

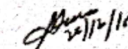


UNIVERSITY OF MUMBAI
No. UG/210 of 2016-17

CIRCULAR:-

The Principals of the affiliated Colleges in Arts, Science and Commerce and the Heads of recognized Institutions concerned are hereby informed that the recommendation made by Ad-hoc Board of Studies in Lifelong Learning & Extension under Faculty of Arts, Science and Commerce at its meeting held on 29th June, 2016 has been accepted by the Academic Council at its meeting held on 14th July, 2016 vide item No. 4.84 and that in accordance therewith, the revised syllabus as per the Choice Based Credit System for Extension Work Subject for F.Y.B.A/B.Com./B.Sc. & other Professional Courses for Foundation Course approved by the Board of Studies in Extension Work for academic year 2016-17, which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

MUMBAI - 400 032
21 December, 2016
To


(Dr.M.A.Khan)
REGISTRAR

The Principals of the affiliated Colleges in Arts, Science and Commerce and the Heads of recognized Institutions concerned.

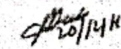
A.C/4.84/14/07/2016

No. UG/210 -A of 2016

MUMBAI-400 032 21 December, 2016

Copy forwarded with Compliments for information to:-

- 1) The Co-ordinator, Faculty of Arts, Science and Commerce,
- 2) The Director, Board of College and University Development,
- 3) The Co-Ordinator, University Computerization Centre,
- 4) The Controller of Examinations.


(Dr.M.A.Khan)
REGISTRAR

....PTO



UNIVERSITY OF MUMBAI
Department of Lifelong Learning & Extension
FIRST YEAR - Foundation Course-I in Extension Work

SYLLABUS

SEMESTER I : EXTENSION AND FIELD OUTREACH

UNIT I: EXTENSION: BASIC CONCEPTS AND PRINCIPLES

Extension: Concept, History & Goals, Extension (Principles, advantages and disadvantages), Role of Extension Work in Rural & Urban Development.

UNIT II: FIELD OUTREACH

Field Outreach Activities (Need, Methods, Advantages and Disadvantages), Social Leadership- Concept, Characteristics & Functions.

UNIT III: COMMUNICATION SKILLS

Concept, Definition, Process of communication, significance & its limitations
Mass Media: Concept, Importance and its uses.

SEMESTER II: VALUE EDUCATION AND SKILL DEVELOPMENT

UNIT IV: VALUE EDUCATION AND LONGEVITY

Value Education and Longevity: Meaning and Significance, Development of Value Education and its Longevity: Role of Citizens, Family, Learners, Teachers and Social Reformers, Value Education: Activities and Strategies, Role of Government (Schools & Colleges), Hazards and recycling of e-waste.

UNIT V: SKILL DEVELOPMENT

Computer: Fundamentals of Computers, Basic Computer Applications,
E Learning: Meaning, Need Scope, Functions & Significance
Application Software, Operating Systems & Utility Programs

UNIT VI: DEVELOPMENT OF SOFT SKILLS

Personality Development: Meaning & Importance, Etiquettes, Code of Conduct, Accent in Communication, Grooming Styles, Preparing & Presenting Yourself, Motivation and Confidence Building, Soft Skills, Time Management

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PRINCIPAL
K.E.S. A. P. Science College
Nagothane, Dist. Raigad (M.S.)


 AC _____
 Item No. _____

UNIVERSITY OF MUMBAI



Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	Foundation Course (SYBA, SYBSc, SYBCom; Semesters III and IV)
2	Eligibility for Admission	Not Applicable
3	Passing Marks	40 %
4	Ordinances / Regulations (if any)	Not Applicable
5	No. of Years / Semesters	III and IV Semesters
6	Level	P.G./ U.G./ Diploma / Certificate (Strike out which is not applicable)
7	Pattern	Yearly / Semester (Strike out which is not applicable)
8	Status	New / Revised (Strike out which is not applicable)
9	To be implemented from Academic Year	From Academic Year 2017-18

Date: 8th May, 2017

Signature :

Name of BOS Chairperson /Dean : Dr Agnelo Menezes



UNIVERSITY OF MUMBAI



Essentials Elements of the Syllabus

1	Title of the Course	Foundation Course (SYBA, SYBSc, SYBCom – III and IV Semesters)
2	Course Code	
3	Preamble / Scope	Not Applicable
4	Objective of Course / Course Outcome	Not Applicable
5	Eligibility	Not Applicable
6	Fee Structure	Not Applicable
7	No. of Lectures	3 lectures per week
8	No. of Practical	Not Applicable
9	Duration of the Course	III and IV Semesters respectively
10	Notional hours	Not Applicable
11	No. of Students per Batch	Not Applicable
12	Selection	Not Applicable
13	Assessment	Not Applicable
14	Syllabus Details	Given
15	Title of the Unit	Not Applicable
16	Title of the Sub-Unit	Not Applicable
17	Semester wise Theory	Not Applicable
18	Semester wise List of Practical	Not Applicable
19	Question Paper Pattern	Given
20	Pattern of Practical Exam	Not Applicable
21	Scheme of Evaluation of Project / Internship	Given
22	List of Suggested Reading	Given
23	List of Websites	Given
24	List of You-Tube Videos	Not Applicable
25	List of MOOCs	Not Applicable



UNIVERSITY OF MUMBAI

SECOND YEAR B.A., SECOND YEAR B.Sc.,

SECOND YEAR B.Com.

SEMESTER III AND IV

FOUNDATION COURSE

UNDER THE CBCGSS SYSTEM

EFFECTIVE FROM 2017-2018





FOUNDATION COURSE

Semester III

Internal marks: 25

External marks: 75

Total Marks: 100

Lectures: 45

Objectives

- i. Develop a basic understanding about issues related to Human Rights of weaker sections, ecology, and science and technology.
- ii. Gain an overview of significant skills required to address competition in career choices
- iii. Appreciate the importance of developing a scientific temper towards technology and its use in everyday life

Module 1 Human Rights Provisions, Violations and Redressal (12 lectures)

- A. Scheduled Castes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. (2 Lectures)
- B. Scheduled tribes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. (2 Lectures)
- C. Women- Constitutional and legal rights, Forms of violations, Redressal mechanisms. (2 Lectures)
- D. Children- Constitutional and legal rights, Forms of violations, Redressal mechanisms. (2 Lectures)
- E. People with Disabilities, Minorities, and the Elderly population- Constitutional and legal rights, Forms of violations, Redressal mechanisms. (4 Lectures)

Module 2 Dealing With Environmental Concerns (11 lectures)

- A. Concept of Disaster and general effects of Disasters on human life- physical, psychological, economic and social effects. (3 Lectures)
- B. Some locally relevant case studies of environmental disasters. (2 Lectures)
- C. Dealing with Disasters - Factors to be considered in Prevention, Mitigation (Relief and Rehabilitation) and disaster Preparedness. (3 Lectures)
- D. Human Rights issues in addressing disasters- issues related to compensation, equitable and fair distribution of relief and humanitarian approach to resettlement and rehabilitation. (3 Lectures)

Module 3 Science and Technology I (11 lectures)

- A. Development of Science- the ancient cultures, the Classical era, the Middle Ages, the Renaissance, the Age of Reason and Enlightenment. (3 Lectures)
- B. Nature of science- its principles and characteristics; Science as empirical, practical, theoretical, validated knowledge. (2 Lectures)
- C. Science and Superstition- the role of science in exploding myths, blind beliefs and prejudices; Science and scientific temper- scientific temper as a fundamental duty of the Indian citizen. (3 Lectures)





D. Science in everyday life- technology, its meaning and role in development; Interrelation and distinction between science and technology. (3 Lectures)

Module 4 Soft Skills for Effective Interpersonal Communication (11 lectures)

Part A (4 Lectures)

- I) Effective Listening - Importance and Features.
- II) Verbal and Non-Verbal Communication; Public-Speaking and Presentation Skills.
- III) Barriers to Effective Communication; Importance of Self-Awareness and Body Language.

