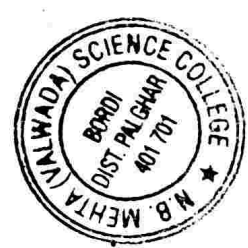


UNIVERSITY OF MUMBAI



**Revised Syllabus for S.Y.B.Sc.
Program: B.Sc.
Course: MICROBIOLOGY (USMB)**

(Choice Based Credit System with effect from the
Academic year 2017-18)
till date



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G.E. Society's N.B. Mehta Sci. College BORDI

SEMESTER I
Ability Enhancement Course 1 (FC I)
Societal Awareness

F.Y.

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT-107	Societal Awareness	2	
<p>Unit I Overview of Indian Society</p> <p>Understand the multi-cultural diversity of Indian society through its demographic composition: caste and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural urban and tribal characteristics; Understanding the concept of diversity as difference</p>			
15 Lectures	30 hrs		
<p>Unit II Concept of Disparity</p> <p>Concept of Disparity-I Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media; Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities</p> <p>Concept of Disparity-II Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences</p>			
15 Lectures	30 hrs		
<p>Unit III The Indian Constitution and Significant Aspects of Political Processes</p> <p>The Indian Constitution Philosophy of the Constitution as set out in the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution</p> <p>Significant Aspects of Political Processes The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics</p>			
15 lectures	30 hrs		

Topics for Project Guidance: Growing Social Problems in India:

- Suburban & urban impact on youth & challenges for the future
- HIV/AIDS awareness, prevention, treatment and services
- Problems of the elderly - causes, implications and response
- Issue of child labour - magnitude, causes, effects and response
- Child abuse - effects and ways to prevent
- Trafficking of women - causes, effects and response



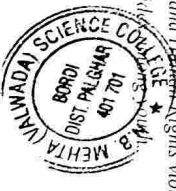
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SEMESTER II
Ability Enhancement Course 2 (FC II)
Globalization, Ecology and Sustainable Development

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT-207	Globalization, Ecology and Sustainable Development	2	
<p>Unit I Globalisation and Indian Society and Human Rights</p> <p>Globalisation and Indian Society: Understanding the concepts of liberalization, privatization and globalization; Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry; Changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.</p> <p>Human Rights Concept of Human Rights, origin and evolution of the concept; The Universal Declaration of Human Rights; Human Rights constituents with special reference to Fundamental Rights stated in the Constitution</p>			
15 Lectures	30 hrs		
<p>Unit II Ecology and Sustainable Development</p> <p>Ecology and Sustainable Development Importance of Environment; Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectivity; Environment as natural capital and connection to quality of human life; Environmental Degradation causes and impact on human life; Sustainable development, concept and components; poverty and environment</p>			
15 Lectures	30 hrs		
<p>Unit III Understanding and Managing Stress and Conflict in Contemporary Society</p> <p>Understanding Stress and Conflict Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society; Aggression and violence as the public expression of conflict</p> <p>Managing Stress and Conflict in Society Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation; Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society</p>			
15 lectures	30 hrs		

Topics for Project Guidance: Growing Social Problems in India:

- Increasing urbanization, problems of housing, health and sanitation;
- Changing lifestyles and impact on culture.
- Farmers' suicides and agrarian distress.
- Debate regarding Genetically Modified Crops
- Development projects and Human Rights violations.
- Increasing crime/suicide



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B. Sc (Information Technology)			
Course Name: Communication Skills	Semester – I		Course Code: US11105
Periods per week (1 Period is 50 minutes)	5		
Credits	2		
Evaluation System	Theory Examination	2½	Marks 75
	Internal	–	Marks 25

