AC 7-4-2014
Item No. – 4.46

UNIVERSITY OF MUMBAI

Syllabus for the

Program: **B.Sc. Interdisciplinary Science**

Course : **Secretarial Practice**

(Credit Based Semester and Grading System with effect from the academic year 2014–2015)

Course: Secretarial Practice

Syllabus

For Credit Based Semester and Grading System
To be implemented form the Academic year 2014-2015

MODULE I

Course Code	Unit	Topics	Credits	L/Week
USIDSP01	I	Secretary, Joint stock company	3	1
	II	Company Meetings		1
	III	Business Correspondence		1

MODULE II

Course Code	Unit	Topics	Credits	L/Week
USIDSP02	I	Business Finance, Sources of Business Finance	3	1
	II	Role of a Secretary in the Capital Formation		1
	III	Declaration and payment of Dividend, Financial markets		1

SYLLABUS MODULE I

Course Code	Credits	
USIDSP01	**3 Credits (45 Lectures)**	
Secretary: Meaning, definition and importance. Types of secretaries: a) Personal b) Non – profit Association c) Co – operative Society d) Joint Stock Company e) Government department (Qualifications, qualities and functions) **Joint stock company:** Evolution, Definition and Features, Merits and limitations, Formation of Joint stock Company – Stages, Promotion, Incorporation, Capital raising and obtaining Trading Certificate, Documents related to the Formation of a Joint stock Company, Memorandum of Association, Articles of Association, Prospectus, Statement in lieu of prospectus (Meaning, purpose and contents of each document).		**15 Lectures**
Company Meetings : Provisions for convening and conducting a valid meeting. Provisions related to Notice, Agenda, Quorum, Proxy, Voting, Motions, Amendments, Resolutions, Minutes. Types of Meetings – Statutory Meeting, Annual General Meeting, Extra – Ordinary General Meeting, Meetings of Board of directors. Role of a Company secretary relating to Meetings.		**15 Lectures**
Business Correspondence : Basic principles of Business correspondence, Importance, Layout of a Business Letter, Essentials of a good business letter, Physical appearance of business letter, Precaution to be taken while writing business letters		**15 Lectures**

SYLLABUS MODULE II

Course Code	Credits	
USIDSP02	**3 Credits (45 Lectures)**	
Business Finance : Business Finance – Meaning, role, objectives of financial management. Financial planning – Meaning and importance. Capital structure – Meaning and factors. Fixed and working capital – Meaning and factors affecting their requirements. **Sources of Business Finance :** Nature and significance: Financial requirements and sources. Methods of raising finance Equity and preference shares Debentures and Bonds Retained profits Public deposits Loan from commercial banks Loan from financial institutions Trade credit Discounting of bills of Exchange Global Depository Receipt, American Depository Receipt		**15 Lectures**
Role of a Secretary in the Capital Formation Part I Meaning of issue of shares at par, premium and discount, at bid price, Meaning of Initial public offer. Meaning of bonus issue, Meaning of rights issue, Meaning of Employee stock option scheme, Meaning of private placement, Issue of shares – procedure, Allotment – Meaning, conditions for valid allotment, procedure, Transfer and Transmission of shares, Meaning, provisions, procedure, difference, Issue of share certificate and share warrant Meaning, provisions, procedure, difference. **Role of a Secretary in the Capital Formation Part II** Issue of debentures – procedure, conversion and redemption of debentures Deposits, invitation, acceptance, renewal, repayment, default and remedies, Depositories and dematerialization of securities – meaning, importance, procedure, secretarial duties in issuing securities in dematerialized form		**15 Lectures**

Declaration and payment of dividend Meaning, Provisions related to ascertainment of dividend, declaration of dividend and payment of dividend. Procedure of payment of dividend. Provisions regarding unpaid / unclaimed dividend Interim and final dividend Meaning and Difference **Financial markets** Concept of Financial market Money market nature, instruments. Capital market- nature and constituents, primary and secondary market. Distinction between capital market and money market. Stock Exchange, meaning, functions, BSE, NSEI, Trading procedure. Securities Exchange Board of India (SEBI) objectives, functions.	**15** **Lectures**

AC 7-4-2014
Item No. – 4.43

UNIVERSITY OF MUMBAI

Syllabus for the

Program: **B.Sc. Interdisciplinary Science**

Course : **Office Organization and Management**

(Credit Based Semester and Grading System with effect from the academic year 2014–2015)

Course: Office Organization and Management

Syllabus

For Credit Based Semester and Grading System
To be implemented form the Academic year 2014-2015

MODULE I

Course Code	Unit	Topics	Credits	L/Week
USIDOM01	I	Introduction	3	1
	II	Office Systems & Routines		1
	III	Office Accommodation & Working Environment		1

MODULE II

Course Code	Unit	Topics	Credits	L/Week
USIDOM02	I	Record Management	3	1
	II	Office equipment and machines		1
	III	Office automation practices, Safety & Security		1

SYLLABUS MODULE I

Course Code	Credits
USIDOM01	**3 Credits (45 Lectures)**

Introduction : Meaning & definition of office , nature of office Work, importance & functions of office ,meaning & Definition of office management, functions, duties & qualities of office manager	**15 Lectures**
Office Systems & Routines : Meaning & importance of system & routines, system Vs. Routines. Organization structure :- meaning & Definition of organization structure , importance of Organization structure, types of organization Structure, advantages and disadvantages of Different types of structures.	**15 Lectures**
Office Accommodation & Working Environment: Meaning & importance of office accommodation, Factors influencing choice of office Accommodation. Meaning and definition of working Environment, factors affecting working Environment.	**15 Lectures**

SYLLABUS MODULE II

Course Code	Credits
USIDOM02	**3 Credits (45 Lectures)**

Record Management : Meaning, definition & scope of record management, Principles of record keeping , filing :- meaning, definition & different types of filing system. Indexing:- meaning, definition & different types of indexing .	**15 Lectures**
Office equipment and machines : Introduction, Basic principles of selecting furniture, equipments Office furniture & its types Office machines and its merits & demerits.	**15 Lectures**
Office automation practices : Office machines & their uses computers, overhead projector, fax, modem, cellular's, latest communication system **Safety & Security** Meaning, importance of safety & security. Measures to ensure safety and security.	**15 Lectures**