(4 Lectures)

Part B

- I) Formal and Informal Communication - Purpose and Types.
- II) Writing Formal Applications, Statement of Purpose (SOP) and Resume.
- III) Preparing for Group Discussions, Interviews and Presentations.

(3 Lectures)

Part C

- I) Leadership Skills and Self-Improvement - Characteristics of Effective Leadership.
- II) Styles of Leadership and Team-Building.

Projects / Assignments (for Internal Assessment)

- i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.
- ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.
- iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.
- iv. Students can work in groups of not more than 8 per topic.
- v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75

DURATION: 150 MINUTES

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	i. Question 1 A will be asked on the meaning / definition of concepts / terms from all	a) Total marks: 15



	<p>Modules.</p> <p>ii. Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester</p> <p>iii. In all 8 Questions will be asked out of which 5 have to be attempted.</p>	<p>b) For 1 A, there will be 3 marks for each sub-question.</p> <p>c) For 1 B there will be 15 marks without any break-up.</p>
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

FOUNDATION COURSE

Semester IV

Internal marks: 25

External marks: 75

Total Marks: 100

Lectures: 45



Module 1 Significant, contemporary Rights of Citizens (12 lectures)

- A. Rights of Consumers-Violations of consumer rights and important provisions of the Consumer Protection Act, 2016; Other important laws to protect consumers; Consumer courts and consumer movements. (3 Lectures)
- B. Right to Information- Genesis and relation with transparency and accountability; important provisions of the Right to Information Act, 2005; some success stories. (3 Lectures)
- C. Protection of Citizens'/Public Interest-Public Interest Litigation, need and procedure to file a PIL; some landmark cases. (3 Lectures)
- D. Citizens' Charters, Public Service Guarantee Acts. (3 Lectures)

Module 2 Approaches to understanding Ecology (11 lectures)

- A. Understanding approaches to ecology- Anthropocentrism, Biocentrism and Eco centrist, Ecofeminism and Deep Ecology. (3 Lectures)
- B. Environmental Principles-1: the sustainability principle; the polluter pays principle; the precautionary principle. (4 Lectures)
- C. Environmental Principles-2: the equity principle; human rights principles; the participation principle. (4 Lectures)

Module 3 Science and Technology II (11 lectures)

Part A: Some Significant Modern Technologies, Features and Applications: (7 Lectures)

- i. Laser Technology- Light Amplification by Stimulated Emission of Radiation; use of laser in remote sensing, GIS/GPS mapping, medical use.
- ii. Satellite Technology- various uses in satellite navigation systems, GPS, and imprecise climate and weather analyses.
- iii. Information and Communication Technology- convergence of various technologies like satellite, computer and digital in the information revolution of today's society.
- iv. Biotechnology and Genetic engineering- applied biology and uses in medicine, pharmaceuticals and agriculture; genetically modified plant, animal and human life.
- v. Nanotechnology- definition: the study, control and application of phenomena and materials at length scales below 100 nm; uses in medicine, military intelligence and consumer products.

Part B: Issues of Control, Access and Misuse of Technology. (4 Lectures)





Module 4 Introduction to Competitive Examinations

(11 lectures)

Part A. Basic information on Competitive Examinations- the pattern, eligibility criteria and local centres: (4 Lectures)

- i. Examinations conducted for entry into professional courses - Graduate Record Examinations (GRE), Graduate Management Admission Test (GMAT), Common Admission Test (CAT) and Scholastic Aptitude Test (SAT).
- ii. Examinations conducted for entry into jobs by Union Public Service Commission, Staff Selection Commission (SSC), State Public Service Commissions, Banking and Insurance sectors, and the National and State Eligibility Tests (NET / SET) for entry into teaching profession.

Part B. Soft skills required for competitive examinations- (7 Lectures)

- i. Information on areas tested: Quantitative Ability, Data Interpretation, Verbal Ability and Logical Reasoning, Creativity and Lateral Thinking
- ii. Motivation: Concept, Theories and Types of Motivation
- iii. Goal-Setting: Types of Goals, SMART Goals, Stephen Covey's concept of human endowment
- iv. Time Management: Effective Strategies for Time Management
- v. Writing Skills: Paragraph Writing, Report Writing, Filing an application under the RTI Act, Consumer Grievance Letter.

Projects / Assignments (for Internal Assessment)

- i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in Module 1 to Module 4.
- ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.
- iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.
- iv. Students can work in groups of not more than 8 per topic.
- v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester IV)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75

DURATION: 150 MINUTES


QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	i. Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules.	a) Total marks: 15 b) For 1 A, there will be 3 marks for each sub-question.




	<p>ii. Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester</p> <p>iii. In all 8 Questions will be asked out of which 5 have to be attempted.</p>	<p>c) For 1 B there will be 15 marks without any break-up.</p>
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

References


1. Asthana, D. K., and Asthana, Meera, *Environmental Problems and Solutions*, S. Chand, New Delhi, 2012.
2. Bajpai, Asha, *Child Rights in India*, Oxford University Press, New Delhi, 2010.
3. Bhatnagar Mamta and Bhatnagar Nitin, *Effective Communication and Soft Skills*, Pearson India, New Delhi, 2011.
4. G Subba Rao, *Writing Skills for Civil Services Examination*, Access Publishing, New Delhi, 2014
5. Kaushal, Rachana, *Women and Human Rights in India*, Kaveri Books, New Delhi, 2000.
6. Mohapatra, Gaur Krishna Das, *Environmental Ecology*, Vikas, Noida, 2008.
7. Motilal, Shashi, and Nanda, Bijoy Lakshmi, *Human Rights: Gender and Environment*, Allied Publishers, New Delhi, 2007.

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8. Murthy, D. B. N., *Disaster Management: Text and Case Studies*, Deep and Deep Publications, New Delhi, 2013.
 9. Parsuraman, S., and Unnikrishnan, ed., *India Disasters Report II*, Oxford, New Delhi, 2013
 10. Reza, B. K., *Disaster Management*, Global Publications, New Delhi, 2010.
 11. Sathe, Satyaranjan P., *Judicial Activism in India*, Oxford University Press, New Delhi, 2003.
 12. Singh, Ashok Kumar, *Science and Technology for Civil Service Examination*, Tata McGraw Hill, New Delhi, 2012.
 13. Thorpe, Edgar, *General Studies Paper I Volume V*, Pearson, New Delhi, 2017.




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Nagothane, Dist. Raigad (M.S.)

F.Y. B.Sc.