Unit	Details	Lectures
I	The Seven Cs of Effective Communication: Completeness, Conciseness, Consideration, Correctness, Clarity, Courtesy, Correctness Understanding Business Communication: Nature and Scope of Communication, Non-verbal Communication, Cross-cultural communication, Technology-enabled Business Communication	12
II	Writing Business Messages and Documents: Business writing, Business Correspondence, Instructions Business Reports and Proposals, Career building and Resume writing. Developing Oral Communication Skills for Business: Effective Listening, Business Presentations and Public Speaking, Conversations, Interviews	12
III	Developing Oral Communication Skills for Business: Meetings and Conferences, Group Discussions and Team Presentations, Team Briefing. Understanding Specific Communication Needs: Communication across Functional Areas	12
IV	Understanding Specific Communication Needs: Corporate Communication, Persuasive Strategies in Business Communication, Ethics in Business Communication, Business Communication Aids	12
V	Presentation Process: Planning the presentations, executing the presentations, Impressing the audience by performing, Planning stage: Brainstorming, mind maps / concept maps, executing stage: chunking theory, creating outlines, Use of templates: Adding graphics to your presentation: Visual communication, Impress stage: use of font, colour, layout, Importance of practice and performance.	12

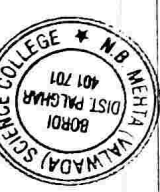
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Business Communication	Edited by Meenakshi Raman and Prakash Singh	Oxford University Press	Second	
2.	Professional Communication	Aruna Koneru	Tata McGraw Hill		



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B. Sc. (Information Technology)			
Course Name: Green Computing	Semester – II		Course Code: USIT205
Periods per week (1 Period is 50 minutes)	5		
Credits	2		
Evaluation System	Theory Examination	2½	Marks 75
	Internal	–	Marks 25

Unit	Details	Lectures
I	Overview and Issues: Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power. Initiatives and Standards: Global Initiatives: United Nations, Basel Action Network, Basel Convention, North America: The United States, Canada, Australia, Europe, WEEE Directive, RoHS, National Adoption, Asia: Japan, China, Korea.	12
II	Minimizing Power Usage: Power Problems, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, Low-Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, Software. Cooling: Cooling Costs, Power Cost, Causes of Cost, Calculating Cooling Needs, Reducing Cooling Costs, Economizers, On-Demand Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised Floors, Cable Management, Vapour Seal, Prevent Recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Datacentre Design, Centralized Control, Design for Your Needs, Put Everything Together.	12
III	Changing the Way of Work: Old Behaviours, starting at the Top, Process Reengineering with Green in Mind, Analysing the Global Impact of Local Actions, Steps: Water, Recycling, Energy, Pollutants, Teleworkers and Outsourcing, Telecommuting, Outsourcing, how to Outsource. Going Paperless: Paper: Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational Realities, Changing Over Paperless Billing, Handheld Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office SharePoint Server 2007, Electronic Data Interchange (EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles.	12



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IV	<p>Recycling: Problems, China, Africa, Materials, Means of Disposal, Recycling, Refurbishing, Make the Decision, Life Cycle, from beginning to end, Life, Cost, Green Design, Recycling Companies, Finding the Best One, Checklist, Certifications, Hard Drive Recycling, Consequences, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs, good and bad about CD and DVDs disposal, Change the mind-set, David vs. America Online</p> <p>Hardware Considerations: Certification Programs, EPEAT, RoHS, Energy Star, Computers, Monitors, Printers, Scanners, All-in-Ones, Thin Clients, Servers, Blade Servers, Consolidation, Products, Hardware Considerations, Planned Obsolescence, Packaging, Toxins, Other Factors, Remote Desktop, Using Remote Desktop, Establishing a Connection, In Practice</p>	12
V	<p>Greening Your Information Systems: Initial Improvement Calculations, Selecting Metrics, Tracking Progress, Change Business Processes, Customer Interaction, Paper Reduction, Green Supply Chain, Improve Technology Infrastructure, Reduce PCs and Servers, Shared Services, Hardware Costs, Cooling.</p> <p>Staying Green: Organizational Check-ups, Chief Green Officer, Evolution, Sell the CEO, SMART Goals, Equipment Check-ups, Gather Data, Tracking the data, Baseline Data, Benchmarking, Analyse Data, Conduct Audits, Certifications, Benefits, Realities, Helpful Organizations.</p>	12

