

AC 24 / 06 / 2016

Item no.4.21

# UNIVERSITY OF MUMBAI



Revised syllabus for Sem I and II

Program: B. A.

Course: History & Archaeology

(Choice Based Credit System with effect from the Academic  
year 2016-17)

**Semester –II**  
**History of Modern India: Society and Economy.**

**Module I: Socio Religious Reform Movements: Reforms and Revival**

- ✓(a) Brahmo Samaj, Arya Samaj and Ramakrishna Mission
- (b) Satyashodhak Samaj, Aligarh movement and Singh Sabha Movement.
- (c) Impact of Reform Movements

**Module II: Education, Press and Transport**

- ✓(a) Introduction of Western Education and its Impact
- ✓(b) Development of Press
- ✓(c) Transport and Communications

**Module III: Impact of the British Rule on Indian Economy.**

- (a) Revenue Settlements, Commercialisation of Agriculture
- (b) Drain Theory
- (c) Deindustrialisation and Growth of Large Scale Industry

**Module IV: Nationalism and Social Groups: interfaces.**

- ✓(a) Women
- ✓(b) Dalits
- ✓(c) Peasants and Tribals

Item no.

# UNIVERSITY OF MUMBAI



**Revised Syllabus for Sem III and Sem IV**

**Program: B. A.**

**Course: History and Archaeology**

**(Choice Based Credit System with effect from the Academic year 2017-2018)**



**SYBA – History Paper-II**  
**Landmarks in World History, 1300 A.D.-1945 A.D.**

**SEMESTER-III**

**Objectives:** To enable the students to comprehend the transition of Europe from medieval to modern times and its impact on the world. To provide accurate knowledge of the most significant events and personalities of the period under study and encourage understanding of the making of the modern world

**Module I: The Modern Age**

- (a) Renaissance
- (b) Geographical Discoveries
- ✓(c) Reformation

**Module II: Age of Revolutions**

- ✓(a) American Revolution
- ✓(b) French Revolution
- (c) Industrial Revolution

**Module III: Nationalism and Imperialism**

- (a) Formation of Nation-States in Europe
- (b) Nationalist Movements in Italy and Germany
- (c) Imperialist Expansion in Asia

**Module IV: World in Transition (1914-1919)**

- (a) World War I
- (b) Russian Revolution
- ✓(c) League of Nations

## SEMESTER-IV

### Module I: Inter War Period

- (a) Kemal Pasha and Modernization of Turkey
- (b) Reza Shah and Reforms in Iran
- (c) Birth of Israel

### ✓ Module II: Rise of Dictatorships

- (a) Fascism
- (b) Nazism
- (c) Militarism in Japan

### Module III: World War II and Efforts for Peace

- (a) World War II
- (b) The Atlantic Charter
- ✓ (c) United Nations Organization.

### Module IV: Nationalist Movements in Asia

- ✓ (a) Dr. Sun-Yat-Sen and China
- ✓ (b) Mahatma Gandhi and India
- ✓ (c) Dr. Sukarno and Indonesia

**SYBA History- Paper- III**  
**Ancient India from Earliest Times to 1000 A.D.**

**SEMESTER-III**

**Objectives:** To acquaint the students with different sources of Ancient Indian History. To enable the students to understand the political, socio-economic and cultural developments in the period under study and appreciate the rich cultural heritage in India

**Module I: Sources of Ancient India and their Importance**

- (a) Archaeological
- (b) Literary
- (c) Foreign Travellers

**Module II: Indus Valley Civilization**

- (a) Social and Economic Life
- (b) Religious Life
- (c) Town Planning and Decline of the Civilization

**Module III: Vedic Age**

- (a) Janapada
- (b) Social and Economic Life
- (c) Religion

**Module IV: India after 6<sup>th</sup> Century B.C.**

- (a) Administration of Mahajanapadas
- (b) Jainism and Buddhism
- (c) Persian and Greek Invasions

## SEMESTER-IV

### ✓ **Module I: Mauryan and Post- Mauryan Period (322 B.C. to 320 A.D.)**

- (a) Chandragupta and Ashoka
- (b) Mauryan Administration
- ✓ (c) Post Mauryan Dynasties- Sungas, Kushanas and Satavahanas

### **Module II: Gupta Age (320 A.D. to 600 A.D.)**

- (a) Imperial Expansion: Chandragupta I, Samudragupta and Chandragupta II
- (b) Administration
- (c) Classical Age

### ✓ **Module III: Post Gupta Period (600A.D. to 1000A.D.)**

- (a) The Age of Harshavardhan
- ✓ (b) The Rise of Rajputs
- (c) Arab Invasion of Sind

### **Module IV: Major Dynasties of Deccan and South India**

- (a) Chalukyas of Badami and Rashtrakutas
- (b) Pallavas and Cholas
- ✓ (c) Spread of Indian Culture in South-East Asia



## T.Y.B.A. History

### SEMESTER -V

#### Core Course IV- History of Medieval India (1000 CE-1526CE)

##### Objectives:

1. To acquaint the students with the history of early Medieval India that laid the foundation of the Sultanate in India.
2. To study the contribution of Vijayanagar and Bahamani kingdoms to Medieval Indian History.
3. To examine the administrative, socio-economic and cultural aspects of Medieval India.

##### Module I: Foundation, Expansion and Decline of Delhi Sultanate.

- ✓(a) Socio-economic and political conditions on the eve of the Turkish Invasion
- (b) Rise and Decline of Slave dynasty, Khilji Dynasty
- (c) Tughlaq, Sayyid and Lodi Dynasty

##### Module II: Administrative Structure of the Sultanate

- (a) Central Administration and Iqta system
- (b) Administrative and Military Reforms of Ala-ud-din Khilji
- (c) Reforms of Firozshah Tughlaq and Mohammed bin Tughlaq

##### Module III: Emergence of Vijaynagar and Bahamani Kingdoms

- (a) Rise, Growth and Decline of Vijaynagar and Bahamani Kingdoms
- (b) Administration, Socio-Economic and Cultural conditions of Vijayanagar Empire
- (c) Administration, Socio-Economic and Cultural conditions of Bahamani Kingdom

##### Module IV: Society, Economy, Religion and Culture of Delhi Sultanate

- ✓(a) Socio-economic and religious life
- (b) Education and Literature
- ✓(c) Art and Architecture



## T.Y.B.A. History

### SEMESTER -V

#### Core Course V- History of Modern Maharashtra (1818 CE-1960 CE)

##### Objectives:

1. To acquaint students with regional history.
2. To understand political and socio-economic developments during the 19<sup>th</sup> and 20<sup>th</sup> centuries.
3. To create understanding of the movement that led to the formation of Maharashtra.