University of Mumbai
 Board of Studies in Botany
 FYBSc Syllabus Credit System 2014-2015 onwards

AC 7/4/2014
Item No. 4.23

Semester I USBO101		L	Cr
Paper I -- Plant Diversity I		45	2
UNIT I		15	
ALGAE			
1	Structure, life cycle and systematic position of <i>Nostoc</i> and <i>Spirogyra</i> .		
2	Economic importance of Algae.		
UNIT II		15	
FUNGI			
1	Structure, life cycle and systematic position of <i>Rhizopus</i> and <i>Aspergillus</i>		
2	Economic importance of Fungi.		
3	Modes of nutrition in Fungi (Saprophytism and Parasitism).		
UNIT III		15	
BRYOPHYTA			
1	General characters of Hepaticae		
2	Structure, life cycle and systematic position of <i>Riccia</i> .		

University of Mumbai
Board of Studies in Botany
FYBSc Syllabus Credit System 2014-2015 onwards



AC 7/4/2014
Item No. 4.23

Semester I USBO102		L	Cr
Paper II – Form and Function 1		45	2
UNIT I		15	
CELL BIOLOGY			
1	General structure of plant cell: cell wall Plasma membrane (bilayer lipid structure, fluid mosaic model)		
2	Ultra structure and functions of the following cell organelles: Endoplasmic reticulum and Chloroplast		
UNIT II		15	
ECOLOGY			
1	Energy pyramids, energy flow in an ecosystem.		
2	Types of ecosystems: aquatic and terrestrial.		
UNIT III		15	
GENETICS			
1	Phenotype/Genotype, Mendelian Genetics- monohybrid, dihybrid; test cross; back cross ratios.		
2	Epistatic and non epistatic interactions; multiple alleles.		

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Board of Studies in Botany
FYBSc Syllabus Credit System 2014-2015 onwards



AC 7/4/2014
Item No. 4.23

Semester I USBOP1		L	Cr
PRACTICAL Paper I – Plant Diversity 1		30	1
1	Study of stages in the life cycle of <i>Nostoc</i> from fresh/ preserved material and permanent slides.		
2	Study of stages in the life cycle of <i>Spirogyra</i> from fresh/ preserved material and permanent slides.		
3	Economic importance of algae: <i>Ulva</i> (Biofuel), <i>Spirulina</i> (Neutraceutical), <i>Gelidium</i> (Agar)		
4	Study of stages in the life cycle of <i>Rhizopus</i> from fresh/ preserved material and permanent slides.		
5	Study of stages in the life cycle of <i>Aspergillus</i> from fresh/ preserved material and permanent slides.		
6	Economic importance of Fungi: Mushroom , Yeast, wood rotting fungi (any bracket fungus).		
7	Study of stages in the life cycle of <i>Riccia</i> from fresh/ preserved material.		
8	Study of stages in the life cycle of <i>Riccia</i> with the help of permanent slides.		
PRACTICAL PAPER II- FORM AND FUNCTION 1		30	1
1	Examining various stages of mitosis in root tip cells (<i>Allium</i>)		
2	Cell inclusions: Starch grains (Potato and Rice); Aleurone Layer (Maize)		
3	Cystolith (<i>Ficus</i>); Raphides (<i>Pistia</i>); Sphaeraphides (<i>Opuntia</i>).		
4	Identification of cell organelles with the help of photomicrograph: Plastids: Chloroplast, Amyloplast, Endoplasmic Reticulum and Nucleus		
4	Identification of plants adapted to different environmental conditions: Hydrophytes: Floating: Free floating (<i>Pistia/Eichornia</i>); Rooted floating (<i>Nymphaea</i>); Submerged (<i>Hydrilla</i>)		
5	Mesophytes (any common plant); Hygrophytes (<i>Typha/Cyperus</i>)		


University of Mumbai
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AC 7/4/2014
Item No. 4.23

6	Xerophytes : Succulent (<i>Opuntia</i>); Woody Xerophyte (<i>Nerium</i>); Halophyte (<i>Avicennia pneumatophore</i>) No sections in ecology, only identification and description of specimens. Morphological adaptations only.		
7	Calculation of mean, median and mode.		
8	Calculation of standard deviation.		
9	Frequency distribution, graphical representation of data- frequency polygon, histogram, pie chart.		
10	Study of Karyotypes: Human: Normal male and female, <i>Allium cepa</i> .		




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AC 7/4/2014
Item No. 4.23

Semester II USBO201		Hrs	Cr
Paper I -- Plant Diversity 1		45	2
UNIT I		15	
PTERIDOPHYTES			
1	Structure life cycle, systematic position and alternation of generations in <i>Nephrolepis</i>		
2	Stelar evolution		
UNIT II		15	
GYMNOSPERMS			
2	Structure life cycle systematic position and alternation of generations in <i>Cycas</i>		
3	Economic importance of Gymnosperms		
Unit III			
ANGIOSPERMS		15	
1.	Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes. Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, <i>Drosera</i> or insectivorous plants.		
2	Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticillaster, hypanthodium.		
3	Study of following families: Malvaceae, Amaryllidaceae.		

Semester II USBO202		Hrs	Cr
Paper II – Form and Function 1		45	2
UNIT I		15	
ANATOMY			
1	Simple tissues, complex tissues.		
2	Primary structure of dicot and monocot root, stem and leaf.		
3	Epidermal tissue system: types of hair, monocot and dicot stomata.		

University of Mumbai
Board of Studies in Botany
FYBSc Syllabus Credit System 2014-2015 onwards



AC 7/4/2014
Item No. 4.23

UNIT II		15	
PHYSIOLOGY			
1	Photosynthesis: Light reactions, photolysis of water, photophosphorylation (cyclic and non cyclic), carbon fixation phase (C ₃ , C ₄ and CAM pathways).		
UNIT III		15	
MEDICINAL BOTANY			
1	Concept of primary and secondary metabolites, difference between primary and secondary metabolites.		
2	Grandma's pouch: Following plants have to be studied with respect to botanical source, part of the plant used, active constituents present and medicinal uses: <i>Oscimum sanctum</i> , <i>Adathoda vasica</i> , <i>Zinziber officinale</i> , <i>Curcuma longa</i> , <i>Santalum album</i> , <i>Aloe vera</i> .		

University of Mumbai
Board of Studies in Botany
FYBSc Syllabus Credit System 2014-2015 onwards



AC 7/4/2014
Item No. 4.23

Semester II USBOP2		Cr
PRACTICAL Paper I – Plant Diversity 1		1
1	Study of stages in the life cycle of <i>Nephrolepis</i> : Mounting of ramentum, hydathode, T.S. of rachis.	
2	T.S. of pinna of <i>Nephrolepis</i> passing through sorus.	
3	Stelar evolution with the help of permanent slides: Protostele: haplostele, actinostele, plectostele, mixed protostele, siphonostele: ectophloic, amphiphloic, dictyostele, eustele and atactostele.	
4	<i>Cycas</i> : T.S of leaflet (<i>Cycas</i> pinna)	
5	Megasporophyll, microsporophyll, coralloid root, microspore, L.S. of ovule of <i>Cycas</i> – all specimens to be shown.	
6	Economic importance of Gymnosperms: <i>Pinus</i> (turpentine, wood, seeds)	
7	Leaf morphology : as per theory	
8	Types of inflorescence: as per theory	
9	Malvaceae	
10	Amaryllidaceae	
PRACTICAL Paper II – Form and Function 1		1
1	Primary structure of dicot and monocot root.	
2	Primary structure of dicot and monocot stem.	
3	Study of dicot and monocot stomata.	
4	Epidermal outgrowths: with the help of mountings Unicellular: <i>Gossypium</i> /Radish Multicellular: <i>Lantana</i> /Sunflower Glandular: <i>Drosera</i> and Stinging: <i>Urtica</i> – only identification with the help of permanent slides. Peltate: <i>Thespesia</i> Stellate: <i>Erythrina</i> / <i>Sida acuta</i> / <i>Solanum</i> / <i>Helecteris</i>	