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
✓ 1.	Green IT	Toby Velte, Anthony Velte, Robert Elsenpeter	McGraw Hill		2008
2.	Green Data Center: Steps for the Journey	Alvin Galea, Michael Schaefer, Mike Ebbers	Shroff Publishers and Distributers		2011
3.	Green Computing and Green IT Best Practice	Jason Harris	Emerero		
4.	Green Computing Tools and Techniques for Saving Energy, Money and Resources	Bud E. Smith	CRC Press		2014



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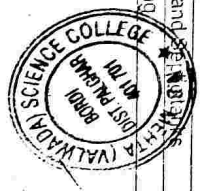
S.Y.B.Sc Microbiology Syllabus (General Outline)
Revised for Choice Based Credit System
To be Implemented from the Academic year 2017-18
Semester III

Course Code	Title	Credits	Lectures / Week
USMB-301	Biomolecules and Microbial taxonomy	2 Credits	
	Theory	(45 lectures)	3
	Unit-I	Estimation of Biomolecules	15 lectures
	Unit-II	Nucleic acid structure and chemistry	15 lectures
USMB-302	Environmental Microbiology	2 Credits	
	Theory	(45 lectures)	3
	Unit-I	Air Microbiology	15 lectures
	Unit-II	Fresh Water & Sewage Microbiology	15 lectures
USMB-303	Basic and Advanced Microbiology	2 Credits	
	Theory	(45 lectures)	3
	Unit-I	Basic Microbiology	15 lectures
	Unit-II	Common infectious diseases, Epidemiology and public health awareness	15 lectures
USMB-303	Basic and Advanced Microbiology	2 Credits	
	Theory	(45 lectures)	3
	Unit-I	Basic Microbiology	15 lectures
	Unit-II	Control of Microorganisms & Safety in Clinical Microbiology	15 lectures
USMB-303	Basic and Advanced Microbiology	2 Credits	
	Theory	(45 lectures)	3
	Unit-I	Basics of Microbiology	15 lectures
	Unit-II	Physical and chemical agents for Microbial Control	15 lectures
USMB-303	Basic and Advanced Microbiology	2 Credits	
	Theory	(45 lectures)	3
	Unit-I	Basics of Microbiology	15 lectures
	Unit-II	Basic DNA technology and Bioinformatics	15 lectures
SECTION-1	PRACTICALS	3 Credits	
	Theory	(45 lectures)	3
	Unit-I	Basics of Microbiology	15 lectures
	Unit-II	Physical and chemical agents for Microbial Control	15 lectures
SECTION-2	Biomolecules and Microbial taxonomy	1 Credit	
	Theory	(45 lectures)	3
	Unit-I	Estimation of Biomolecules	15 lectures
	Unit-II	Nucleic acid structure and chemistry	15 lectures
SECTION-3	Environmental Microbiology	1 Credit	
	Theory	(45 lectures)	3
	Unit-I	Air Microbiology	15 lectures
	Unit-II	Fresh Water & Sewage Microbiology	15 lectures
SECTION-3	Basic and Advanced Microbiology	1 Credit	
	Theory	(45 lectures)	3
	Unit-I	Basic Microbiology	15 lectures
	Unit-II	Control of Microorganisms & Safety in Clinical Microbiology	15 lectures