AC 7-4-2014
Item No. – 4.46

UNIVERSITY OF MUMBAI

Syllabus for the

Program: **B.Sc. Interdisciplinary Science**

Course : **Secretarial Practice**

(Credit Based Semester and Grading System with effect from the academic year 2014–2015)

Course: Secretarial Practice

Syllabus

For Credit Based Semester and Grading System
To be implemented form the Academic year 2014-2015

MODULE I

Course Code	Unit	Topics	Credits	L/Week
USIDSP01	I	Secretary, Joint stock company	3	1
	II	Company Meetings		1
	III	Business Correspondence		1

MODULE II

Course Code	Unit	Topics	Credits	L/Week
USIDSP02	I	Business Finance, Sources of Business Finance	3	1
	II	Role of a Secretary in the Capital Formation		1
	III	Declaration and payment of Dividend, Financial markets		1

SYLLABUS MODULE I

Course Code	Credits	
USIDSP01	**3 Credits (45 Lectures)**	
Secretary: Meaning, definition and importance. Types of secretaries: a) Personal b) Non – profit Association c) Co – operative Society d) Joint Stock Company e) Government department (Qualifications, qualities and functions) **Joint stock company:** Evolution, Definition and Features, Merits and limitations, Formation of Joint stock Company – Stages, Promotion, Incorporation, Capital raising and obtaining Trading Certificate, Documents related to the Formation of a Joint stock Company, Memorandum of Association, Articles of Association, Prospectus, Statement in lieu of prospectus (Meaning, purpose and contents of each document).		**15 Lectures**
Company Meetings : Provisions for convening and conducting a valid meeting. Provisions related to Notice, Agenda, Quorum, Proxy, Voting, Motions, Amendments, Resolutions, Minutes. Types of Meetings – Statutory Meeting, Annual General Meeting, Extra – Ordinary General Meeting, Meetings of Board of directors. Role of a Company secretary relating to Meetings.		**15 Lectures**
Business Correspondence : Basic principles of Business correspondence, Importance, Layout of a Business Letter, Essentials of a good business letter, Physical appearance of business letter, Precaution to be taken while writing business letters		**15 Lectures**

SYLLABUS MODULE II

Course Code	Credits	
USIDSP02	**3 Credits (45 Lectures)**	
Business Finance : Business Finance – Meaning, role, objectives of financial management. Financial planning – Meaning and importance. Capital structure – Meaning and factors. Fixed and working capital – Meaning and factors affecting their requirements. **Sources of Business Finance :** Nature and significance: Financial requirements and sources. Methods of raising finance Equity and preference shares Debentures and Bonds Retained profits Public deposits Loan from commercial banks Loan from financial institutions Trade credit Discounting of bills of Exchange Global Depository Receipt, American Depository Receipt		**15 Lectures**
Role of a Secretary in the Capital Formation Part I Meaning of issue of shares at par, premium and discount, at bid price, Meaning of Initial public offer. Meaning of bonus issue, Meaning of rights issue, Meaning of Employee stock option scheme, Meaning of private placement, Issue of shares – procedure, Allotment – Meaning, conditions for valid allotment, procedure, Transfer and Transmission of shares, Meaning, provisions, procedure, difference, Issue of share certificate and share warrant Meaning, provisions, procedure, difference. **Role of a Secretary in the Capital Formation Part II** Issue of debentures – procedure, conversion and redemption of debentures Deposits, invitation, acceptance, renewal, repayment, default and remedies, Depositories and dematerialization of securities – meaning, importance, procedure, secretarial duties in issuing securities in dematerialized form		**15 Lectures**

Declaration and payment of dividend Meaning, Provisions related to ascertainment of dividend, declaration of dividend and payment of dividend. Procedure of payment of dividend. Provisions regarding unpaid / unclaimed dividend Interim and final dividend Meaning and Difference **Financial markets** Concept of Financial market Money market nature, instruments. Capital market- nature and constituents, primary and secondary market. Distinction between capital market and money market. Stock Exchange, meaning, functions, BSE, NSEI, Trading procedure. Securities Exchange Board of India (SEBI) objectives, functions.	**15** **Lectures**

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)

Preamble

Choice Based Credit System (CBCS) was introduced by our University from the academic year 2016-2017. Objective is to create a curriculum where students are given a chance to learn course of their choice from other subjects, giving them opportunity to choose from a bouquet of Science Courses relevant to their curiosity and future career goal.

The process was initiated with restructuring of FYBSc syllabus according to this CBCS pattern and its implementation in year 2016-2017. As a continuation of this theme, the restructured syllabus of SYBSc is prepared as per the CBCS pattern. As a part of this theme, in SYBSc Paper III in all subjects is available to any BSc student irrespective of their subject combination. So students of any subject interested in Microbiology can opt for Paper III of Microbiology course. Likewise Microbiology Students can opt for Paper III of any subject available in their College. Since this paper is open to all students, 2 options are created to provide diversity of applied topics and choice for student and students can select any one option (provided it is offered by their college) relevant to their curiosity and future career goal.

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

	SEMESTER III		
Course Code	**Title**	**Credits**	Lectures / week
USMB-301 Theory	**Biomolecules and Microbial taxonomy**	2 Credits (45 lectures)	3
Unit-I	Estimation of Biomolecules	15 lectures.	1
Unit-II	Nucleic acid structure and chemistry	15 lectures.	1
Unit-III	Microbial Taxonomy	15 lectures.	1
USMB-302 Theory	**Environmental Microbiology**	2 Credits (45 lectures)	3
Unit-I	Air Microbiology	15 lectures.	1
Unit-II	Fresh Water & Sewage Microbiology	15 lectures.	1
Unit-III	Soil and Geo Microbiology	15 lectures.	1
USMB-303 Option A Theory	**Introduction to Clinical Microbiology**	2 Credits (45 lectures)	3
Unit-I	Basic Microbiology	15 lectures.	1
Unit-II	Common infectious diseases, Epidemiology and public health awareness	15 lectures.	1
Unit-III	Control of Microorganisms & Safety in Clinical Microbiology	15 lectures.	1
	OR		
USMB-303 Option B	**Basic and Advanced Microbiology**	2 Credits (45 lectures)	3
Unit-I	Basics of Microbiology	15 lectures.	1
Unit-II	Physical and chemical agents for Microbial Control	15 lectures.	1
Unit-III	Basic r DNA technology and Bioinformatics	15 lectures.	1
USMBP-3	PRACTICALS	3 Credits	9
SECTION-1	**Biomolecules and Microbial taxonomy** (Practicals Based On Unit-I,II & III Of USMB-301	1 Credit (45 lectures)	3
SECTION-2	**Environmental Microbiology** (Practicals Based On Unit-I,II & III Of USMB-302	1 Credit (45 lectures)	3
SECTION-3 Any One Option	Option A: **Introduction to Clinical Microbiology** (Practicals Based On Unit-I,II & III Of USMB-303 Option A)	1 Credit (45 lectures)	3
	Option B: **Basic and Advanced Microbiology** (Practicals Based On Unit-I,II & III Of USMB-303 Option B)	1 Credit (45 lectures)	3