University of Mumbai
Board of Studies in Botany
FYBSc Syllabus Credit System 2014-2015 onwards



AC 7/4/2014
Item No. 4.23

	T-shaped: <i>Avicennia</i>	
5	Separation of chlorophyll pigments by strip paper chromatography.	
6	Separation of amino acids by paper chromatography.	
7	Change in colour because of change in pH: Anthocyanin: black grapes/Purple cabbage	
8	Test for tannins: tea powder/catechu.	
9	Identification of plants or plant parts for grandma's pouch as per theory.	




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S.Y.B.Sc.
Botany



UNIVERSITY OF MUMBAI
No. UG/110of 2017-18

CIRCULAR:-

The Principals of the affiliated Colleges in Science and the Directors of recognized Science Institutions concerned are hereby informed that in continuation syllabi relating to Bachelor of Science degree Course (S.Y.B.Sc) passed by the Academic Council at its meeting held on 26/2/2015, vide item No. 4.33 and proposal received from Chairperson, Board of Studies in Botany has been accepted by the Academic Council at its meeting held on 11th May, 2017 vide item no. 4.214 and that in accordance therewith, the revised syllabus as per the (CBCS) for S.Y.B.Sc. Paper - II (Sem - III) Programme in the Course of Botany, which is available on the University's website (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2017-18.

(Signature)

REGISTRAR

MUMBAI - 400 032
27th July, 2017

To,

The Principals of the affiliated Colleges in Science and the Directors of Recognized Institutions concerned.

A.C/4.214/11.05.2017

No. UG/110 -A of 2017

MUMBAI-400 032

27th July, 2017

Copy forwarded with compliments for information to :-

- 1) The Co-ordinator, Faculty of Science,
- 2) The Offg. Director, Board of Examinations and Evaluation,
- 3) The Chairperson, Board of Studies in Botany,
- 4) The Director of Board of Studies Development,
- 5) The Professor-cum-Director, Institute of Distance and Open Learning.
- 6) The Co-Ordinator, University Computerization Centre.

(Signature)

REGISTRAR

....PTO



Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

Course Code	SEM III- Title	Credits
USBO302	<u>FORM AND FUNCTION II</u>	2 Credits (45 lectures)
Unit II : Cell Biology <ul style="list-style-type: none"> • Ultra Structure and functions of the following cell organelles: <ul style="list-style-type: none"> ○ Mitochondrion(membranes, cristae, F1 particles and matrix) ○ Peroxisomes and Glyoxysomes ○ Ribosomes (prokaryotic, eukaryotic and subunits) • Cell Division and its significance <ul style="list-style-type: none"> ○ Cell Cycle, structure of Interphase Nucleus(nuclear envelop, chromatin network, nucleolus and nucleoplasm) ○ Mitosis & Meiosis ○ Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA 		15 Lectures
Unit III : Cytogenetics <ul style="list-style-type: none"> • Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Deletions, Duplications, Inversions and Translocations. • Sex determination, Sex linked, sex influenced and sex limited traits : Sex determination- Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in <i>Drosophila</i>, Lyon's Hypothesis of X chromosome inactivation. Sex linked- eye colour in <i>Drosophila</i>, Haemophilia, colour blindness Sex influenced- baldness in man • Extranuclear Genetics Organelle heredity- <ul style="list-style-type: none"> ○ Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in <i>Chlamydomonas</i>. ○ Male sterility in maize 		15 Lectures
Unit III : Molecular Biology <ul style="list-style-type: none"> • DNA replication : Modes of Replication, Messelson and Stahl Experiment, DNA replication in prokaryotes and eukaryotes- enzymes involved and molecular mechanism of replication. • Protein Synthesis: <ul style="list-style-type: none"> ○ Central dogma of Protein synthesis ○ Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. ○ RNA processing: Adenylation & Capping. 		15 Lectures

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY




USBO402	<u>FORM AND FUNCTION II</u>	2 Credits (45 lectures)
<p>Unit I : Anatomy</p> <ul style="list-style-type: none"> • Normal Secondary Growth in Dicotyledonous stem and root. • Growth rings, periderm, lenticels, tyloses, heart wood and sap wood. • Mechanical Tissue system <ul style="list-style-type: none"> ○ Tissues providing mechanical strength and support and their disposition ○ I-girders in aerial and underground organs • Types of Vascular Bundles. 		15 Lectures
<p>Unit II : Plant Physiology and Plant Biochemistry</p> <ul style="list-style-type: none"> • Respiration: Aerobic: Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration. • Photorespiration • Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants, Physico-chemical properties of phytochrome, Pr-Pfr interconversion, role of phytochrome in flowering of SDPs and LDPs; • Vernalization mechanisms and applications. 		15 Lectures
<p>Unit III : Ecology and Environmental Botany</p> <ul style="list-style-type: none"> • Biogeochemical Cycles- Carbon, Nitrogen and Water. • Ecological factors: Concept of environmental factors. Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile. • Community ecology- Characters of community - Quantitative characters and qualitative characters 		15 Lectures



Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

SEMESTER IV USBOT P4		Cr
PRACTICALS Paper II – FORM AND FUNCTION- II		1
Anatomy		
1 Study of normal secondary growth in the stem and root of a Dicotyledonous plant		
2 Types of mechanical tissues, mechanical tissue system in aerial, underground organs.		
3 Study of conducting tissues- Xylem and phloem elements in Gymnosperms and Angiosperms as seen in LS and through maceration technique.		
4 Study of different types of vascular bundles.		
5 Growth rings, periderm, lenticels, tyloses, heart wood and sap wood		
Plant Physiology and Plant Biochemistry		
6 Q_{10} - germinating seeds using Phenol red indicator		
7 NR activity – <i>in-vivo</i>		
8 Estimation of proteins by Lowry's method (Prepare standard graph).		
Ecology and Environmental Botany		
9 Study of the working of the following Ecological Instruments- Soil thermometer, Soil testing kit, Soil pH, Wind anemometer.		
10 Mechanical analysis of soil by the sieve method & pH of soil.		
11 Quantitative estimation of organic matter of the soil by Walkley and Blacks Rapid titration method.		
12 Study of vegetation by the list quadrat method		




PRINCIPAL
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Nagothane, Dist. Raigad (M.S.)

UNIVERSITY OF MUMBAI



Program: S.Y.B. Sc.