##### Module I: Beginning of the British Rule

- ✓(a) Socio-Economic conditions of Maharashtra in 19<sup>th</sup> Century
- (b) Administration and Judiciary
- ✓(c) Tribal and Peasant Uprisings

##### ✓Module II: Socio- Economic Awakening

- (a) Mahatma Jotirao Phule - Satya Shodhak Samaj and Universal Humanism
- (b) Prarthana Samaj
- (c) Contribution of thinkers of Maharashtra to Economic Nationalism

##### Module III: Political Developments in Maharashtra (1885-1960)

- (a) Moderates, Extremists and Revolutionaries in Maharashtra
- (b) Response to Gandhian Movements in Maharashtra
- (c) Samyukta Maharashtra Movement

##### Module IV: Emergence of New Forces

- ✓(a) Contribution of Reformers in Education
- (b) Contribution of Reformers towards Emancipation of Women
- ✓(c) Contribution of Reformers towards Upliftment of Depressed Classes: V. R. Shinde, Rajarshi Shahu Maharaj and Dr. B.R. Ambedkar

# **T.Y.B.A. History**

## **SEMESTER -V**

### **Core Course VI A – Introduction to Archaeology**

#### **Objectives:**

1. To understand the basic facets of Archaeology.
2. To evaluate the importance of Epigraphy.
3. To study the importance of Numismatics as an important source of history.

#### **Module I: Aims and Methods of Archaeology**

- (a) Definition, Aims and Development of Archaeology in India
- (b) Archaeology and History; Archaeology and Other Sciences
- (c) Field Archaeology: Methods of Exploration, Excavation and Dating Antiquities; Significance of Archaeology

#### **Module II: Pre-Historic, Proto-Historic and Early Historical Periods**

- (a) Palaeolithic and Mesolithic Periods
- (b) Neolithic and Chalcolithic Periods
- (c) Megalithic and Early Historical Periods

#### **Module III: Epigraphy**

- (a) Definition and History of Indian Epigraphy
- (b) Types of Inscriptions and their significance
- (c) Evolution of Brahmi and Kharosthi Scripts; Edicts of Ashoka

#### **Module IV: Numismatics**

- (a) Definition and History of Indian Numismatics
- (b) Ancient Indian Coinage: Punch-Marked, Satavahana, Western Kshatrapas, Kushana and Gupta Coins
- (c) Contribution of Numismatics to Indian History

## T.Y.B.A. History

### SEMESTER -VI

#### Core Course: IV- History of Medieval India (1526 CE-1707CE)

##### Objectives:

1. To acquaint the students with the history of India since the emergence of the Mughal rule.
2. To understand administration of the Mughal Empire.
3. To study the rise of the Maratha Power.

##### Module I: Foundation, Expansion and Decline of the Mughal Rule

- (a) India on the eve of Mughal Rule; Invasion of Babur
- (b) Humayun, Shershah and Akbar
- (c) Jahangir, Shahjahan and Aurangzeb

##### Module II: Administrative Structure of the Mughals

- (a) Central and Provincial Administration
- (b) Mansabdari System
- (c) Revenue and Judicial system

##### Module III: Rise of the Maratha Power

- (a) Shivaji and Foundation of Swarajya
- (b) Administration of Shivaji
- (c) Sambhaji, Rajaram and Tarabai

##### Module IV: Society and Economy, Religion and Culture of the Mughal Rule

- (a) Society and Economy
- (b) Religion, Education and Literature
- (c) Art and Architecture



# T.Y.B.A. History

## SEMESTER -VI

### Core Course V – History of Contemporary India (1947 CE- 2000 CE)

#### Objectives:

1. To understand the process of making the Constitution and the Integration and Reorganization of Indian States.
2. To acquaint the students with the political developments in India after Independence.
3. To comprehend the socio-economic changes and progress in science and technology in India.

#### ✓ Module I: The Nehru Era (1947 CE – 1964 CE)

- (a) Features of Indian Constitution
- (b) Integration and Reorganization of Indian States
- (c) Socio- Economic Reforms and Foreign Policy

#### Module II: Political, Social and Economic Developments (1964 CE – 1984 CE)

- ✓ (a) Political Developments after Nehru Era; Green Revolution.
- (b) Abolition of Privy Purses and Titles; Nationalization of Banks; The Emergency
- (c) Janata Government; Return of Congress to power ; Foreign Policy

#### ✓ Module III: Political, Social and Economic Developments (1984 CE – 2000 CE)

- (a) Political Developments
- (b) Relations with Neighboring Countries
- (c) Liberalization, Privatization and Globalization

#### Module IV: Emerging Trends

- (a) Communalism and Separatist Movements
- (b) Women Empowerment and Policy of Reservation
- (c) Science, Technology and Education

- To make the learner proficient in analysing the various observations and chemical phenomena presented to him during the course.
- To make the learner capable of solving problems in the various units of this course
- To give the learner an opportunity to get hands on experience of the various concepts and processes in the various branches of chemistry
- To impart various skills of handling chemicals, reagents, apparatus, instruments and the care and safety aspects involved in such handling
- To make the learner capable of analysing and interpreting results of the experiments he conducts or performs
- To make the learner capable of acquiring or pursuing a source of livelihood like jobs in chemical industry
- To arouse the interest to pursue higher levels of learning in chemistry,

**2. Condition for Admission**

A candidate who has passed the F.Y.B.Sc. of Mumbai University or an examination of some other university accepted by the syndicate as equivalent there to with Chemistry, Physics, Maths, Botany, Zoology or Life Science shall be eligible for admission into S.Y.B.Sc., course in Chemistry.

To

- 3. Duration of the Course: one year**
- 4. Course of study:**

**Draft copy of the proposed revised syllabus for  
Choice Based Credit System  
S.Y.B.Sc. Chemistry  
To be implemented from the Academic year 2017-2018**

For the subject of chemistry there shall be three papers for 45 lectures each comprising of three units of 15 L each.