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

	SEMESTER IV		
Course Code	**Title**	**Credits**	**Lectures / week**
USMB-401 Theory	**Metabolism & Basic Analytical Techniques**	2 Credits (45 Lectures)	3
Unit-I	Introduction To Metabolism & Bioenergetics	15 lectures.	1
Unit-II	Enzyme Kinetics	15 lectures.	1
Unit-III	Analytical techniques	15 lectures.	1
USMB-402 Theory	**Applied Microbiology**	2 Credits (45 Lectures)	3
Unit-I	Host defence and public health (Epidemiology of infectious diseases)	15 lectures.	1
Unit-II	Food Microbiology	15 lectures.	1
Unit-III	Dairy Microbiology	15 lectures.	1
USMB-403 Option A Theory	**Fermented Foods, Food Sanitation and Microbial Ecology**	2 Credits (45 lectures)	3
Unit-I	Fermented Foods	15 lectures.	1
Unit-II	Food Sanitation	15 lectures.	1
Unit-III	Microbial evolution and ecology	15 lectures.	1
USMB-403 Option B Theory	**Advances & Applications Of Microbiology and Soft Skills**	2 Credits (45 lectures)	3
Unit-I	Nanobiotechnology, Biofilms and biosensors with applications	15 lectures.	1
Unit-II	Scientific writing, research methodology and Biostatistics	15 lectures.	1
Unit-III	Biofertiliser, Biopesticide , Bioremediation	15 lectures.	1
USMBP-4	PRACTICALS	3 Credits	9
SECTION-1	**Metabolism & Basic Analytical Techniques** (Practicals Based On Unit-I,II & III Of USMB-401	1 Credit (45 lectures)	3
SECTION-2	**Applied Microbiology** (Practicals Based On Unit-I,II & III Of USMB-402	1 Credit (45 Lectures)	3
SECTION-3 Any One Option	Option A **Fermented Foods, Food Sanitation and Microbial Ecology** (Practicals Based On Unit-I,II & III Of USMB-403 Option A)	1 Credit (45 Lectures)	3
	Option B **Advances & Applications Of Microbiology and Soft Skills** (Practicals Based On Unit-I,II & III Of USMB-403 Option B)	1 Credit (45 Lectures)	3

S.Y.B.Sc Microbiology: Detail Syllabus
Revised for Credit Based Semester & Grading System
To be implemented from the academic year 2017-18

Bachelor of Science in Microbiology Duration: Six Semesters			
SEMESTER III			
Course Code	**Title**	**Credits**	Notional Periods
USMB-301 Theory	**Biomolecules and Microbial taxonomy**	**2 Credits (45 lectures)**	Self Study (45)
Unit-I	**Unit I: Estimation Of Biomolecules**	15 Lectures	15
	1a. Macromolecular composition of a microbial cell	1	
	1b. Methods of elemental analysis: Carbon ,Nitrogen and Phosphorus	3	
	1c. Estimation of Proteins and amino acids Proteins by Biuret method (Direct and indirect) Amino acids by Ninhydrin method	3	
	1d. Estimation of Carbohydrates Total carbohydrates by Anthrone method Reducing Sugars (maltose) by DNSA method Reducing sugar Felhing's method	3	
	1e. Extraction of Lipids by Soxhlet method	1	
	1f. Estimation of Nucleic acids General principles and extraction of nucleic acids DNA by DPA method RNA by Orcinol method	4	
Unit-II	**Unit II: Nucleic acid structure and chemistry**	15 Lectures	15
	2a. Nucleic Acid Structure DNA stores genetic information DNA molecules have distinctive base composition DNA is a double helix DNA can occur in different 3D forms DNA sequences adopt unusual structures Many RNAs have complex 3D structures	15	
	2b. Nucleic acid chemistry Denaturation of double helical DNA and RNA Nucleic acid from different species can form hybrids Nucleotides and nucleic acids undergo non enzymatic transformations DNA methylation		
	2c. Other Functions of nucleotides		
	2d. Structures of chromosomes of eukaryotic cell		
Unit-III	**Unit III. Microbial Taxonomy**	15 Lectures	15
	3a. Introduction to microbial taxonomy Systems of classification(Cavalier Smith 6 kingdom) Bergey's manual The three domain concept based on phylogeny Nomenclature Taxonomic ranks	4	

	Numerical Taxonomy		
	3b. Methods of analysis used in classification : Phenotypic analysis (Morphological characteristics, Physiological and metabolic characteristics, Biochemical characteristics, Ecological characteristics, Fatty acid analysis)	2	
	3c. Genetic analysis DNA-DNA hybridization DNA profiling Multilocus sequence analysis G+C ratio Genetic finger printing	4	
	3d. Amino acid sequencing	1	
	3e. Phylogenetic analysis Nucleic acid sequencing Analysis of individual genes Multilocus gene sequence analysis Whole genome sequence analysis	3	
	3f. Phylogenetic tree: Types	1	
USMB-302 Theory	**Environmental Microbiology**	**2 Credits (45 lectures)**	Self Study (45)
Unit-I	**Unit I: Air Microbiology**	15 Lectures	
	1a. Aeromicrobiology: Important airborne pathogens and toxins, Aerosols, nature of bioaerosols, aeromicrobiological pathway, microbial survival in the air, extramural aeromicrobiology, intramural aeromicrobiology	7	**15**
	1b. Sampling Devices for the Collection of Air Samples, Detection of microorganisms on fomites	3	
	1c. Air Sanitation	2	
	1d. Air Quality Standards	3	
Unit-II	**Unit II : Fresh Water and Sewage Microbiology**	15 lectures.	15
	Unit II (A) Fresh Water Microbiology: (**7 Lectures**)		
	2a. Fresh water environments and micro-organisms found in Springs, rivers and streams, Lakes , marshes and bogs	3	
	2b. Potable water: Definition, water purification ,water quality standards and pathogens transmitted through water	2	
	2c. Microbiological analysis of water: Indicator organisms and their detection in water- Total Coliforms, Fecal Coliforms and *E. coli*, Fecal *Streptococci*, *Clostridium perfringens*	2	
	Unit II (B) Sewage Microbiology : (8 Lectures)		
	2d Modern Waste Water treatment: Primary, Secondary and Tertiary Treatment . The	1	
	2e. nature of wastewater and Monitoring of waste water treatment process(BOD,COD)	2	
	2f. Removal of Pathogens by Sewage treatment Processes	1	
	2g. Oxidation Ponds and Septic tanks	1	
	2h. Sludge Processing	1	