Course: Zoology

(Credit Based Semester and Grading System
with effect from the academic year 2016–2017)

Syllabus for
S.Y.B.Sc.
Course – ZOOLOGY
To be implemented from Academic year 2016-17
SEMESTER - III



COURSE CODE	UNIT	TOPIC	CREDITS	LECTURES/ WEEK
USZO301	I	Fundamentals of Genetics,	2	1
	II	Chromosomes and Heredity,		1
	III	Nucleic acids		1
USZO302	I	Study of Nutrition and Excretion	2	1
	II	Study Respiration and circulation,		1
	III	Control and coordination, Locomotion and Reproduction		1
USZO303	I	Ethology	2	1
	II	Parasitology		1
	III	Economic Zoology		1
USZOP3	Practical based on all three courses		03	9

SEMESTER - IV

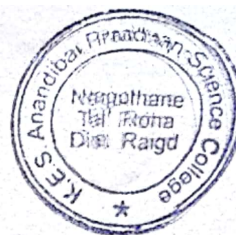
COURSE CODE	UNIT	TOPIC	CREDITS	LECTURES/ WEEK
USZO401	I	Origin and evolution of Life,	2	1
	II	Population genetics and evolution,		1
	III	Scientific Attitude methodology , writing and ethics		1
USZO402	I	Cell Biology,	2	1
	II	Endo membrane System		1
	III	Biomolecules		1
USZO403	I	Comparative Embryology,	2	1
	II	Aspects of Human Reproduction,		1
	III	Pollution and its effect on organisms		1
USZOP4	Practical based on all three courses		03	9



3.4	Lipids <ul style="list-style-type: none"> ➤ Definition, classification of lipids with examples, Ester linkage ➤ Physical and Chemical properties of lipids ➤ Saturated and Unsaturated fatty acids, Essential fatty acids ➤ Triacylglycerols, Phospholipids (Lecithin and Cephalin) and Steroids (Cholesterol). ➤ Biological role and their Clinical significance 	4L	5hrs
3.5	Vitamins <ul style="list-style-type: none"> ➤ Water soluble vitamins(e.g. Vit C, Vit B12) ➤ Lipid soluble vitamins (e.g. Vit A, Vit D) ➤ Biological role and their Clinical significance 	2L	4hrs
USZO403 COURSE-10			
Comparative Embryology, Aspects of Human Reproduction, Pollution and its effect on organisms			
UNIT 1: Comparative Embryology		15L	25hrs
Objective:			
➤ <i>To acquaint the learner with key concepts of embryology.</i>			
Desired Outcomes:			
➤ <i>Learner will be able to understand and compare the different pre- embryonic stages</i>			
➤ <i>Learner will be able to appreciate the functional aspects of extra embryonic membranes and classify the different types of placentae.</i>			
1.1	➤ Types of Eggs- Based on amount and distribution of yolk	2L	4hrs
1.2	➤ Structure and Types of Sperms	1L	1hr
1.3	➤ Types of Cleavages.- Holoblastic and Meroblastic	1L	3hrs
1.4	➤ Types of Blastulae	1L	3hrs
1.5	➤ Gastrulation	2L	4hrs
1.6	➤ Coelom -Formation and types	2L	3hrs
1.7	➤ Extra embryonic membranes ➤ Types of Placentae -Based on histology, morphology and implantation	6L	10hrs
UNIT 2: Aspects of Human Reproduction		15L	30 hrs
Objectives:			
➤ <i>To acquaint the learners with different aspects of human reproduction.</i>			
➤ <i>To make them aware of the causes of infertility, techniques to overcome infertility and the concept of birth control</i>			
Desired Outcome:			



	<ul style="list-style-type: none"> ➤ Learners will able to understand human reproductive physiology ➤ Learners will become familiar with advances in ART and related ethical issues. 		
2.1	Human Reproductive system and Hormonal regulation <ul style="list-style-type: none"> ➤ Anatomy of human male and female reproductive system ➤ Hormonal regulation of Reproduction and Impact of age on reproduction-Menopause and Andropause 	2L	4hrs
2.2	Contraception & birth control <ul style="list-style-type: none"> ➤ Difference between contraception and birth control ➤ Natural Methods: Abstinence , Rhythm method, Temperature method, cervical mucus or Billings method, Coitus interruptus, Lactation amenorrhea ➤ Artificial methods : Barrier methods, Hormonal methods, Intrauterine contraceptives, Sterilization, Termination , Abortion 	2L	4hrs
2.3	Infertility Female infertility <ul style="list-style-type: none"> ➤ Causes - Failure to ovulate; production of infertile eggs ; damage to oviducts (oviduct scarring and PID or Pelvic inflammatory disease, TB of oviduct), Uterus (T. B. of uterus and cervix) ➤ Infertility associated disorders (Endometriosis, Polycystic Ovarian syndrome (PCOS), POF (Primary ovarian failure) STDs (Gonorrhea, Chlamydia, Syphilis and Genital Herpes); Antibodies to sperm; Genetic causes-Recurrent abortions; Role of endocrine disruptors 	4L	8hrs
	Male infertility Causes : Testicular failure, infections of epididymis, seminal vesicles or prostate, hypogonadism, cryptorchidism , congenital abnormalities ,Varicocele , Blockage, Azoospermia, Oligospermia, abnormal sperms, autoimmunity, ejaculatory disorders and Idiopathic infertility.		
2.5	Treatment of Infertility <ul style="list-style-type: none"> ➤ Removal /reduction of causative environmental factors ➤ Surgical treatment ➤ Hormonal treatment- Fertility drugs ➤ Assisted Reproductive Technology ➤ Sperm banks, cryopreservation of gametes and embryos ➤ Surrogacy 	4L	8hrs

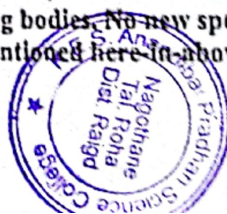



2.6	Techniques and Ethical considerations of ART > In vitro fertilization, Embryo transfer (ET), Intra-fallopian transfer (IFT), Intrauterine transfer (IUT), Gamete intra-fallopian transfer (GIFT), intra-zygote transfer (ZIFT), Intracytoplasmic sperm injection (ICSI) with ejaculated sperm and sperm retrieved from testicular biopsies – Testicular sperm extraction (TESE), Pronuclear stage transfer (PROST).	3L	6hrs
	UNIT3: Pollution and its effect on organisms	15L	27hrs
	Objective: > To provide a panoramic view of impact of human activities leading to pollution and its implications.		
	Desired Outcome : > The learners will be sensitized about the adverse effects of pollution and measures to control it.		
3.1	Air Pollution > Types and sources of air pollutants > Effects and control measures	3L	6hrs
3.2	Water Pollution > Types and sources of water pollutants > Effects and control measures	3L	6hrs
3.3	Soil Pollution > Types and sources of soil pollutants > Effects and control measures	3L	4hrs
3.4	Noise pollution > Different means of noise pollution > Effects and control measures	1L	3hrs
3.5	Radioactive pollution	1L	2hrs
3.6	Solid waste Pollution > Types and sources, > Effects and control	2L	4hrs
3.7	Pollution – Climate change and Global warming	2L	2hrs



	b. Endoplasmic reticulum (Smooth and rough) c. Mitochondria. d. Golgi apparatus e. Lysosomes
8	Study of clinical disorders due to carbohydrates, proteins and lipids imbalance.(photograph to be provided / significance to given and disorder to be identified) a. Hyperglycemia , Hypoglycemia. b. Thalessemia, Kwashiorkar c. Obesity, Atherosclerosis
	Practical USZOP4 (Course X)
1	Estimation of Dissolved oxygen from the given water sample .
2	Estimation of Salinity by refractometer from the given water sample.
3	Estimation of conductivity by conductometer from the given water sample .
4	Determination of blood pressure by sphygmomanometer.
5	Detection of Creatinine in urine.
6	Determination of blood sugar by GOD and POD method
7	Study of bleeding time and clotting time.
8	Study of the following permanent slides, museum specimens and materials. a. Mammalian sperm and ovum. b. Egg types –Fish eggs, Frog eggs , Hen's egg. c. Cleavage , blastula and gastrula (Amphioxus, Frog and Bird).
9	Study of commercially important fishery (Catla, Rohu, Catfish, Mackerel, Pomfret, Bombay duck, Prawn/ Shrimp, Crab, Lobster, Edible oyster)
10	Review writing based on programmes telecast by Doordarshan, Discovery channel, Gyandarshan, UGC programmes, Animal planet
11	Study of natural ecosystem and field report of the visit