**Semester-III**

1. Paper-I (General Chemistry) Unit-I Physical Chemistry  
Unit-II Inorganic Chemistry  
Unit-III Organic Chemistry.
2. Paper-II (General Chemistry) Unit-I Physical Chemistry  
Unit-II Inorganic Chemistry  
Unit-III Organic Chemistry.
3. Paper III Basics of Analytical Chemistry

**Semester-IV**

1. Paper-I (General Chemistry) Unit-I Physical Chemistry  
Unit-II Inorganic Chemistry  
Unit-III Organic Chemistry.
2. Paper-II (General Chemistry) Unit-I Physical Chemistry  
Unit-II Inorganic Chemistry  
Unit-III Organic Chemistry.  
Basics of Analytical Chemistry
3. Paper III



**Choice Based Credit System**  
**S. Y. B. Sc.**  
**Chemistry Syllabus**  
**To be implemented from the Academic year 2017-2018**

**Course Content**  
**Semester III**

| Course Code | Unit | Topics   | Credits | L/Week |
|-------------|------|--|---------|--------|
| USCH301     | I    | Chemical Thermodynamics-II,<br>Electrochemistry                                      | 2       | 1      |
|             | II   | Chemical Bonding   |         | 1      |
|             | III  | Reactions and reactivity of halogenated hydrocarbons, alcohols, phenols and epoxides |         | 1      |
| USCH302     | I    | Chemical Kinetics-II, Solutions  | 2       | 1      |
|             | II   | Selected topics on p block elements  |         | 1      |
|             | III  | Carbonyl Compounds   |         | 1      |
| USCH303     | I    | Intorduction to Analytical Chemistry and Statistical Treatment of analytical data-I  | 2       | 1      |
|             | II   | Classical Methods of Analysis.   |         | 1      |
|             | III  | Instrumental Methods-I   |         | 1      |
| USCHP1      |      | Chemistry Practicals I   | 1       | 3      |
| USCHP2      |      | Chemistry Practicals II  | 1       | 3      |
| USCHP3      |      | Chemistry Practicals III   | 1       | 3      |

**Semester IV**

| Course Code | Unit | Topics  | Credits | L/Week |
|-------------|------|---|---------|--------|
| USCH401     | I    | Electrochemistry-II, Phase Equilibria   | 2       | 1      |
|             | II   | Comparative Chemistry of the transition metals & Coordination Chemistry                   |         | 1      |
|             | III  | Carboxylic acids and their derivatives, Sulphonic acids                                   |         | 1      |
| USCH402     | I    | Solid state, Catalysis  | 2       | 1      |
|             | II   | Ions in aqeous medium & Uses and Environmental Chemistry of volatile Oxides and oxo-acids |         | 1      |
|             | III  | Amines, Diazonium salts, Heterocyclic compounds   |         | 1      |
| USCH403     | I    | Separation Techniques in Analytical Chemistry   | 2       | 1      |
|             | II   | Instrumental Methods-II   |         | 1      |
|             | III  | Statistical Treatment of analytical data --II   |         | 1      |
| USCHP4      |      | Chemistry Practicals I  | 1       | 3      |
| USCHP5      |      | Chemistry Practicals II   | 1       | 3      |
| USCHP6      |      | Chemistry Practicals III  | 1       | 3      |

- 2.2.2 Interaction between two hydrogen atoms and the Potential energy diagram of the resultant system.
- 2.2.3 Corrections applied to the system of two hydrogen atoms- Formation of H<sub>2</sub>
- 2.2.4 Homonuclear diatomic molecules from He<sub>2</sub> to Ne<sub>2</sub>
- 2.2.5 Resonance and the concept of Formal Charge; Rules for Resonance or Canonical structures.
- 2.2.6 Bonding in Polyatomic Species: The role of Hybridization. And types of hybrid orbitals-*sp*, *sp*<sup>2</sup>, *sp*<sup>3</sup>, *sp*<sup>3</sup>*d*, *sp*<sup>2</sup>*d*<sup>2</sup> and *sp*<sup>2</sup>*d* *sp*<sup>3</sup>*d*<sup>2</sup>.
- 2.2.7 Equivalent and Non-Equivalent hybrid orbitals
- 2.2.8 Contribution of a given atomic orbital to the hybrid orbitals (with reference to *sp*<sup>3</sup> hybridisation as in CH<sub>4</sub>, NH<sub>3</sub> and H<sub>2</sub>O and series like NH<sub>3</sub>, PH<sub>3</sub>, AsH<sub>3</sub>, BiH<sub>3</sub>)

### 2.3 Molecular Orbital Theory (5L)

- 2.3.1. Comparing Atomic Orbitals and Molecular Orbitals.
- 2.3.2. Linear combination of atomic orbitals. to give molecular orbitals LCAO-MO approach for diatomic homonuclear molecules).
- 2.3.4. Wave mechanical treatment for molecular orbitals (H<sub>2</sub><sup>+</sup> and H<sub>2</sub>)
- 2.3.4 Molecular orbital Theory and Bond Order and magnetic property: with reference to O<sub>2</sub>, O<sub>2</sub><sup>+</sup>, O<sub>2</sub><sup>-</sup>, O<sub>2</sub><sup>2-</sup>

(Problems and numerical problems expected wherever possible)

## Unit III: Organic Chemistry

### 3.1.1. Reactions and reactivity of halogenated hydrocarbons: [4L]

- 3.1.1. **Alkyl halides:** Nucleophilic substitution reactions: S<sub>N</sub>1, S<sub>N</sub>2 and S<sub>N</sub>i mechanisms with stereochemical aspects and factors affecting nucleophilic substitution reactions- nature of substrate, solvent, nucleophilic reagent and leaving group.
- 3.1.2. **Aryl halides:** Reactivity of aryl halides towards nucleophilic substitution reactions. Nucleophilic aromatic substitution (S<sub>N</sub>Ar) addition-elimination mechanism and benzyne mechanism.

### 3.1.2. Organomagnesium and organolithium compounds: [3L]

Nomenclature, nature, type and reactivity of carbon-metal bond. Preparation using alkyl / aryl halide. Structure, stability and reactions with compounds containing acidic hydrogen, carbonyl compounds, CO<sub>2</sub>, cyanides and epoxides.

### 3.2 Alcohols, phenols and epoxides: [8L]

## 2.1 Chemistry of Boron compounds

- 2.1.1 Electron deficient compounds –  $\text{BH}_3$ ,  $\text{BF}_3$ ,  $\text{BCl}_3$  with respect to Lewis acidity and applications.
- 2.1.2 Preparation of simple boranes like diborane and tetraborane.
- 2.1.3 Structure and bonding in diborane and tetraborane (2e-3c bonds)
- 2.1.4 Synthesis of Borax.

## 2.2 Chemistry of Silicon and Germanium

- 2.2.1 Silicon compounds: Occurrence, Structure and inertness of  $\text{SiO}_2$
- 2.2.2 Preparation of structure of  $\text{SiCl}_4$
- 2.2.3 Occurrence and extraction of Germanium
- 2.2.4 Preparation of extra pure Silicon and Germanium

## 2.3 Chemistry of Nitrogen family

- 2.3.1 Trends in chemical reactivity - Formation of hydrides, halides, oxides with special reference to oxides of nitrogen.
- 2.3.2 Oxides of nitrogen with respect to preparation and structure of  $\text{NO}$ ,  $\text{NO}_2$ ,  $\text{N}_2\text{O}$  and  $\text{N}_2\text{O}_4$ .
- 2.3.3 Synthesis of ammonia by Bosch – Haber process.