	2i. Disposal of treated waste water and biosolids.	2	
Unit-III	**Unit III: Soil and Geo Microbiology:**	15 lectures.	15
	3a. Terrestrial Environment Soil- Definition, Composition, function , Textural triangle Types of soil microorganisms and their activities	2	
	3b. Methods of studying soil microorganisms: Sampling, Cultural methods, Physiological methods, Immunological methods, Nucleic acid based methods, Radioisotope techniques	5	
	3c. Biogeochemical Cycles: Carbon cycle, Nitrogen cycle, Sulphur cycle, Phosphorus Cycle, Iron cycle	6	
	3d. Soil Bioremediation	2	
USMB-303 Option A Theory	**Introduction to Clinical Microbiology**	**2 Credits (45 lectures)**	Self Study (45)
Unit-I	**Basic Microbiology**	15 lectures.	15
	1a. Microbial World & you: Microbes in our lives Types of Microorganisms	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	5	
	1c. Culture Methods Methods of Isolating Pure Cultures Anaerobic Culture Methods (Anaerobic blood agar, Cooked meat media, Thioglycollate medium)	3	
	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.	4	
	1e. Bacterial Taxonomy Nomenclature Type Cultures	1	
Unit-II	**Common infectious diseases, Epidemiology and public health awareness**	15 lectures.	15
	Part A: Common infectious diseases (10 Lectures)		
	2a. Skin Infections: Study of structure and functions of skin Study of skin infections caused by *Pseudomonas*, 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	
	Part B: Epidemiology and Public Health Awareness (5 Lectures)		
	2e. The Epidemiology of Infectious Diseases and Their Control Epidemiological terminology: Epidemiology, sporadic diseases, endemic diseases, Hyperendemic Diseases, Epidemic Diseases, Index Case, Pandemic Disease, Outbreak	1	
	2f. The Spread of Infection: Reservoirs of infection - Human reservoir, Animal reservoir, non-living reservoir Transmission of Disease- Contact transmission, Vehicle Transmission and vectors	2	
	2g. Public Health Measures For Control Of Disease: Control directed against reservoir, Transmission of the pathogens. Immunisation, Quarantine, Surveillance and pathogen eradication	2	
Unit-III	**Control of Microorganisms & Safety in Clinical Microbiology**	15 lectures.	15
	3a. Sterilization and disinfection Methods of sterilization: Dry heat: Hot air sterilizers Moist heat: Steaming at 100°C, Autoclave. Gas Sterilization: Ethylene oxide sterilizer, Gas plasma Sterilizing filters Sterilization by radiation	6	
	3b. Disinfectants: Disinfection of surfaces and spillages Disinfection of safety cabinets Discard jars Disinfection of rooms Disinfection of skin Testing of disinfectants	4	
	3c. Safety in Clinical Microbiology Chemical safety Fire safety Electrical safety Handling of compressed gases: Exposure control plan: Employee education and orientation, Disposal of hazardous waste, Standard precautions, Engineering controls: Laboratory Environment, Biological safety cabinet, Personal protective equipment, Post exposure control Classification of biologic agents based on hazard	5	
USMB-303 Option B Theory	**Basic and Advanced Microbiology**	**2 Credits (45 lectures)**	Self Study (45)
Unit-I	**Basics of Microbiology**	15 lectures.	15

	1a. Major fields of Microbiology	1	
	1b. Members of microbial world Size, shape, arrangement and prokaryotic cell structure	2	
	1c. Microscopy :Bright field and dark field	1	
	1d. Staining differential and cytological	1	
	1e. Microbial nutrition	2	
	1f. Culture media	1	
	1g. Growth curve	2	
	1h. Measurement of growth	3	
	1i. Effect of pH, temperature ,O_2 on growth	2	
Unit-II	**Physical and chemical agents for Microbial Control**	15 lectures.	15
	2a. Controlling Micro-organisms: Relative resistance of microbial forms; Terminology and methods of Microbial control; Microbial death and factors that affect death rate;	3	
	2b. Antimicrobial agents and their modes of action	1	
	2c. Methods of Physical Control and their applications: Heat, Cold, Desiccation ,Osmotic Pressure, Radiation and Filtration	5	
	2d. Chemical agents in Microbial Control: Choosing a Microbicidal chemical; Factors that affect the germicidal activity of chemicals Germicidal chemical compounds: their modes of action and applications(Halogens, phenolic compounds, alcohols, hydrogen peroxide, aldehydes, Gases, detergents and soaps, heavy metals, dyes, acids, alkalis, , Quaternary Ammonium compounds)	6	
Unit-III	**Basic r DNA technology and Bioinformatics**	15 lectures.	15
	3a. Recombinant DNA Technology: Historical Perspectives Techniques used in r DNA technology Synthetic DNA The Polymerase Chain Reaction Gel Electrophoresis Cloning vectors and creating Recombinant DNA Construction of Genomic Libraries Inserting Recombinant DNA into Host cells Expressing Foreign Genes in Host cells Social Impacts of Recombinant DNA Technology Applications of Genetic Engineering	**10**	
	3b. Bioinformatics Introduction Definition, aims, tasks and applications of Bioinformatics. Database, tools and their uses - ▪ Importance, Types and classification of databases ▪ Nucleic acid sequence databases- EMBL, DDBJ, GenBank, ▪ Protein sequence databases-PIR, SWISS-PROT, TrEMBL	**5**	