Note -The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here in above.
#There shall be at least one excursion/field trip




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Syllabus for
FYBSc.
Course – ZOOLOGY
To be implemented from Academic year 2015-16
SEMESTER - I

COURSE CODE	UNIT	TOPICS	CREDITS	LECTURES/WEEK
USZO101	I	Wonders of animal world	2	1
	II	Biodiversity and its conservation		1
	III	Footsteps to follow		1
USZO102	I	Laboratory safety and Units of Measurement	2	1
	II	Animal Biotechnology		1
	III	Instrumentation		1
USZOP1	Practical based on both courses		2	6

SEMESTER - II

COURSE CODE	UNIT	TOPICS	CREDITS	LECTURES/WEEK
USZO201	I	Population Ecology	2	1
	II	Ecosystem		1
	III	National park and Sanctuaries		1
USZO202	I	Nutrition and Health	2	1
	II	Public health and Hygiene		1
	III	Common human Diseases		1
USZOP2	Practical based on both courses		2	6



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UNIVERSITY OF MUMBAI



Syllabus for F.Y.B.Sc.
Program BSc
Course: ZOOLOGY

Semester I and II

(Credit Based Semester and Grading System
with effect from the academic year 2015–2016)



F.Y.B.Sc. ZOOLOGY

(THEORY)

SEMESTER I

USZO101 (Course 1)

Wonders of Animal World, Biodiversity and its Conservation

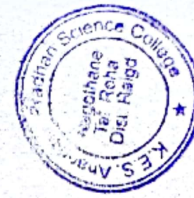
Unit 1: Wonders of Animal World

(15 L)

Objective: To take learners through a captivating journey of hoarded wealth of marvellous animal world.

Desired Outcome: Curiosity will be ignited in the mind of learners, to know more about the fascinating world of animals which would enhance their interest and love for the subject of Zoology.

- 1.1: Echolocation in Bats and Cetaceans - Dolphins and Whales
- 1.2: Mechanism of Pearl formation in Mollusca
- 1.3: Bioluminescence in Animals: Noctiluca, Glow worm, Firefly, Angler Fish (Mechanism and use for the animal)
- 1.4: Regeneration in Animals - Earthworm (Annelida) and Lizard (Reptile)
- 1.5: Mimicry in Butterflies and its significance: Great Eggfly and Common Crow, Common Palmfly and Plain Tiger.
- 1.6: Mechanism of Coral formation and types of Coral reefs
- 1.7: Bird migration: Definition, types and factors inducing bird migration
- 1.8: Adaptive features of desert animals: Reptiles (Phrynosoma) and Mammals (Camel)
- 1.9: Breeding and Parental care in:
 - 1.9.1: Pisces - Ovo-viviparous (Black Molly/Guppy), Mouth brooders (Tilapia), Brood pouches (Sea horse)
 - 1.9.2: Amphibia - Mouth brooders (Darwin's Frog), Egg carriers (Midwife Toad)



1.9.3: Mammals - Egg-laying (Duck-billed Platypus), Marsupials (Kangaroo)

1.10: Aves: Brood Parasitism (Cuckoo)

Unit 2: Biodiversity and its Conservation (15 L)

Objective: To orient learners about rich heritage of Biodiversity of India and make them understand significance of its conservation.

Desired Outcome: Learners would appreciate treasure of Biodiversity, its importance and hence would contribute their best for its conservation.

2.1: Introduction to Biodiversity - Definition, Concepts, Scope and Significance

2.2: Levels of Biodiversity - Introduction to Genetic, Species and Ecosystem Biodiversity

2.3: Introduction of Biodiversity Hotspots- (Western Ghats and Indo-Burma Border)

2.4: Values of biodiversity - Direct and Indirect use value

2.5: Threats to Biodiversity - Habitat loss and Man-Wildlife conflict

2.6: Biodiversity conservation and management

2.6.1: Conservation strategies: *in situ*, ex-situ, National parks, Sanctuaries and Biosphere reserves.

2.6.2: Introduction to International efforts : Convention on Biological Diversity (CBD), International Union for Conservation of Nature and Natural Resources (IUCN), United Nations Environment Program - World Conservation Monitoring Centre (UNEP-WCMC)

2.6.3: National Biodiversity Action Plan, 2002



2.6.4: Introduction to Indian Wildlife (Protection) Act, 1972 and Convention for International Trade of endangered species

Unit 3: Footsteps to follow

(15 L)

Objective: To teach learners about innovative and novel work of scientists/philosopher/entrepreneurs in the field of biological sciences.

Desired Outcome: Minds of learners would be impulsed to think differently and would be encouraged ipso facto to their original crude ideas from the field of biological sciences.

- 3.1: Dr. Hargobind Khorana (Genetic code)
- 3.2: Dr. Varghese Kurien (Amul –White revolution)
- 3.3: Dr. Salim Ali (Ornithologist)
- 3.4: Anna Hazare (Water Conservation-Ralegan Siddhi)
- 3.5: Baba Amte (Anandvan)
- 3.6: Kiran Mazumdar Shaw (Biocon)
- 3.7: Gadre Fisheries (Surimi)
- 3.8: Rajendra Singh

Two cases preferably of local importance to the college be additionally taught.

USZO102 (Course 2)

INSTRUMENTATION and ANIMAL BIOTECHNOLOGY

Unit 1: Laboratory safety, Units and Measurement

(15 L)

Objective: To make learners aware of risks involved in handling of different hazardous chemicals, sensitive (electrical/electronic) instruments and infectious biological specimens especially during practical sessions in the laboratory and to train them to avoid mishap.

Desired Outcome: Learners would work safely in the laboratory and avoid occurrence of accidents (mishaps) which will boost their scholastic performance and economy in use of materials/chemicals during practical sessions.

1.1: Introduction to good laboratory practices



1.2: Use of safety symbols: meaning, types of hazards and precautions

1.3: Units of measurement:

1.3.1: Calculations and related conversions of each: Metric system- length (meter to micrometer); weight (gram to microgram), Volumetric (Cubic measures)

1.3.2: Temperature: Celsius, Fahrenheit, Kelvin

1.3.3: Concentrations: Percent solutions, ppt, ppm, ppb dilutions, Normality, Molarity and Molality.