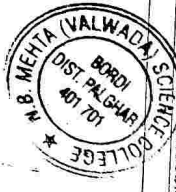
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Unit-I	Unit-II	Unit-III	Unit-IV
<p>1b. Methods of analysis used in classification : [2 L] Phenotypic analysis (Morphological characteristics, Physiological and metabolic characteristics, Fluorescent characteristics, Ecological characteristics, Fatty acid analysis)</p> <p>3c. Genetic analysis [4 L] DNA-DNA hybridization DNA profiling Multilocus sequence analysis G+C ratio Genetic finger printing</p> <p>3d. Amino acid sequencing [1L] 3e. Phylogenetic analysis [3 L] Nucleic acid sequencing Analysis of individual genes Multilocus gene sequence analysis - Whole genome sequence analysis 3f. Phylogenetic tree: Types [1 L]</p>	<p>1a. Aeromicrobiology [7 L]: Important airborne pathogens and toxins, Aerosols, nature of bioaerosols, aeromicrobiological pathway, microbial survival in the air, extramural aeromicrobiology, Inammural aeromicrobiology</p> <p>1c. Air Sanitation [2L] 3L 1d. Air Quality Standards: [3L] 2L 1L</p> <p>Unit II : Fresh Water and Sewage Microbiology : (7 Lectures) Unit II (A) Fresh Water Microbiology : 2a. Fresh water environments and micro-organisms found in Springs, rivers and streams, Lakes, marshes and bogs [3L] 2b. Potable water: Definition, water purification, water quality standards and pathogens transmitted through water [2L] 2c. Microbiological analysis of water: [2L] Indicator organisms and their detection in water- Total Coliforms, Fecal Coliforms and E. coli, Fecal Streptococci, Clostridium perfringens</p> <p>Unit II (B) Sewage Microbiology : (8 Lectures) 2d Modern Waste Water treatment: Primary, Secondary and Tertiary Treatment [2L] 2e. The nature of wastewater and Monitoring of waste water treatment process(BOD, COD) 2f. Removal of Pathogens by Sewage treatment Processes [1L] 2g. Oxidation Ponds and Sludge Processing [1L] 2h. Sludge Processing [1L]</p>	<p>Brook 12th 394 Prescott 8th 448-449 Prescott 7th 479-480 Prescott 8th 449-450 and Brook 12th 385-386 Brook 12th 386 (for FA analysis) Brook 12th 387-389</p> <p>Prescott 8th 453 Prescott 8th 455-456 Prescott 7th 485-486 Brook 12th 389-390 3</p> <p>Brook 12th 377-381 and Prescott 8th 456-458</p>	<p>15 Lectures Maier 83-97 Maier 149-154 Saite 661-668 NAAOS Manual Volume I</p> <p>Maier 116-115 Fobisher 683-687 Frobisher 698-706 Prescott 1053 (diagram) 1052 (table) Prescott- 1054--1057 Maier 485-491</p> <p>Maier 503-524 506-5111 503-506 511-513 513-516 521-523</p>



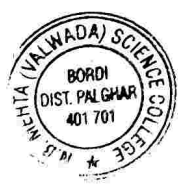
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21. Disposal of treated waste water and biosolids [2L]	516-518 523-524	15 lectures.	
Unit III: Soil and Geo Microbiology:			
3a. Terrestrial Environment [2L] Soil- Definition, Composition, function, Textural triangle		Kolwzan 8,9,11-16,21-23	
3b. Methods of studying soil microorganisms and their activities Cultural methods, Physiological methods, Sampling, Immunological methods, Nucleic acid based methods, Radiolotope techniques [5L]		Maier	
3c. Biogeochemical Cycles: Carbon cycle, Nitrogen cycle, Sulphur cycle, Phosphorus Cycle, Iron cycle [6L]		Maier 289-317 P cycle Subha Rao 293-295,298	
3d. Soil Bioremediation [2L]		Kolwzan 29-32	
USMB-303 Option A Theory	Introduction to Clinical Microbiology [REFER TO SEPA]	2 Credits (45 lectures)	
Basic Microbiology		15 lectures	
1a. Microbial World & you: Microbes in our lives Types of Microorganisms		102/204 2	
1b. Morphology and Physiology of Bacteria: Microscopy Staining - monochrome, differential and cytological Shape of Bacteria Bacterial Anatomy- Structure & function Growth and Multiplication of Bacteria Bacterial Growth Curve		Bailey & An. 5th 11-13 14-15 15-16 15-23 23-24	
1c. Culture Methods 1) Methods of Isolating Pure Cultures 2) Anaerobic Culture Methods (Anaerobic blood agar, Cooked meat media, Thioglycolate medium)		i) - Bailey 11 X ii) - Ananthnarayan. Ch. 5. 44-45 47-48	
1d. Culture Media and Bacterial Growth Types of Media and examples of media like Nutrient agar, Sabouraud agar, MacConkeys agar. Study of morphological & cultural characteristics.		Bailey, An Ch-4 30-45 Mackie - Inocula comp. 4 Ananthnarayan. Ch. 7. 54-57	
1e. Bacterial Taxonomy Nomenclature Type Cultures		Ananthnarayan. Ch. 7. 54-57	
Common infectious diseases, Epidemiology and public health awareness		15 lectures.	
Part A: Common infectious diseases (10 Lectures) - Total 20 Lectures			
2a. Skin Infections: Study of structure and functions of skin Study of skin infections caused by <i>Pseudomonas</i> , Acne & Measles		3	
2b. Infections of Nervous system Study of structure and functions of nervous system Study of Tetanus & Rabies		2	
2c. Infections of Respiratory systems Study of structure and function of respiratory system Study of pharyngitis, laryngitis, Sinusitis (learn terms only), Diphtheria and common cold		2	
2d. Infections of Digestive system Study of structure and function of Digestive system Study of Typhoid fever, E. coli gastroenteritis, Hepatitis A, Rotavirus and Amoebiasis		3	