	Different terminologies – Transcriptome, Metabolomics, Pharmacogenomics, Phylogenetic analysis, Phylogenetic tree, Annotation,. Sequence alignment—(global, local), FASTA, BLAST. Genomics (structural, functional and comparative genomics), Proteomics (structural and functional proteomics)		
USMBP-3	**PRACTICALS**	**2 Credits**	Notional Periods
Section-1	**Biomolecules and Microbial taxonomy** (Practicals Based On Unit-I,II & III Of USMB-301		
Unit-I	1. Estimation of total sugar by Anthrone method(Demo) 2. Estimation of reducing sugar by DNSA method 3. Estimation of reducing method by Felhing's method 4. Estimation of protein Biuret method (indirect and direct) 5. Extraction of lipid by Soxhlet method (Demonstration)	**1 Credit (45 lectures)**	Self Study (45)
Unit-II	6. Isolation and detection of DNA from onion / E.coli 7. Estimation of DNA by DPA method 8. Estimation of RNA by Orcinol method		
Unit-III	9. Identification of bacteria		
Section-2	**Environmental Microbiology** (Practicals Based On Unit-I,II & III Of USMB-302		
Unit-I	1. Enumeration of microorganisms in air and study of its load after fumigation 2. Study of air microflora and determination of sedimentation rate	**1 Credit (45 lectures)**	Self Study (45)
Unit-II	3. Routine analysis of water: a. Standard Plate Count b. Detection of Coliforms in water: Presumptive Test, Confirmed Test and Completed Test c. Rapid Detection of E.coli by MUG Technique (Demonstration) 4. Waste water analysis: a. Study of microbial flora in raw and treated sewage b. Determination of total solids in wastewater c. Determination of BOD and COD of wastewater		
Unit-III	5. Total viable count of soil microflora 6. Isolation of bacteria, Actinomycetes and fungi from soil 7. Enrichment and isolation of Nitrosifiers, Nitrifiers, Cellulose degraders, Sulphate reducers and Phosphate solubilisers from soil 8. Winogradskys column 9. Visit to a sewage treatment plant or water purification plant		
Section-3 Option A	Option A: **Introduction to Clinical Microbiology** (Practicals Based On Unit-I,II & III Of USMB-303 Option A)		
Unit-I	1 Study of different parts of a compound Microscope. 2 Monochrome staining of bacterial smear.	**1 Credit**	Self Study

	3 Gram staining of bacterial smear. 4 To study the growth of yeast on the Sabouraud agar To study the growth of lactose fermentor and non lactose fermentors on the MacConkey's agar	**(45 lectures)**	(45)
Unit-II	5 Isolation of *Pseudomonas, Escherichia coli and S. typhi* 6 Permanant slides of *Entamoeba histolytica* 7 Assignment on: i. Normal flora of - skin/ respiratory system/ nervous system / digestive system, ii. Immunization programmes in India (role of CDC, WHO, ICMR, NICD, NAARI)		
Unit-III	8 Determination of MIC of a chemical disinfectant 9 AST-Kirby method 10 Effect of UV		
Section-3 Option B	Option B: **Basic and Advanced Microbiology** (Practicals Based On Unit-I,II & III Of USMB-303 Option B)		
Unit-I	1 Aseptic transfer techniques 2 Methods of inoculation 3 Isolation of culture on Nutrient agar and MacConkey's agar 4 Gram staining 5 Viable count (demonstration)	**1 Credit (45 lectures)**	Self Study (45)
Unit-II	6 Introduction to Safety Measures in the Laboratory : Disinfection and discarding techniques in the Laboratory 7 Method of preparation and sterilization of glassware and other material 8 Effect of Osmotic pressure, Heavy metals on bacteria 9 To study the sensitivity of micro-organisms to chemotherapeutic agents by disc inhibition method		
Unit-III	10 Isolation of plasmid (demonstration) 11 Restriction digestion (demonstration) 12 Visiting & exploring NCBI and EMBL websites a) Using BLAST and FASTA for sequence analysis b) Fish out homologs for given specific sequences (by teacher – decide sequence of some relevance to their syllabus and related to some biological problem e.g. evolution of a specific protein in bacteria, predicting function of unknown protein from a new organism based on its homology) c) Pair-wise alignment and multiple alignment of a given protein sequences d) Formation of phylogenetic tree		

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S.Y.B.Sc Microbiology: Detailed Syllabus
Revised for Credit Based Semester & Grading System
To be implemented from the academic year 2017-18

SEMESTER IV			
Course Code	**Title**	**Credits**	Notional Periods
USMB-401 Theory	**Metabolism & Basic Analytical Techniques**	**2 Credits (45 lectures)**	Self Study (45)
Unit-I	**Introduction To Metabolism & Bioenergetics**	15 Lectures	15
	1a Introduction to metabolism, Metabolic pathways	2	
	1b Organic reaction mechanism	3	
	1c Experimental approaches to study metabolism 1d Thermodynamics of Phosphate compounds 1e Oxidation-reduction reactions 1f Thermodynamics of life	10	
Unit-II	**Enzyme Kinetics**	15 Lectures	15
	2a. Introduction of Enzymes: General properties of enzymes How do enzymes accelerate reaction Rate law for a simple catalysed reaction, Michaelis-Menten equation and it's derivation Lineweaver Bruck plot Classification of enzymes	6	
	2b. Overview of Coenzyme: Coenzymes: Different types and reactions catalyzed by coenzymes (in tabular form) Nicotinic acid: structure, occurrence & biochemical function	2	
	2c. Enzyme Kinetics: Saturation kinetics Effect of temperature and pH Effect of Inhibitors- Reversible and irreversible, competitive, Non competitive and uncompetitive inhibitors Multisubstrate reactions- Ordered, Random and pingpong reactions Allosteric effects in enzyme catalysed reactions- Koshland-Nemethy and Filmer model & Monod, Wyman and Changeux model	7	
Unit-III	**Analytical techniques**	15 Lectures	15
	3a.Chromatography Introduction to chromatography, types of chromatography Paper chromatography:Principle, circular, ascending and descending Paper Chromatography, Separation of amino acids and monosaccharides by Paper Chromatography. Thin layer chromatography : principle, preparation of TLC plates, procedure for TLC, preparative TLC, 2D TLC [one paragraph], HPTLC-[1 page],	8	