1.3.4: Biostatistics: Introduction and scope, Sampling and its types, Central Tendencies (mean, median, mode) Tabulation, Graphical representations (Histograms, bar diagrams, pie diagrams).

Unit 2: Animal Biotechnology

(15 L)

Objective: To acquaint learners to the modern developments and concepts of Zoology highlighting their applications aiming for the benefit of human being.
Desired Outcome: Learners would understand recent advances in the subject and their applications for the betterment of mankind; and that the young minds would be tuned to think out of the box.

2.1: Biotechnology: Scope and achievements of Biotechnology (Fishery, Animal Husbandry, Medical, Industrial)

2.2: Transgenesis: Retro viral method, Nuclear transplantation method, DNA microinjection method and Embryonic stem cell method

2.3: Cloning (Dolly)

2.4: Ethical issues of transgenic and cloned animals

2.5: Applications of Biotechnology:

2.5.1: DNA fingerprinting: Technique in brief and its application in forensic science (Crime Investigation)

2.5.2: Recombinant DNA in medicines (recombinant insulin)

2.5.3: Gene therapy: Ex-vivo and *In vivo*, Severe Combined Immunodeficiency (SCID), Cystic Fibrosis



SEMESTER-II

USZO201 (Course: 3)

Ecology and Wildlife Management

Unit 1: Population ecology:

(15 L)

Objective: To facilitate the learning of population ecology, its dynamics and regulatory factors important for its sustenance.

Desired Outcome: This unit would allow learners to study about nature of animal population, specific factors affecting its growth and its impact on the population of other life form.

1.1: Population dynamics

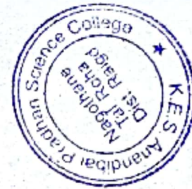
- 1.1.1: Population density
- 1.1.2: Natality
- 1.1.3: Mortality
- 1.1.4: Fecundity
- 1.1.5: Age structure
- 1.1.6: Sex ratio
- 1.1.7: Life tables
- 1.1.8: Survivorship curves
- 1.1.9: Population dispersal and distribution patterns
- 1.1.10 Niche concept

1.2: Population growth regulation

- 1.2.1: Intrinsic mechanism – Density dependent fluctuations and oscillations
- 1.2.2: Extrinsic mechanism- Density independent, environmental and climate factors, population interactions

1.3: Population growth pattern

- 1.3.1: Sigmoid
- 1.3.2: J Shaped



1.4: Human census (India) – Concept, mechanism and significance

(15 L)

Unit 2: Ecosystem:

Objective: To impart knowledge of different components of ecosystem and educate about essentials of coexistence of human beings with all other living organisms.

Desired Outcome: Learners will grasp the concept of interdependence and interaction of physical, chemical and biological factors in the environment and will lead to better understanding about implications of loss of fauna specifically on human being, erupting spur of desire for conservation of all flora and fauna.

2.1: Concept of Ecosystems

- 2.1.1: Ecosystem - Definition and components
- 2.1.2: Impact of temperature on biota
- 2.1.3: Biogeochemical cycles (Water, Oxygen, Nitrogen, Sulphur)
- 2.1.4: Fresh water ecosystem – Lentic and Lotic
- 2.1.5: Food chain and food web in ecosystem (Fresh water and Grass land).
- 2.1.6: Ecological pyramids - energy, biomass and number.
- 2.1.7: Animal interactions (commensalism, mutualism, predation, antibiosis, parasitism)

Unit 3: National parks and Sanctuaries of India

(15 L)

Objective: To enlighten learners about the current status of wild life conservation in India in the light of guidelines from different relevant governing agencies vis-à-vis with adversity of poaching and biopiracy.

Desired Outcome: Learners would be inspired to choose career options in the field of wild life conservation, research, photography and ecotourism.

- 3.1: Concept of Endangered and Critically Endangered species using examples of Indian Wildlife with respect to National Parks and Wildlife



Sanctuaries of India (Sanjay Gandhi National Park, Tadoba Tiger Reserve, Corbett National Park, Kaziranga National Park, Gir National Park, Silent Valley, Pirotan Island Marine Park, Keoladeo Ghana National Park, Bandipur Sanctuary)

- 3.2: Management strategies with special reference to Tiger and Rhinoceros in India
- 3.3: Ecotourism
- 3.4: Biopiracy

SEMESTER-II

Course: 4 [USZO 202]

NUTRITION, PUBLIC HEALTH AND HYGIENE

Unit 1: Nutrition and Health

(15 L)

Objective: To make learners understand the importance of balanced diet and essential nutrients of food at different stages of life.

Desired Outcome: Healthy dietary habits would be inculcated in the life style of learners in order to prevent risk of developing health hazards in younger generation due to faulty eating habits.

- 1.1: Concept of balanced diet, dietary recommendations to a normal adult, infant, pregnant woman and aged.
- 1.2: Malnutrition disorders – Anemia (B₁₂ and Iron deficiency), Rickets, Marasmus, Goiter, Kwashiorkar (cause, symptoms, precaution and remedy).
- 1.3: Constipation, piles, starvation, acidity, flatulence, peptic ulcers (cause, symptoms, precaution and remedy).
- 1.4: Obesity (Definition and consequences).
- 1.5: Importance of fibres in food.
- 1.6: Significance of breast feeding.
- 1.7: Swine flu (cause, symptoms, precaution and remedy).
- 1.8: BMI calculation and its significance.



Unit 2: Public Health and Hygiene

(15 L)

Objective: To impart knowledge about source, quantum and need for conservation of fast depleting water resource and essentials of maintaining proper sanitation, hygiene and optimizing use of electronic gadgets.

Desired Outcome: Promoting optimum conservation of water, encouragement for maintaining adequate personal hygiene, optimum use of electronic gadgets, avoiding addiction, thus facilitating achievement of the goal of healthy young India in true sense.

2.1: Health

2.1.1: Definition of Health, the need for health education and health goal.

2.1.2: Physical, psychological and Social health issues.

2.1.3: WHO and its programmes - Polio, Small pox, Malaria and Leprosy (concept, brief accounts and outcome with respect to India).

2.1.4: Ill effects of self-medication.

2.2: Water and water supply

2.2.1: Sources and properties of water.

2.2.2: Purification of water, small scale, medium scale and large scale (rapid sand filters)

2.2.3 : Water footprint (concept, brief accounts and significance).

2.3: Hygiene:

2.3.1: Hygiene and health factors at home, personal hygiene, oral hygiene and sex hygiene.

2.4: Radiation risk:

2.4.1: Mobile Cell tower and electronic gadgets (data of recommended level, effects and precaution).

2.5: Blood bank – Concept and significance



UNIT 3: Common Human Diseases and Disorders

(15 L)

Objective: To educate learners about causes, symptoms and impact of stress related disorders and infectious diseases.

Desired Outcome: Learners will be able to promptly recognize stress related problems at initial stages and would be able to adopt relevant solutions which would lead to psychologically strong mind set promoting positive attitude important for academics and would be able to acquire knowledge of cause, symptoms and precautions of infectious diseases.

3.1: Stress related disorders

3.1.1: Hypertension, Diabetes type II, anxiety, insomnia, migraine, depression (cause, symptoms, precaution and remedy)

3.2: Communicable and non-communicable diseases

3.2.1: Tuberculosis, Typhoid and Dengue

3.2.2: Hepatitis (A and B), AIDS, Gonorrhoea and Syphilis

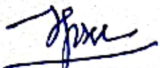
3.2.3: Diseases of respiratory system- Asthma, Bronchitis.