## Unit III: Organic Chemistry

### Carbonyl Compounds: [15L]

- 3.1 Nomenclature of aliphatic, alicyclic and aromatic carbonyl compounds. Structure, reactivity of aldehydes and ketones and methods of preparation; Oxidation of primary and secondary alcohols using PCC, hydration of alkynes, action of Grignard reagent on esters, Rosenmund reduction, Gattermann – Koch formylation and Friedel Craft acylation of arenes
- 3.2 General mechanism of nucleophilic addition, and acid catalyzed nucleophilic addition reactions.
- 3.3 Reactions of aldehydes and ketones with  $\text{NaHSO}_3$ ,  $\text{HCN}$ ,  $\text{RMgX}$ , alcohol, amine, phenyl hydrazine, 2,4-Dinitrophenyl hydrazine,  $\text{LiAlH}_4$  and  $\text{NaBH}_4$ .
- 3.4 Mechanisms of following reactions: Benzoin condensation, Knoevenagel condensation, Claisen-Schmidt and Cannizzaro reaction.
- 3.5 Keto-enol tautomerism: Mechanism of acid and base catalysed enolization
- 3.6 Active methylene compounds: Acetylacetone, ethyl acetoacetate diethyl malonate, stabilised enols. Reactions of Acetylacetone and ethyl acetoacetate (alkylation, conversion to ketone, mono- and dicarboxylic acid)



## **2 Ions in aqueous medium**

### **2.1. Acidity of Cations and Basicity of Anions**

- i. Hydration of Cations; Hydrolysis of Cations predicting degree of hydrolysis of Cations-effect of Charge and Radius.
- ii. Latimer Equation. Relationship between  $pK_a$ , acidity and  $z^2/r$  ratios of metal ions graphical Presentation
- iii. Classification of cations on the basis of acidity category – Non acidic, Moderately acidic, strongly acidic, very strongly acidic with  $pK_a$  values range and examples
- iv. Hydration of Anions; Effect of Charge and Radius; Hydration of anions- concept, diagram classification on the basis of basicity

### **2.2. Uses and Environmental Chemistry of volatile Oxides and oxo-acids**

- i. Physical properties of concentrated oxo-acids like sulfuric, Nitric and Phosphoric acid
- ii. Uses and environments aspects of these acids

## **Unit III: Organic Chemistry**

### **Nitrogen containing compounds and heterocyclic compounds:**

#### **3.1 Amines:** Nomenclature, effect of substituent on basicity of aliphatic and aromatic amines;

- 3.1.1. Preparation: Reduction of aromatic nitro compounds using catalytic hydrogenation, chemical reduction using Fe-HCl, Sn-HCl, Zn-acetic acid, reduction of nitriles, ammonolysis of halides, reductive amination, Hofmann bromamide reaction.
- 3.1.2. Reactions- Salt Formation, N-acylation, N-alkylation, Hofmann's exhaustive methylation (HEM), Hofmann-elimination reaction, reaction with nitrous acid, carbylamine reaction, Electrophilic substitution in aromatic amines: bromination, nitration and sulphonation.

#### **3.2 Diazonium Salts: (7 Lectures)**

Preparation and their reactions/synthetic application - Sandmeyer reaction, Gattermann reaction, Gomberg reaction, Replacement of diazo group by -H, -OH. Azo coupling with phenols, naphthols and aromatic amines, reduction of diazonium salt to aryl hydrazine and hydroazobenzene

#### **3.3 Heterocyclic Compounds: (8 Lectures)**

Students are expected to write balanced chemical reactions wherever necessary.  
(Minimum 6 compounds to be analyzed)

**Reference Books for Practicals:**

**Unit I:**

1. Khosla B.D., Garg V.C. and Gulati A., Senior Practical Physical Chemistry, R. Chand and Co., New Delhi (2011).
2. Garland C. W., Nibler J.W. and Shoemaker D.P., Experiments in Physical Chemistry, 8th Ed., McGraw-Hill, New York (2003).
3. Halpern A.M. and McBane G.C., Experimental Physical Chemistry, 3rd Ed., W.H. Freeman and Co., New York (2003).
4. Athawale V.D. and Mathur P., Experimental Physical Chemistry, New Age International, New Delhi (2001)

**Unit II:**

1. *Practical Inorganic Chemistry* by G. Marr and B. W. Rockett van Nostrand Reinhold Company (1972)

**Unit III:**

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5<sup>th</sup> Ed., Pearson (2012)
4. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996

(The learner should draw diagrams and write-ups providing uses, care and maintenance of the items mentioned in (a) and principle, construction and uses of items (b) to (e) in his journal.

2. Gravimetric estimation of Nickel (II) as Ni-DMG and calculation of % error.  
(The learner is expected to know the role of the various reagents/chemicals used in the estimation, various steps involved. They should write the complete and Balanced chemical reaction for the formation of the Ni(DMG)<sub>2</sub> complex.
3. Colorimetric Determination of Copper Ions in given Solution by using calibration curve method and calculation of % error.  
(The learner is expected to learn the relation between concentration and Absorbance, to draw a calibration curve, use the slope of the calibration curve and compare it with the calculated slope. They are also expected to state the error estimate of their results).
4. Determination of buffer capacity of acid buffer and basic buffer.  
(The learner is expected to learn the use pH meter, standardization of pH meter, use of Henderson's equation and calculation of buffer capacity)
5. Estimation of Aspirin
6. Gravimetric estimation of barium ions using K<sub>2</sub>CrO<sub>4</sub> as precipitant calculation of % error.  
(The learner is expected to learn the skills of using the counterpoise technique used in this gravimetric estimation; Using counterpoise method whatman No.42 for filtration. In such a case no incineration or use of silica crucible is required. They are also expected to state the error estimate of their results)

#### Semester IV

### Paper III Basics in Analytical Chemistry -II

Theory: 45 Lectures

#### Unit –I -Methods of separation ( 15 L)

Objectives:

The learner is expected to understand

- The importance of separation in sample treatment
- Various methods of separations
- How to select a method of separation of an analyte from the matrix
- How a solute gets distributed between two immiscible phases
- Principle of solvent extraction and various terms involved therein
- Effect of various parameters on solvent extraction of a solute
- Classification of Chromatographic methods
- Paper and thin layer chromatography and using them in practice.