	Separation of amino acids and sugars by TLC. Column chromatography : Introduction & principle Exclusion chromatography , gel chromatography		
	3b. Centrifugation Introduction : basic principles of sedimentation Types, care and safety aspects of centrifuges, types of rotors , care and maintenance, safety & centrifugation Preparative centrifugation & its applications, Analytical centrifugation and its application	5	
	3c. Electrophoresis General principles, support media –agarose gels, polyacrylamide gels	2	
USMB-402 Theory	**Applied Microbiology**	**2 Credits (45 lectures)**	Self Study (45)
Unit-I	**Host defence and public health (Epidemiology of infectious diseases)**	15 lectures	
	Innate immunity and immune system (11 Lectures)		
	1a. Classification of immune system (innate immunity & acquired immunity)	2	
	1b. Physical barriers in non specific innate resistance revision.Chemical barriers (Complement: principle & significance (no pathway), Cytokines: interferon, antimicrobialpeptides, bacteriocins	4	
	1c. Cells of immune sytem: Haematopoiesis,lymphocyctes, monocytes & macrophages, granulocytes, mast cells, dendritic cells & NK cells	2	
	1d.Phagocytosis & Inflammation	3	
	Epidemiology of infectious diseases (4 Lectures)		
	1e.Tools of epidemiology, recognition of an infectious disease in population	4	
	1f. Spread of infection: Reservoirs and transmissions. Nosocomial infections: Micro organism in hospital, compromised host, chain of transmission, control of nosocomial infection.	4	
Unit-II	**Food Microbiology**	15 lectures.	15
	2a. Introduction, Food as a substrate for microorganism a. pH, aw, O-R potential b. Nutrient Content c. Accessory food substances d. Inhibitory substances & biological structure e. Combined effects of factors affecting growth	2	
	2b. Food Control Enforcement & Control Agency: International agencies, Federal agencies (FDA, USDA), FSSAI[website], Introduction to HACCP	1	

	2.c Important Microorganisms in Food Microbiology: General characteristics of the enlisted organisms to be studied wrt spoilage and transmission of infection/intoxication (no clinical features and structural details) A. Spoilage -causing microorganisms a. Yeast & Molds: Saccharomyces, *Aspergillus & Penicillium* b. Bacteria: *Bacillus, Clostridium, Flavobacterium, Pseudomonas* B. Food-borne Illness associated Microorganisms: Classification of Food-borne diseases (Schematic). Bacteria responsible for food -borne intoxication and infections-overview/tabulation. Examples of non-bacterial food-borne pathogens Details of : a) Staphylococcus food intoxication (organism, enterotoxin, incidence, foods involved, prevention of outbreaks) b) Salmonellosis (organism, source, incidence, foods involved, outbreak-conditions & prevention)	5	
	2d. Food Spoilage, General Principles of spoilage of: a. Fruits and vegetables b. Meat (including spoilage under aerobic & anaerobic conditions- exclude spoilage of different kinds of meats) c. Canned foods	3	
	2e. General Principles of Food Preservation: a. Preservation using High temperature (including TDT, D, F, Z values, 12D concept), principle of canning b. Low temperature c. Drying d. Food preservatives (organic acids & their salts, Sugar & salt) e. Ionizing radiations	4	
	2f. Methods of microbial examination of foods: a. Homogenization of food samples b. Methods- SPC, spiral plater, membrane filters, dry films, surface examination-swab rinse & contact plate methods. c. Enlist the following methods giving their application only- Impedance, microcalometry, thermostable nuclease, LAL test, PCR, ATP, whole animal assay, Ligate loop technique	3	
Unit-III	**Dairy Microbiology**	15 lectures.	15
	3a. Raw and fluid milk products Pasteurization & Ultra-pasteurization	2	
	3b. Concentrated and dry milk, whey	2	
	3c. Microbiology of butter	1	
	3d. Fermented milk: Yogurt, cultured buttermilk and fermented milk in India	3	

	3e. Cheese: Cheddar, Cottage, Processed Cheese, Cheese Defects. Enlist other cheese and associated microorganisms	4	
	3g. Microbiological Quality of Milk & Milk Products: SPC, coliform count, LPC, thermophilic, psychrophilic counts and RPT (RRT, MBRT, DMC)	3	
USMB-403 Option A Theory	**Fermented Foods, Food Sanitation and Microbial Ecology**	**2 Credits (45 lectures)**	Self Study (45)
Unit-I	**Fermented Foods**	15 lectures.	15
	1a. Microorganisms used in food fermentations: yeasts, molds and lactic acid bacteria	2	
	1b. Microbiology of fermented food: bread, cheese, idli butter, yogurt, soy products, tea, coffee and cocoa,	4	
	1c. Fermented beverages: beer, wine	4	
	1d. Food ingredients of microbial origin: SCP, amino acids, vitamins, colours, nutraceuticals and flavours	3	
	1e. Probiotics and intestinal bacteria	2	
Unit-II	**Food Sanitation**	15 lectures.	15
	2a. Food Sanitation & Hygiene: Water, potable water, Sources of contamination of water, treatment of water, pesticide residue	4	
	2b. Food, Food Handling, Food contamination, equipment, Control of insects & Rodents, Practical rules for good sanitation.	3	
	2c. Food borne diseases	3	
	2d. Toxins from plants, toxins from animals, Mycotoxins, Toxic Agricultural Residues, Poisoning by chemicals, Food poisoning by bacteria, Food infections, other infection.	3	
	2e. Food laws and food adulteration	1	
	2f. Consumer protection & consumer guidance society	1	
Unit-III	**Microbial evolution and ecology**	15 lectures.	15
	3a. Microbial evolution: formation and early history of earth, origin of cellular life, microbial diversification, endosymbiotic origin of eukaryotes	5	
	3b. Microbial ecosystems: Principles of microbial ecology, the microbial habitats, fresh water ,soil and plant microbial ecosystems, marine microbial ecosystems	7	
	3c. Microbial Ecology and its Methods - An Overview	3	
USMB-403	**Advances & Applications Of Microbiology and Soft Skills**	**2 Credits**	Self Study

