UNIVERSITY OF MUMBAI
No.UG./ 257 of 2006

CIRCULAR :-

The Principals of the affiliated colleges in Science are hereby informed that the recommendation made by the Dean of the faculty of Science has been accepted by the Academic Council at its meeting held on 7th June, 2006 vide item No.4.7 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 Industrial Toxicology course under the Faculty of Science is instituted by the University from the academic year 2006-2007.

Further that in exercise of powers conferred upon Management Council under Section 54(1) and Section 55(1) of the Maharashtra Universities Act 1994, it has made the Ordinances 5634and 5635 and Regulations 5443, 5444, 5445, 5446, 5447, 5448, 5449, 5450, 5451, 5452, 5453, 5454 and 5455 including syllabus relating to the Diploma in Industrial Toxicology Course is passed as per **Appendix** and that the same has been brought into force with effect from the academic year 2006-2007.

Further that the eligibility criteria for the admission to Diploma in Industrial Toxicology Course as Bachelor of Science in different subjects, the Diploma in Industrial Toxicology Course is called as Post-Graduate Course

MUMBAI-400 032

17th July, 2006

for REGISTRAR.

To,

The Principals of the affiliated colleges in Science

AC/4.7/7.06.06
MC/13/16.06.06

No.UG/ 257-A of 2006, MUMBAI-400032 17th July 2006

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Science

for REGISTRAR

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Personal Assistants to the Vice-Chancellar, the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative, Ratnagiri for information. The Offg. Controller of examinations (10 copies), the Finance and Accounts officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrollment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar, (PRO). The Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that no Separate Action Taken Report will be sent in this connection. The Assistant Registrar Constituent Colleges Unit (2 copies), BUCT (1 copy), the Deputy Accounts Unit V(1 copy), the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), the Superintendent, Post-Graduate Section (2 copies), the Superintendent, Thesis Section (2 copies)

Enclosure to Item No. 4.7
7/6/06

UNIVERSITY OF MUMBAI

ORDINANCES, REGULATIONS AND SYLLABUS FOR DIPLOMA COURSE IN INDUSTRIAL TOXICOLOGY

(With effect from the academic year 2006-2007)

University of Mumbai

ORDIANCES, REGULATIONS AND SYLLABUS FOR

Diploma in Industrial Toxicology

(Faculty of Science)

5634

O .... **Title : Diploma in Industrial Toxicology : Dip. Ind. Tox.**

5635

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

5443

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

5444

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

5445

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.

5446

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.

5447

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 =	The student gets B grade.
GPA = 42 / 14 = 3.0 .	

5448

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.

5449

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.

5450

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:

5451

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.

5452

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.

5453

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.

5454

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. Principles of Toxicology

Definition of the subject, basis concepts. Laws concerning the subject. Relationship between toxic substances and a human organism. General toxicology – toxicity, molecular and cellular toxicology, biotransformation of xenobiotics. Fundamentals and principles of toxicology including absorption, distribution, metabolism and excretion of toxic chemicals in mammalian systems. Discussion of molecular mechanisms, cellular targets, and biological consequences of exposure to toxic agents. Chemical carcinogenesis, mutagenesis, and teratogenesis; molecular mechanisms of toxic action. Regulatory toxicology and Risk Assessment.

2. Environmental Toxicology

Analysis of real problems involving toxic chemicals and the human food, air and water supplies, occupational exposures, and life styles. Formal problems will be considered by small groups of students and discussed by the class.

3. Industrial Toxicology

Analysis of responsibilities toxicologists have in industry, including product safety generating material safety, data sheets, animal testing, ecotoxicological testing, risk/hazard communication, and assisting industrial hygienists and occupational physicians; emphasis on interdisciplinary nature of industrial toxicology and communication skills.

4. Experimental Molecular Toxicology (Laboratory)

Techniques in mutagenesis research including DNA damage and repair in specific sequences and genes, in single cells and cell populations in microbial and mammalian systems, and in transgenic mice; method for screening and sequence analysis of mutations.