#### 1. Separation Techniques in Analytical Chemistry (02 L)

- 1.1. An Introduction to Analytical Separations and its importance in analysis.
- 1.2. Estimation of an analyte without effecting separation.
- 1.3. Types of separation methods
  - 1.3.1. Based on Solubilities (Precipitation, Filtration Crystallisation)
  - 1.3.2. Based on Gravity- Centrifugation
  - 1.3.3. Based on volatility-Distillation ;

**Revised Syllabus of Courses of B.Com. Programme at Semester I  
with Effect from the Academic Year 2016-2017**

**Ability Enhancement Courses (AEC)**

**4. Business Communication - I**

**Modules at a Glance**

| Sr. No.      | Modules                     | No. of Lectures |
|--------------|-----------------------------|-----------------|
| 1            | Theory of Communication     | 15              |
| 2            | Business Correspondence     | 15              |
| 3            | Language and Writing Skills | 15              |
| <b>Total</b> |                             | <b>45</b>       |

**Note:**

*One tutorial per batch per week in addition to number of lectures stated above  
(Batch size as per the University norms)*

| SN | Objectives   |
|----|--|
| 1  | To develop awareness of the complexity of the communication process  |
| 2  | To develop effective listening skills in students so as to enable them to comprehend instructions and become a critical listener |
| 3  | To develop effective oral skills so as to enable students to speak confidently interpersonally as well as in large groups        |
| 4  | To develop effective writing skills so as enable students to write in clear, concise, persuasive and audience centered manner    |
| 5  | To demonstrate effective use of communication technology   |

| SN | Expected Outcome  |
|----|---|
| 1  | After successful completion of the course the learner should be able to enhance his Listening, Speaking, Reading and Writing skills to meet the challenges of the world |



| Sr. No. | Modules / Units  |
|---------|--|
| 1       | <b>Theory of Communication</b>   |
|         | <p>1. <b>Concept of Communication:</b> Models of Communication – Linear / Interactive / Transactional / Shannon and Weaver (To be only discussed in class) Meaning, Definition, Process, Need, Feedback Emergence of Communication as a key concept in the Corporate and Global world</p> <p>2. <b>Impact of Technology Enabled Communication:</b><br/>Types – Internet, Blogs, E – Mail, Moodle, Social Media ( Facebook, Twitter &amp; Whats’app Advantages &amp; Disadvantages</p> <p>3. <b>Communication at Workplace:</b><br/>Channels - Formal and Informal—Vertical, Horizontal, Diagonal, Grapevine, Methods – Verbal / Non Verbal (including Visual), Business Etiquettes</p> <p>4. <b>Business Ethics:</b><br/>Ethics at workplace - Importance of Business Ethics<br/>Personal Integrity at the workplace<br/>Business Ethics and media<br/>Computer Ethics<br/>Corporate Social Responsibility</p> <p>5. <b>Problems in Communication /Barriers to Communication:</b><br/>Physical/ Semantic/Language / Socio-Cultural / Psychological Barriers, Ways to Overcome these Barriers</p> <p>6. <b>Listening:</b><br/>Importance of Listening Skills, Obstacles to Listening, Cultivating good Listening Skills</p> |
| 2       | <b>Business Correspondence</b>   |
|         | <p>1. <b>Theory of Business Letter Writing:</b><br/>Parts, Structure, Layouts-Full Block, Principles of Effective Letter Writing, Principles of effective E - mail Writing</p> <p>2. <b>Personnel Correspondence:</b><br/>Statement of Purpose, Letter of Recommendation, Job Application Letter and Resume, Letter of Appointment (To be only discussed in class), Letter of Acceptance of Job Offer, Letter of Appreciation, Letter of Resignation</p>   |
| 3       | <b>Language and Writing Skills</b>   |
|         | <p>1. <b>Commercial Terms used in Business Communication (to be only discussed)</b></p> <p>2. <b>Paragraph Writing:</b><br/>Developing an idea, using appropriate linking devices, etc<br/>Cohesion and Coherence etc</p> <p>3. <b>Tutorials Activities</b><br/>Speaking Skills, Writing Skills, Remedial Grammar, Soft Skills – EQ, Conflict Management, Time Management<br/>(Students may be asked to make a Power Point Presentation on any topic of their choice in order to enhance LSRW – Listening / Speaking/ Reading / Writing)</p>   |

| Sr. No. | Modules / Units  |
|---------|--|
| 4       | <b>Investment Accounting (w.r.t. Accounting Standard- 13)</b>  |
|         | For shares (variable income bearing securities)<br>For debentures/Preference. shares (fixed income bearing securities)<br>Accounting for transactions of purchase and sale of investments with ex and cum interest prices and finding cost of investment sold and carrying cost as per weighted average method (Excl. brokerage).<br>Columnar format for investment account.   |
| 5       | <b>Ethical Behaviour and Implications for Accountants</b>  |
| *       | Introduction, Meaning of ethical behavior<br>Financial Reports – What is the link between law, corporate governance, corporate social responsibility and ethics?<br>What does the accounting profession mean by the ethical behavior?<br>Implications of ethical values for the principles versus rule based approaches to accounting standards<br>The principal based approach and ethics<br>The accounting standard setting process and ethics<br>The IFAC Code of Ethics for Professional Accountants<br>Ethics in the accounting work environment – A research report<br>Implications of unethical behavior for financial reports<br>Company Codes of Ethics<br>The increasing role of whistle – Blowing<br>Why should student learn ethics? |

**UNIVERSITY OF MUMBAI****Essentials Elements of the Syllabus**

|    |   |   |
|----|---|---|
| 1  | Title of the Course                                     | <b>Foundation Course (SYBA, SYBSc, SYBCom – III and IV Semesters)</b> |
| 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   | <b>3 lectures per week</b>  |
| 8  | No. of Practical  | Not Applicable  |
| 9  | Duration of the Course                                  | <b>III and IV Semesters respectively</b>                              |
| 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 / <del>Internship</del> | 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  |



## 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)



## 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 centrism, 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)

University of Mumbai



**Revised Syllabus  
and  
Question Paper Pattern  
of Course of  
B.Com Programme  
Second Year  
*Semester III & IV*  
Under Choice Based Credit, Grading  
and  
Semester System  
*With effect from Academic Year-2017-2018***

***Board of studies in  
Business Economics***

*Revised Syllabus of Courses of B.Com Programme*

*Semester III*

*With Effect from Academic Year 2017-2018*

**Business Economics -III**

**Macro Economics**

*List of Modules*

| <b>Sr. No.</b> | <b>Modules</b>                                 | <b>No.of Lectures</b> |
|----------------|--|-----------------------|
| 1              | Overview of Macroeconomics                     | 10                    |
| 2              | Basic concepts of Keynesian Economics          | 10                    |
| 3              | Post Keynesian developments in Macro economics | 10                    |
| 4              | Money, prices and Inflation                    | 15                    |
| <b>Total</b>   |  | <b>45</b>             |

