financing options. They will investigate the potentials of renewable energy technologies to help solve environmental and economic problems with society.

j) Energy Efficiency and Conservation Methods

To identify and explain all of the energy efficiency/conservation methods available for energy use reduction. Energy-consuming facilities, both domestic and commercial, will be analyzed by the students for energy efficiency opportunities. The student shall calculate energy savings and environmental impacts for most energy efficiency methods in order to identify and assess energy conservation opportunities. In addition, the student shall demonstrate the appropriate usage of energy monitoring and measuring equipment commonly used by energy specialists and energy auditors.

Reference Books

1. Gwendolyn Burke, Ben Ramnarine Singh, Louis Theodore, Handbook of Environmental Management and Technology,
2. Thomas T. Shen, Industrial Pollution Prevention (Environmental Engineering), Springer.
3. Gary S. Moore, Living with the Earth: Concepts in Environmental Health Science, Lewis Publishers.
4. George Tchobanoglous " Metcalf & Eddy's Wastewater Engineering: Treatment and Reuse" McGraw-Hill.
5. Peirce, J. Jeffrey , Weiner, Ruth F. and Weiner, Ruth," Environmental Pollution and Control," Butterworth-Heinemann.
6. T. Matsuo, K. Hanaki, S. Takizawa, and H. Satoh, "Advances in Water And Wastewater Treatment Technology", Elsevier.
7. Ruth Weiner and Robin Matthews, "Environmental Engineering", Elsevier.
8. Daniel Vallero, "Engineering The Risks Of Hazardous Wastes", Elsevier.
9. R. Gavasci and S. Zandaryaa, Environmental Engineering And Renewable Energy, Elsevier
10. Nicholas P. Cheremisinoff, "Environmental Technologies Handbook",
11. R. Wane Schneiter, Myron Sveum," Environmental Engineering Solved Problems",

R.5532 **FEE STRUCTURE**

Tuition Fees Rs. 10,000/- p.a. for both semesters

Examination Fee per Semester : Rs. 2000/-

Number of students : 30

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