Semester II (Each subject is 2 credits and 30 hours contact)

1. Risk Assessment and Management

Analysis of the components of risk assessment used in regulatory toxicology: definition of hazard and hazard identification, dose-response modeling, exposure assessment, and risk characterization. Case studies in making risk associated with control measures, and policy decisions to limit expcsures. Discussion of risk perception and risk communication. Applications of risk assessment and management to the control of exposure to chemical carcinogens and to chemicals that induce hazards other than cancer. (Bosan)

2. Chemical Mutagenesis and Carcinogenesis

Molecular mechanisms in carcinogenesis; structure-activity relationships; DNA repair; multistage models; proto-oncogenes and oncogenes; experimental bases for mechanisms; mutagenicity and carcinogenicity testing

3. Experimental Design and Interpretation of Toxicology Studies (Laboratory)

Introduction to methods of structuring toxicology experiments and analyzing data including experimental design, data distributions, sample sizes, hypothesis testing, linear regression, analysis of variance, multiple comparison testing and non-parametric tests.

4. Elective

The one of following electives is required.

a) Neurotoxicology

The effects of various harmful chemicals upon nervous system function. Emphasis given to the molecular events underlying neurological damage and to the relation of such processes to basic mechanisms of neurobiology.

b) Target Organ Toxicology

Analysis of the responses occurring in individual organs of man and animals exposed to environmental chemicals at toxic levels; distinctive structural and functional features of ten organ systems are presented in terms of phenomena, mechanisms of action, and methods of study.

c) Advanced Toxicological Techniques

Discussion of basic principles involved and their implementation in analytical methods used in Toxicology research. Laboratory methods for the determination of toxicity of chemicals and techniques to determine the interaction of toxicants with biochemical and physiological processes.

d) Inhalation Toxicology

The principles and practice of laboratory inhalation toxicology. Topics include aerosols, gases, respiratory tract structure and function, lung defenses, aerosol deposition exposure techniques, characterization of exposure atmospheres, experimental designs, animal models, and regulations and guidelines.

e) Environmental Toxicology Seminar

Presentation and discussion of current research problems and issues by students, faculty, and guests, covering the broad research and policy areas of environmental toxicology

Books and Reading Material

1. E R Plunkett, Handbook of Industrial Toxicology, Chemical Publishing Company
2. Casarett and Doull's toxicology : the basic science of poisons. Klaassen, C.D., ed. 6th ed. McGraw-Hill, 2001 (ISBN: 0071347216)
3. Ellenhorn, M.J. Ellenhorn's Medical toxicology : Diagnosis and treatment of human poisoning. 2nd ed. Williams & Wilkens, 1997 (ISBN: 0683303872)
4. General & applied toxicology. Vol. 1 & 2. Ballantyne, B., et al., eds. 2nd ed. Macmillan Ltd., 2001 (ISBN: 0333696681)
5. Goldfank, L., et al. Goldfrank's Toxicologic Emergencies. 7th ed. McGraw-Hill, 2002 (ISBN: 0071360018)
6. Gosselin, R.E., et al. Clinical Toxicology of Commercial Products. 5th ed. Williams & Wilkins, 1984 (ISBN: 0683036327)
7. Grant, W.M., et al. Toxicology of the eye. 4th ed. Charles C Thomas, 1993 (ISBN: 0398051844)
8. Haddad, L.M., et al. Clinical management of poisoning and drug overdose. 3rd ed. Saunders, 1998
9. Hamilton and Hardy's Industrial Toxicology. Harbison, R.D., ed. 5th ed. Mosby, 1998 (ISBN: 0815141815)
10. Hazardous materials toxicology : clinical principles of environmental health. Sullivan, J.B., Jr., et al, eds. Williams & Wilkins, 1992 (ISBN: 0683080253)

11. Industrial Toxicology : Safety and Health Applications in the Workplace. Williams, P.L., et al, eds. John Wiley & Sons, 1989 (ISBN 047128887X)
12. Lewis, R.J., Sr. Hazardous chemicals desk reference. 5th ed. John Wiley & Sons, 2002 (ISBN: 0471441651)
13. Patty's Industrial Hygiene and Toxicology. 5th ed. John Wiley & Sons, 2001 (ISBN: 0471319457)

R.....5455.....**FEE STRUCTURE**

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

Examination Fee per Semester : Rs. 2000/-

Number of students for Dip. Ind. Tox. : 30

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