| Sr.No. | Modules / Units  |
|--------|--|
| 1      | <b>INTRODUCTION</b>  |
|        | <ul style="list-style-type: none"> <li>• <b>Macroeconomics:</b> Meaning, Scope and Importance.</li> <li>• <b>Circular flow of aggregate income and expenditure</b> and its Importance- closed and open economy models</li> <li>• <b>The Measurement of National Product:</b> Meaning and Importance of National Income Accounting- conventional and Green GNP and NNP concepts -National Income and Economic Welfare.</li> <li>• <b>Trade Cycles:</b> Features and Phases</li> <li>• <b>Classical Macro economics ; Say's law of Markets - Features, Implications and Criticism</b></li> </ul>   |
| 2      | <b>BASIC CONCEPTS OF KEYNESIAN ECONOMICS</b>   |
|        | <ul style="list-style-type: none"> <li>• <b>The Principle of Effective Demand:</b> Aggregate Demand and Aggregate Supply</li> <li>• <b>Consumption Function:</b> Properties, Assumptions and Implications</li> <li>• <b>Investment function and Marginal Efficiency of capital</b></li> <li>• <b>Investment Multiplier effect on Income and Output:</b> Assumptions, Working, Leakages, Criticism and Importance - paradox of thrift</li> <li>• <b>Relevance of Keynesian theory tools to the developing countries</b></li> </ul>  |
| 3      | <b>POST KEYNESIAN DEVELOPMENTS IN MACRO ECONOMICS</b>  |
|        | <ul style="list-style-type: none"> <li>• <b>The IS-LM model</b> of integration of commodity and money markets</li> <li>• <b>Inflation and unemployment :</b> Philips curve</li> <li>• <b>Stagflation :</b> meaning, causes, and consequences</li> <li>• <b>Supply side economics :</b> Basic propositions and critical appraisal</li> </ul>  |
| 4      | <b>MONEY, PRICES AND INFLATION</b>   |
|        | <ul style="list-style-type: none"> <li>• <b>Money Supply:</b> Determinants of Money Supply - Factors influencing Velocity of Circulation of Money</li> <li>• <b>Demand for Money :</b> Classical and Keynesian approaches and Keynes' liquidity preference theory of interest - Friedman's restatement of Demand for money</li> <li>• <b>Money and prices :</b> Quantity theory of money - Fisher's equation of exchange - Cambridge cash balance approach</li> <li>• <b>Inflation :</b> Demand Pull Inflation and Cost Push Inflation - Effects of Inflation- Nature of inflation in a developing economy - policy measures to curb inflation- monetary policy and inflation targeting</li> </ul> |



| <b>Reference Books</b> |  |
|------------------------|--|
|                        | Ackley.G (1976), Macro Economic Theory and Policy, Macmillan Publishing Co. New York                                       |
|                        | Ahuja. H.L., Modern Economics — S.Chand Company Ltd. New Delhi.  |
|                        | Blanchard Olivier (2000), Macro Economics, Englewood Elitt, Prentice Hall  |
|                        | Bouman John, Principles of Macro Economics   |
|                        | Dornbush , Rudiger, Fisher Stanley and Startz, Richards Macroeconomics, Nineth edition 2004 Tata-Mac Graw Hill, New Delhi. |
|                        | Dwivedi, D.N. (2001), Macro Economics: Theory and Policy, Tata-Mac Graw Hill, New Delhi.                                   |
|                        | Friedman Hilton (1953) Essays in Positive Economics, University of Chicago Press, London.                                  |
|                        | Gregory .N. Mankiw, Macroeconomics, Fifth Edition (2002) New York:Worth Publishers   |
|                        | Jhingan, M.L., Principles of Economics — Vrinda Publications (P) Ltd.  |
|                        | Shapiro, E (1996), Macro-Economic Analysis , Galgotia Publication, New Delhi.  |
|                        | Vaish .M.C. (2010) Macro Economic Theory 14th edition, Vikas Publishing House(P)Ltd  |

## QUESTION PAPER PATTERN

### Business Economics Semester III

**Maximum Marks:** 100 Marks

**Time:** 3 Hours

**Note:** 1) Attempt all Questions

2) All Questions carry equal marks

3) Attempt any two questions out of three in each of question 2, 3, 4 & 5

| Question No           | Particulars   | Marks                           |
|-----------------------|---|---------------------------------|
| Q-1                   | <b>Objective Questions:</b><br>A) Conceptual questions (Any Five out of Eight) (Two from each module)<br>B) Multiple Choice Questions ( 10 questions at least two from each Module) | 20Marks<br>10 Marks<br>10 Marks |
| Q-2 (from Module I )  | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                         |
| Q-3 (from Module II ) | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                         |
| Q-4 (from Module III) | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                         |
| Q-5 (from Module IV ) | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                         |

*Revised Syllabus of Courses of B.Com. Programme at*

*Semester IV*

*With Effect from the Academic Year 2017-2018*

**Business Economics - IV**  
**Foundation of Public Finance**

*List of Modules*

| <b>Sr. No.</b> | <b>Modules</b>                                 | <b>No.of Lectures</b> |
|----------------|--|-----------------------|
| 1              | Introduction to Public Finance                 | 10                    |
| 2              | Public revenue                                 | 10                    |
| 3              | Public Expenditure and Debt                    | 10                    |
| 4              | Fiscal Management and Financial Administration | 15                    |
|                | <b>Total</b>                                   | <b>45</b>             |



| Sr. no | Modules / Units   |
|--------|---|
| 1      | <b>THE ROLE OF GOVERNMENT IN AN ECONOMY</b>   |
|        | <ul style="list-style-type: none"> <li>• <b>Meaning and Scope of Public finance.</b></li> <li>• <b>Major fiscal functions</b> : allocation function, distribution function &amp; stabilization function</li> <li>• <b>Principle of Maximum Social Advantage:</b> Dalton and Musgrave Views - the Principle in Practice, Limitations.</li> <li>• <b>Relation between Efficiency, Markets and Governments</b></li> <li>• <b>The concept of Public Goods and the role of Government</b></li> </ul>   |
| 2      | <b>PUBLIC REVENUE</b>   |
|        | <ul style="list-style-type: none"> <li>• <b>Sources of Public Revenue</b> : tax and non-tax revenues</li> <li>• Objectives of taxation - Canons of taxation - Types of taxes : direct and indirect - Tax Base and Rates of taxation : proportional, progressive and regressive taxation</li> <li>• <b>Shifting of tax burden:</b> Impact and incidence of taxation - Processes- factors influencing incidence of taxation</li> <li>• <b>Economic Effects of taxation:</b> on Income and Wealth, Consumption, Savings, Investments and Production.</li> <li>• <b>Redistributive and Anti – Inflationary nature of taxation</b> and their implications</li> </ul> |
| 3      | <b>PUBLIC EXPENDITURE AND PUBLIC DEBT</b>   |
|        | <ul style="list-style-type: none"> <li>• <b>Public Expenditure:</b> Canons - classification - economic effects of public spending - on production, consumption, distribution, employment and stabilization - Theories of Public Expenditure: Wagner’s Hypothesis and Wiseman Peacock Hypothesis - Causes for Public Expenditure Growth - Significance of Public Expenditure: Low Income Support and Social Insurance Programmes.</li> <li>• <b>Public Debt</b> : Classification - Burden of Debt Finance : Internal and External- Public Debt and Fiscal Solvency</li> </ul>  |
| 4      | <b>Fiscal policy and Management</b>   |
|        | <ul style="list-style-type: none"> <li>• <b>Fiscal Policy:</b> Meaning, Objectives, constituents and Limitations.</li> <li>• <b>Contra cyclical Fiscal Policy and Discretionary Fiscal Policy</b> : Principles of Sound and Functional Finance</li> <li>• <b>Budget-</b> Meaning objectives and types - Structure of Union budget - Deficit concepts</li> <li>• <b>Intergovernmental Fiscal Relations</b> : fiscal federalism and fiscal decentralization - central-state financial relations</li> </ul>  |