Option B Theory		**(45 lectures)**	(45)
Unit-I	**Nanobiotechnology, Biofilms and biosensors with applications**	15 lectures.	15
	1a. Nanobiotechnology Introduction of Nanobiotechnology & application in drug and gene delivery Types of nanomatrials- nanoparticles, nanocapsules, nanotubes, liposomes, nanogels, Dendrimers, Gold nanoparticles.(Definition and applications)	8	
	1.b Biofilms and biosensors with applications: Biosensors: Introduction, design, working and applications of biosensors Biofilms: Introduction of biofilms, Types of biofilms, Mechanism of formation of biofilms and applications of biofilms.	7	
Unit-II	**Scientific writing, research methodology and Biostatistics**	15 lectures.	15
	2.a Perception of Research 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	5	
	2b. Scientific Writing 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 and Characteristics of a good abstract Writing research papers: Format of a research paper ,Advantages of a research paper	5	
	2c Basics of Biostatistics Introduction to Biostatistics Sample and Population Data presentation: Dot diagram, Bar diagram, Histogram, Frequency curve. Central Tendency: Mean, Median, Mode Summation, notations. Standard Deviation, Variance, Q-Test, t-Test	5	
Unit-III	**Biofertiliser, BioPesticide , Bioremediation**	15 lectures.	15
	3a. Biofertiliser Introduction of Biofertilizers. Different types of biofertilizers Mass production of Biofertilizers Application of Biofertilizers	8	

	Azolla as cattle feed List of Biofertilizer production units Constraints in Biofertilizer Technology Biofertilizer strains developed		
	3b. Biopesticides Introduction of biopesticides Types of Biopesticides Basic requirements for establishment of Biopesticide units Technical Aspects of Biopesticides Major biopesticides produced and used in India Biopesticide formulations	3	
	3c. Bioremediation Introduction Principle of Bioremediation Factors affecting Bioremediation Microbial Populations used for Bioremediation processes Bioremediation strategies Advantages & Disadvantages of Bioremediation	4	
USMBP-4	**PRACTICALS**	**2 Credits**	
SECTION-1	**Metabolism & Basic Analytical Techniques** (Practicals Based On Unit-I,II & III Of USMB-401	**1 Credit (45 lectures)**	Self Study (45)
Unit-I	1. Problems on bioenergetics to calculate the Keq.; Gibbs energy , enthalpy, etc. .		
Unit-II	2. Isolation of amylase, protease, lipase producers. 3. Extracellular production of invertase from yeast. 4. Effect of pH, Temp, substrate and enzyme concentration on activity of invertase. 5. Determination of Km and Vmax of an enzyme.		
Unit-III	6. Separation and identification of amino acids and sugars by ascending paper chromatography. 7. Sizing Yeast cells 8. Electrophoresis & centrifuge machine [D]		
Section-2	**Applied Microbiology** (Practicals Based On Unit-I,II & III Of USMB-402	**1 Credit (45 lectures)**	Self Study (45)
Unit-I	1. Differential staining:Blood staning 2. Isolation of organism from fomites. 3. Pyocin typing 4. Phagocytosis (demonstration) 5. Selective isolation of *Staphylococcus & Pseudomonas sp*		
Unit-II	6. Isolation of food spoilage agent: a) Fruit/Vegetable- Physical & Microscopic & Pectinolytic agent b) Meat - Proteolytic, lipolytic, sacchrolytic 7. Determination of TDT and TDP 8. Determination of Salt and sugar tolerance 9. Determination of MIC of a Chemical preservative 10. Visit to Food/Dairy industry		
Unit-III	11. RPT of Milk– RRT, MBRT, DMC 12. Microbiological Quality Control of Milk as per BIS/FSSSAI 13. Analysis of Cheese, Paneer, Butter, Yogurt/curd as		

	per BIS/FSSAI (Group experiment)		
Section- 3 Option A	**Fermented Foods, Food Sanitation and Microbial Ecology** (Practicals Based On Unit-I,II & III Of USMB-403 Option A	**1 Credit (45 lectures)**	Self Study (45)
Unit-I	1. Wine and Bread making 2. Isolation of lactic acid bacteria from fermented food-eg Idli, curd		
Unit-II	3. Isolation of *Staphylococcus aureus* from sweets and demonstrating its virulence. 4. Food adulteration		
Unit-III	5. Winogradskys Column of an aquatic ecosystem		
Section-3 Option B	**Advances , Applications Of Microbiology and Soft Skills** (Practicals Based On Unit-I,II & III Of USMB-403 Option B	**1 Credit (45 lectures)**	Self Study (45)
Unit-I	1. Study of biofilm: slide immersion tech and staining 2. Preparation of nano particles and study their antibacterial activity [D]		
Unit-II	3. Assignment on report writing 4. Writing an abstract from a given paper 5. Statistical analysis of given data		
Unit-III	6. Isolation of Azotobacter 7. Isolation of Rhizobium 8. Efficacy of biofertilizer		

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2. Fundamentals of Biochemistry. D. Voet and J. Voet Publisher Wiley plus Edition 5th.
3. Lehninger- Principles of Biochemistry- David Nelson, Michael Cox. 4th edition W.H. Freeman & Company[Low price edition- for sale in India, Pakistan, Sri Lanka, Bangladesh, Nepal & Bhutan]
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5. Applied Dairy Microbiology by Martha & Steele
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7. Outlines of Biochemistry. E.E. Conn & P.K.Stumpf ,G. Bruening, R.N.Doi. 5th Edition, John Wiley and sons

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2. Food Microbiology – An Introduction by Montville and Mathews,(2008), ASM Press
3. Industrial Microbiology by Waites and Morgan, Blackwell Science
4. Modern Industrial Microbiology and Biotechnology by Nduka Okafor, (2007), Science Publishers.
5. Food Science by Sumati R. Mudambi, Shalini Rao, M.V. Rajagopal, revised 2nd edition, (2006), New Age international publications.
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8. Brock Biology of Microorganisms by Madigan, Martinko, Dunlap and Clark (2009) 12th edition, Pearson Education.