3.2.4: Oral Cancer

(Discuss cause/causative agents, symptoms, diagnostics, precaution /prevention and remedy)



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PRINCIPAL
K.E.S. A. P. Science College
Nagothane, Dist. Raigad (M.S.)



AC - 14/06/2018

Item No. 4.71

UNIVERSITY OF MUMBAI



Program : M.Sc.

(Choice Based Credit System)

Course : M.Sc. Organic Chemistry

Part - I

Syllabus for Semester III & IV

(To be implemented from the Academic year 2018-2019)



Course Code: PSCHOEC-I 304

Paper-IV

Medicinal , Biogenesis and green chemistry

- Unit 1: Drug discovery, design and development** [15L]
- 1.1 Introduction, important terms used in medicinal chemistry: receptor, therapeutic index, bioavailability, drug assay and drug potency. General idea of factors affecting bioactivity: Resonance, inductive effect, bioisosterism, spatial considerations. Basic pharmacokinetics: drug absorption, distribution, metabolism (biotransformation) and elimination. Physical and chemical parameters like solubility, lipophilicity, ionization, pH, redox potential, H-bonding, partition coefficient and isomerism in drug distribution and drug-receptor binding. [7]
- 1.2 Procedures in drug design: Drug discovery without a lead: Penicillin, Librium. Lead discovery: random screening, non-random (or targeted) screening. Lead modification: Identification of the pharmacophore, Functional group modification. Structure-activity relationship, Structure modification to increase potency and therapeutic index: Homologation, chain branching, ring-chain transformation, bioisosterism, combinatorial synthesis (basic idea). [8L]
- Unit 2: Drug design, development and synthesis** [15L]
- 2.1 Introduction to quantitative structure activity relationship studies. QSAR parameters: - steric effects: The Taft and other equations; Methods used to correlate regression parameters with biological activity: Hansch analysis- A linear multiple regression analysis. [5L]
- 2.2 Introduction to modern methods of drug design and synthesis- computer-aided molecular graphics based drug design, drug design via enzyme inhibition (reversible and irreversible), bioinformatics and drug design. [3L]
- 2.3 Concept of prodrugs and soft drugs. (a) Prodrugs: Prodrug design, types of prodrugs, functional groups in prodrugs, advantages of prodrug use. (b) Soft drugs: concept and properties. [3L]
- 2.4 Synthesis and application of the following drugs: Fluoxetine, cetirizine, esomeprazole, fluconazole, zidovudine, methotrexate, diclofenac, labetalol, fenofibrate. [4L]
- Unit 3: Biogenesis and biosynthesis of natural products** [15L]
- 3.1 Primary and secondary metabolites and the building blocks, general pathway of amino acid biosynthesis. [3L]



- 3.2 [4L] Acetate pathway: Biosynthesis of malonylCoA, saturated fatty acids, prostaglandins from arachidonic acid, aromatic polyketides.
- 3.3 [4L] Shikimic Acid pathway: Biosynthesis of shikimic acid, aromatic amino acids, cinnamic acid and its derivatives, lignin and lignans, benzoic acid and its derivatives, flavonoids and isoflavonoids.
- 3.4 [4L] Mevalonate pathway: Biosynthesis of mevalonic acid, monoterpenes – geranyl cation and its derivatives, sesquiterpenes – farnesyl cation and its derivatives and diterpenes.

[15L]
[1L]

Green chemistry

Unit 4:

- 4.1 Introduction, basic principles of green chemistry. Designing a green synthesis: Green starting materials, green reagents, green solvents and reaction conditions, green catalysts.
- 4.2 Use of the following in green synthesis with suitable examples:

[9L]

- a) Green reagents: dimethylcarbonate, polymer supported reagents.
 - b) Green catalysts: Acid catalysts, oxidation catalysts, basic catalysts, phase transfer catalysts [Aliquat 336, benzyltrimethyl ammonium chloride (TMBA), Tetra-n-butyl ammonium chloride, crown ethers], biocatalysts.
 - c) Green solvents: water, ionic liquids, deep eutectic solvents, supercritical carbon dioxide.
 - d) Solid state reactions: solid phase synthesis, solid supported synthesis
 - e) Microwave assisted synthesis: reactions in water, reactions in organic solvents, solvent free reactions.
 - f) Ultrasound assisted reactions.
- 4.3 [3L] Comparison of traditional processes versus green processes in the syntheses of ibuprofen, adipic acid, 4-aminodiphenylamine, p-bromotoluene and benzimidazole.
- 4.4 [2L] Green Catalysts : Nanocatalyst, Types of nanocatalysts, Advantages and Disadvantages of Nanocatalysts, Idea of Magnetically separable nanocatalysts.

REFERENCES:

1. Nelson, D. L., and Cox, M. M, (2008) Lehninger principles of Biochemistry 5th Edition, W. H. Freeman and Company, NY., USA.
2. Stryer, Lubert; Biochemistry; W. H. Freeman publishers.
3. Voet, D. and J. G. Voet (2004) Biochemistry, 3rd Edition, John Wiley & sons, Inc. USA.



SCIENTIFIC PAPERS

Reporting practical and project work, Writing literature surveys and reviews, organizing a poster display, giving an oral presentation.

Writing Scientific Papers:

Justification for scientific contributions, bibliography, description of methods, conclusions, the need for illustration, style, publications of scientific work, writing ethics, avoiding plagiarism.

Unit IV: CHEMICAL SAFETY & ETHICAL HANDLING OF CHEMICALS [15L]

Safe working procedure and protective environment, protective apparel, emergency procedure, first aid, laboratory ventilation, safe storage and use of hazardous chemicals, procedure for working with substances that pose hazards, flammable or explosive hazards, procedures for working with gases at pressures above or below atmospheric pressure, safe storage and disposal of waste chemicals, recovery, recycling and reuse of laboratory chemicals, procedure for laboratory disposal of explosives, identification, verification and segregation of laboratory waste, disposal of chemicals in the sanitary sewer system, incineration and transportation of hazardous chemicals.

REFERENCES:

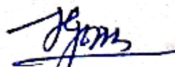
1. Dean, J. R., Jones, A. M., Holmes, D., Reed, R., Weyers, J., & Jones, A., (2011), *Practical skills in Chemistry*, 2nd Ed., Prentice Hall, Harlow.
2. Hibbert, D. B. & Gooding, J. J. (2006) *Data Analysis for Chemistry* Oxford University Press.
3. Topping, J., (1984) *Errors of Observation and their Treatment* 4th Ed., Chapman Hill, London.
4. Harris, D. C. (2007) *Quantitative Chemical Analysis* 6th Ed., Freeman Chapters 3-5
5. Levie, R. De. (2001) *How to use Excel in Analytical Chemistry and in general scientific data analysis* Cambridge University Press.
6. Chemical Safety matters - IUPAC-IPCS, (1992) Cambridge University Press.
7. OSU Safety manual 1.01

Semester IV: Practicals Course code: PSCHO4P1

Two steps preparations

1. Acetophenone → Acetophenone phenyl hydrazine → 2-phenyl




PRINCIPAL
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