| <b>Reference Books</b> |  |
|------------------------|--|
|                        | Ahuja H.L. : Modern Economics, 19th edition, 2015, S.Chand &co Pvt Ltd, New Delhi                                  |
|                        | Bhatia H.L.: Public Finance. Vikas Publishing House Pvt. Ltd.  |
|                        | David N. Hyman : Public Finance A Contemporary Application of theory of policy, Krishna Offset, Delhi              |
|                        | Hoiughton E.W.(1998) : Public Finance, Penguin, Baltimore  |
|                        | Hajela T.N: Public Finance – Ane Books Pvt.Ltd   |
|                        | Jha, R (1998) : Modern Public Economics, Route Ledge, London   |
|                        | Musgrave, R.A and P.B. Musgrave (1976) : Public Finance in Theory and Practice, Tata McGraw Hill, Kogakusha, Tokyo |
|                        | Mithani, D.M (1998) : Modern Public Finance, Himalaya Publishing House, Mumbai                                     |
|                        | Singh.S.K. (2014): Public finance in Theory and Practice, S.Chand &co Pvt Ltd, New Delhi                           |

## QUESTION PAPER PATTERN

### Business Economics Semester IV

**Maximum Marks:** 100 Marks

**Time:** 3 Hours

**Note:** 1) Attempt all Questions

2) Attempt any two out of three questions from each of question no. 2, 3, 4 & 5

| Question No           | Particulars   | Marks                                  |
|-----------------------|---|--|
| Q-1                   | <b>Objective Questions:</b><br>A) Conceptual questions (Any Five out of Eight) (Two from each module)<br>B) Multiple Choice questions ( 10 questions - at least two from each Module) | <b>20Marks</b><br>10 Marks<br>10 Marks |
| Q-2 (from Module I)   | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                                |
| Q-3 (from Module II)  | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                                |
| Q-4 (from Module III) | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                                |
| Q-5 (from Module IV ) | A) Full Length Question<br>B) Full Length Question<br>C) Full Length Question   | 20Marks                                |



## Macro Economics - II

### S.Y.B.A. Semester – IV Paper V (Academic Year: 2020 - 21)

**Preamble:** This course is designed to make students aware of macroeconomic terminologies and make them familiar with macroeconomic terms and concepts in order to understand economics at aggregate level. It also aims to make the students aware about recent developments in macroeconomic literature.

#### **Module - I: Inflation (12 Lectures)**

The Economics of Depression, Hyper Inflation; Inflation: Features and Causes, Demand Pull Inflation and Cost Push Inflation, Effects of Inflation; Nature of Inflation in Developing Economy; Phillips Curve; Stagflation: Meaning, Causes and Consequences

#### **Module – II: Economic Policy (12 Lectures)**

Monetary Policy: Objectives, Instruments, Limitations, Role of Monetary Policy in Developing Economies; Fiscal Policy - Objectives, Instruments, Limitations and Role of Fiscal Policy in Developing Economies

#### **Module – III: Post Keynesian Economics (12 Lectures)**

The IS-LM Model of Integration of Commodity and Money Market; IS Curve: Derivation of IS Curve, Shift in IS Curve, Equilibrium in Goods Market; LM Curve: Derivation of LM Curve, Shift in LM Curve, Equilibrium in Money Market; Simultaneous Equilibrium in Goods and Money Market

#### **Module – IV: External Sector (12 Lectures)**

Balance of Payment: Structure, Disequilibrium in Balance of Payment, Types, Causes and Measures to Correct Balance of Payment Disequilibrium; Foreign Exchange Market: Determination of Exchange Rate: Fixed and Flexible Exchange Rate; Spot and Forward Exchange Rate; Exchange Rate Policy

#### **Reference**

- 1 Richard Froyan, (2012), Macroeconomics: Theories and policies, Pearson Education.
- 2 Eroll D'Souza, (2008), Macroeconomics, Pearson Education.
- 3 Suman Kalyan Chakravarty, (2010), Macroeconomics, Himalaya Publishing House.
- 4 N. Gregory Mankiw, (2015), Principle of Macroeconomics Cengage Learning.
- 5 Francis Cherunilam, (1999), International Economics, Tata McGraw-Hill.
- 6 Bo Soderstein, (1994), International Economics, Palgrave Macmillan.

# University of Mumbai



No. UG/128 of 2019-20

**CIRCULAR:-**

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office Circular No. UG/40 of 2012-13, dated 25<sup>th</sup> June, 2012 relating to the revised syllabus as per the (CBSGS) of Paper II & III in Semester III & Semester IV of B.A. programme in the course of Economics.

They are hereby informed that the recommendations made by the Board of Studies in Economics at its meeting held on 7<sup>th</sup> June, 2019 have been accepted by the Academic Council at its meeting held on 26<sup>th</sup> July, 2019 vide item No.4.28 and that in accordance therewith, the revised syllabus as per the (CBCS) for the S.Y.B.A. (Sem. IV) Indian Economy – Paper VI in Economics has been brought into force with effect from the academic year 2020-21, accordingly. (The same is available on the University's website [www.mu.ac.in](http://www.mu.ac.in)).

MUMBAI – 400 032

26<sup>th</sup> September, 2019

(Dr. Vinod P. Patil)  
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9<sup>th</sup> January, 2018.)

A.C/4.28/26/07/2019

No. UG/128 -A of 2019-20

\*\*\*\*\*  
MUMBAI-400 032

26<sup>th</sup> September, 2019

Copy forwarded with Compliments for information to:-

- 1) The I/c Dean, Faculty of Humanities,
- 2) The Chairman, Board of Studies in Economics,
- 3) The Director, Board of Examinations and Evaluation,
- 4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
- 5) The Director, Board of Students Development,
- 6) The Co-ordinator, University Computerization Centre,

(Dr. Vinod P. Patil)  
I/c REGISTRAR



**Economics**  
**S.Y.B.A. Semester IV**  
**Paper VI**  
**Indian Economy**

**Preamble**

This paper deals with the nature and sector wise composition of Indian economy. The learners shall be able to understand the problems and prospects of Indian Economy. The content has also intended to orient the learners about the recent developments in the economy.