REFERENCES: USMB 403 Option B

1. Bionanotechnology - Andrew and Waqar, One Central Press Ltd, UK., November, 2014.
2. Text book of Biotechnology by R C Dubey. 4th edition
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4. Periodicum Biologorum., Vol 109,, No 2, 2007. Characteristics and Significance of Microbial Biofilm Formation Biofilms Importance and Applications. Indian Journal of Biotechnology, Vol8, April 2009, pp159-169.
5. www.WQPMAG.COM, March 2011
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7. Research Methodology, Yogesh Kumar Singh, New age International Publisher
9. Biostatistics. P.N. Arora, P.K. Malhan. Himalaya Publishing House.
8. Methods in biostatistics for medical & research workers. 6th edition. B.K. Mahajan. Jaypee brothers, Medical Publishers (P) ltd.
9. agritech.tnau.ac.in/org_farm/orgfarm_biofertilizertechnology.html
10. Biopesticides: An eco-friendly approach for pest control Journal of Biopesticides 3(1 Special Issue) 186 - 188 (2010) 186,Suman Gupta and A. K. Dikshit
11. Biopesticide Formulations, Possibility of Application and Future TrendsSlavica Gašić and Brankica Tanović,Pestic. Phytomed. (Belgrade), 28(2), 2013, 97–102 Review paper
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MODALITY OF ASSESSMENT

Theory Examination Pattern:

Semester End Theory Assessment - 100% Total Marks for Every Paper: **100 Marks**

Duration: 3 hrs Total No of Questions: 5

Question No	Maximum Marks	Units Covered	Nature of Q	Internal Options	Example
1	20	All	Objective	None	all
2	20	All	Subjective	60%	4 out of 6
3	20	Unit 1	Subjective	100%	2 out of 4 Or 3 out of 6 Or 4 out of 8 Or 5 out of 10 **etc**
4	20	Unit 2	Subjective	100%	
5	20	Unit 3	Subjective	100%	

PRACTICAL EXAMINATION PATTERN

Semester end practical examination):- 50 Marks Per Section

Section-I based on course-1, Section-II based on course-2
& Section-III based on course-3 Option A or Option

Sr.No.	Particulars	Marks Total
1.	**Laboratory work (Section-I, II, III A or B)**	**40 + 40 + 40 = 120**
2.	**Journal (Section-I, II, III A or B)**	**05 + 05 + 05 = 015**
3.	**Viva (Section-I, II, III A or B)**	**05 + 05 + 05 = 015**
	Grand Total	**50 + 50 + 50 = 150**

PRACTICAL BOOK / JOURNAL

Semester III & IV

For each semester end practical Examination, students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

In case of loss of Journal and/ or Report, a Lost Certificate should be obtained from Head/ Co-ordinator / In-charge of the department; failing which the student will not be allowed to appear for the practical examination.

Overall Examination and Marks Distribution Pattern

Semester III

Course	USMB-301	USMB-302	USMB- 303 Option A	OR	USMB- 303 Option B	
	External	External	External		External	Total
Theory	100	100	100		100	300
Practical	50	50	50		50	150

Semester IV

Course	USMB-401	USMB-402	USMB- 403 Option A	OR	USMB- 303 Option B	
	External	External	External		External	Total
Theory	100	100	100		100	300
Practical	50	50	50		50	150

AC 7-4-2014
Item No. – 4.40

UNIVERSITY OF MUMBAI

Syllabus for the

Program: **B.Sc. Interdisciplinary Science**

Course: **Business Organization & Principles of Management**

(Credit Based Semester and Grading System with effect from the academic year 2014–2015)

Course: Business Organization & Principles of Management

Syllabus

For Credit Based Semester and Grading System
To be implemented form the Academic year 2014-2015

MODULE I

Course Code	Unit	Topics	Credits	L/Week
USIDBOM 01	I	Forms of Business	3	1
	II	Business services		1
	III	Emerging modes of Business		1

MODULE II

Course Code	Unit	Topics	Credits	L/Week
USIDBOM02	I	Social Responsibilities of business and business ethics.	3	1
	II	Principles of Management		1
	III	Entrepreneurship Development		1

SYLLABUS MODULE I

Course Code	Credits	
USIDBOM01	**3 Credits (45 Lectures)**	
Unit I: Forms of business organizations _ Sole proprietorship, Joint Hindu Family Business – meaning, features, merits and demerits. _ Partnership – meaning, types, registration, merits, limitations, types of Partners. _ Co – Operative societies – types, merits and limitations. _ Company – Private Ltd, Public Ltd –merits, limitations. _ Starting a business – Basic factors. Choice of forms of business organizations.		**15 Lectures**
Unit II: Business services _ Nature and types of Business services – Banking, Insurance, Transportation, Warehousing, communication. _ Banking – types of banks, functions of commercial banks, E – banking. _ Insurance – principles & types of life, fire, marine insurances. _ Postal and Telecom services. _ Warehousing – types and functions. _ Transport – meaning, role, means		**15 Lectures**
Unit III: Emerging modes of Business _ E – business – Meaning, Scope and benefits. Resource required for successful E –Business implementation. On – line transactions, payment mechanism. _ Security and safety of business transactions. _Outsourcing – Concept, need and scope.		**15 Lectures**

SYLLABUS MODULE II

Course Code	Credits	
USIDBOM02	**3 Credits (45 Lectures)**	
Unit I : Social Responsibilities of business and business ethics. _ Concept of social responsibility. _ Cases for social responsibility. _ Responsibility towards different interest groups, owners, investors, employees, consumers, government, community, public in general. _ Business ethics – concept and elements. _ Business and environmental protection.		**15 Lectures**
Unit II: Principles of Management -Definition and nature of Management -Purpose of Management -Managerial Functions at different levels -Management- Art or Science _ Fayol's Principles of Management. _ Taylor's Scientific Management - Elton Mayo's Human School of Thought - McGregor's X & Y Theory _Planning function, planning process & purpose, steps in planning, goal setting, decision		**15 Lectures**

making - Organizing function, organizing process, Flat and Tall Structures, Formal and Informal Organizations, Authority, Responsibility and Accountability, Delegation, Centralization and Decentralization, Span of Control - Staffing Function, Staffing Process, Recruitment, Selection, Training, Performance Appraisal etc. -Directing function, Concepts of Leading, Motivating, Communicating, Maslow's Need Hierarchy Theory, McClelland's Motivational Theory, Managerial Grid, Attributes and Qualities of Leaders etc. -Controlling, Control Process, Control Techniques, Budgets and Schedules (Time-lines) - Coordination- Meaning, Needs and Principles of Coordination, Approaches for achieving Effective Coordination	
Unit III : Entrepreneurship Development -The Concept and Introduction, - Personality and Mindset of an Entrepreneur, - Difference between an Entrepreneur, Intrapreneur and Manager/Executive, - Entrepreneurial Eco-system -Types and Functions of an Entrepreneur; - Entrepreneurial Motivation - Entrepreneurship Development Programs - Business Idea Generation - Business Plan and Detailed Project Report - Feasibility and Viability Aspects - Funding and Support Aspects	**15 Lectures**