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	<p>Perception of Research</p> <ul style="list-style-type: none"> Meaning of research P. M. Cook's definition of Research general characteristics of research functions of research specific characteristics of research objectives of research classification of research steps of action research characteristics of an investigator difference between action research and fundamental research 	<p>Research Methodology: Yogesh Kumar Singh, New age International Publisher</p> <p>Blank by email</p>
	<p>Scientific Writing</p> <ul style="list-style-type: none"> The research report Need of research report General format of research report Mechanics of report writing Writing research abstract Need of an Abstract Format of an abstract Characteristics of a good abstract Writing research papers Format of a research paper Advantages of a research paper 	<p>Research Methodology: Yogesh Kumar Singh, New age International Publisher</p>
	<p>Statistical Data Analysis</p> <ul style="list-style-type: none"> Meaning of the terms Statistics and data Methods of organising and presenting data The Graphical Presentation of Ungrouped Data 	<p>Research Methodology: Yogesh Kumar Singh, New age International Publisher</p>
III	<p>Biofertiliser, BioPesticide, Bioremediation</p> <p>Biofertiliser</p> <ul style="list-style-type: none"> Introduction of Biofertilizers. Different types of biofertilizers Mass production of Biofertilizers Application of Biofertilizers Azolla as cattle feed List of Biofertilizer production units in Tamil Nadu Constraints in Biofertilizer Technology Biofertilizer strains developed Economics Cost and availability of Biofertilizers 	<p>agritech man.ac.in/org_farm/orgfar in_biofertilizertechnology.html</p> <p>Ms. Anand Jankar</p> <p>R. C. Dubey</p>



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	<p>Biopesticides SL</p> <p>Introduction of biopesticides</p> <p>Types of Biopesticides</p> <p>Basic requirements for establishment of Biopesticide units</p> <p>Technical Aspects of Biopesticides</p> <p>Major biopesticides produced and used in India</p> <p>Biopesticide formulations</p> <p style="text-align: right;"><i>MS ul ords</i></p>	<ul style="list-style-type: none"> • Biopesticides: An eco-friendly approach for pest control Journal Biopesticides 3(1 Special Issue) 186 - 188 (2010) 186, Suman Gupta and A. K. Dikshit • Biopesticide Formulations, Possibility of Application and Future Trends Slavica Gašić and Brankica Tanović, Pestic. Phytomed. (Belgrade), 23(2), 2013, 97-102 Review paper • agritech.tnau.ac.in/farm-enterprises
	<p>Bioremediation SL</p> <p>Introduction</p> <p>Principle of Bioremediation:-</p> <p>Factors of Bioremediation:-</p> <p>Microbial Populations for Bioremediation processes</p> <p>Bioremediation strategies:-</p> <p>Advantages & Disadvantages of Bioremediation:</p>	<ul style="list-style-type: none"> • Bioremediation: Features, Strategies and applications, Shilpi Sharma. • Asian Journal of Pharmacy and Life Science ISSN 2231 - 4423, Vol. 2 (2), April-June, 2012. Available online on www.ajpls.com Review Article • Prescott and Harley 1075-79 • Bioremediation - An Overview Jr. of Industrial Pollution Control 27(2)(2011) pp 161-168, V. Mary Kensa




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