**Module- I: Introduction**

**(12 Lectures)**

Trends in India's National Income and PCI Since 1990; Structural Changes In Indian Economy; Brief Overview of the Employment Generation and Poverty Alleviation Programmes; Regional Inequalities; Measures to Reduce Regional Inequalities in India

**Module - II: Agricultural Sector**

**(12 Lectures)**

Role of Agriculture in Economic Development; Causes of Low Productivity; Agricultural Inputs; Agricultural Price Policy: Recent Minimum Support Price Policy; Income Support for Farmers; Sources of Agricultural Finance; Micro Finance; NABARD: Role and Function; Agricultural Marketing: Structure and Problems; National Policy for Farmers, 2007; Organic Farming Policy; Food Security in India

**Module -III: Industrial Sector**

**(12 Lectures)**

Infrastructure for Industrial Development; Industrial Policies in India; Industrial Policy of 1991; Micro, Small and Medium Enterprises (MSMEs): Classification, Role and Policy Measures; Growth of Large Scale Industries and Economic Development; Recent Policies and Programs for Industrial Development: Start Up India, Make in India, Skill India; Role and Trends of FDI in Industrial Sector Development

**Module -IV: Service Sector**

**(12 Lectures)**

Role of Service Sector in Indian Economy; Growth and Performance of Healthcare; Performance of Trade and Tourism, Information Technology and IT - Enabled Services; Research and Development Services With Reference to Education and Skill Development in Employment Generation in India; Performance of Service Sector during XII<sup>th</sup> Five Year Plan

**Reference**

- 1) Ashwini Mahajan, Gaurav Datt, (2018) 'Indian Economy', S. Chand and Company, New Delhi.
- 2) Brahmananda, P.R. and V.R. Panchmukhi (Eds.), (2001), 'Development Experience in the Indian Economy: Inter-State Perspectives', Bookwell, New Delhi.
- 3) Datt, Ruddra and K.P.M, Sundaram, (2017), 'Indian Economy', S. Chand & Company Ltd., New Delhi.
- 4) Misra, S. K. and V. K. Puri, (2018) 'Indian Economy', Himalaya Publishing House, Mumbai.

**Revised Syllabus of Courses of B.Com. Programme at Semester V  
with Effect from the Academic Year 2018-2019**

**Elective Courses (EC)**

**1 A. Discipline Specific Elective (DSE) Courses**

**Group A: Advanced Accountancy**

**1. Financial Accounting and Auditing VII -**

**Financial Accounting**

**Modules at a Glance**

| Sr. No. | Modules  | No. of Lectures |
|---------|--|-----------------|
| 1       | Preparation of Final Accounts of Companies             | 15              |
| 2       | Internal Reconstruction                                | 15              |
| 3       | Buy Back of Shares                                     | 10              |
| 4       | Investment Accounting (w.r.t. Accounting Standard- 13) | 12              |
| 5       | Ethical Behaviour and Implications for Accountants     | 08              |
|         | <b>Total</b>   | <b>60</b>       |



| Sr. No. | Modules / Units   |
|---------|---|
| 1       | <p><b>Preparation of Final Accounts of Companies</b></p> <p>Relevant provisions of Companies Act related to preparation of Final Account (excluding cash flow statement)</p> <p>Preparation of financial statements as per Companies Act. (excluding cash flow statement)</p> <p>AS 1 in relation to final accounts of companies (disclosure of accounting policies)</p> <p>Adjustment for –</p> <ol style="list-style-type: none"> <li>1. Closing Stock</li> <li>2. Depreciation</li> <li>3. Outstanding expenses and income</li> <li>4. Prepaid expenses and Pre received income</li> <li>5. Proposed Dividend and Unclaimed Dividend</li> <li>6. Provision for Tax and Advance Tax</li> <li>7. Bill of exchange ( Endorsement, Honour, Dishonour)</li> <li>8. Capital Expenditure included in Revenue expenditure and vice versa eg- purchase of furniture included in purchases</li> <li>9. Unrecorded Sales and Purchases</li> <li>10. Good sold on sale or return basis</li> <li>11. Managerial remuneration on Net Profit before tax</li> <li>12. Transfer to Reserves</li> <li>13. Bad debt and Provision for bad debts</li> <li>14. Calls in Arrears</li> <li>15. Loss by fire ( Partly and fully insured goods)</li> <li>16. Goods distributed as free samples.</li> <li>17. Any other adjustments as per the prevailing accounting standard.</li> </ol> |
| 2       | <p><b>Internal Reconstruction</b></p> <p>Need for reconstruction and company law provisions</p> <p>Distinction between internal and external reconstructions.</p> <p>Methods including alteration of share capital, variation of shareholder rights, sub division, consolidation, surrender and reissue / cancellation, reduction of share capital with relevant legal provisions and accounting treatment for same.</p>   |
| 3       | <p><b>Buy Back of Shares</b></p> <p>Company Law / Legal provisions (including related restrictions, power, transfer to capital redemption reserve account and prohibitions)</p> <p>Compliance of conditions including sources, maximum limits and debt equity ratio. Cancellation of Shares Bought back(Excluding Buy Back of minority shareholding)</p>  |

**T Y B Sc Chemistry**  
Choice Based Credit System

**SEMESTER V**

**Applied Component**

**(Drugs and Dyes)**

**COURSE CODE: USACDD501**

**CREDITS: 02**

**LECTURES: 60**

| Unit     |              | Topics   |             |
|----------|--------------|--|-------------|
| <b>I</b> | <b>1.1</b>   | <b>General Introduction to Drugs</b>   | <b>(8L)</b> |
|          | 1.1.1        | Definition of a drug, sources of drugs, requirements of an ideal drug, classification of drugs (based on therapeutic action),  |             |
|          | 1.1.2        | Nomenclature of drugs: Generic name, Brand name, Systematic name.  |             |
|          | 1.1.3        | Definition of the following medicinal terms: Pharmacoin, Pharmacology, Pharmacophore, Prodrug, Half – life efficiency, LD <sub>50</sub> , ED <sub>50</sub> , GI <sub>50</sub> Therapeutic Index.   |             |
|          | 1.1.4        | Brief idea of the following terms: Receptors, Agonists, Antagonists, Drug-receptor interaction, Drug Potency, Bioavailability, Drug toxicity, Drug addiction, Spurious Drugs, Misbranded Drugs, Adulterated Drugs, Pharmacopoeia.  |             |
|          | <b>1.2</b>   | <b>Routes of Drug Administration and Dosage Forms</b>  | <b>(3L)</b> |
|          | 1.2.1        | Oral and Parenteral routes with advantages and disadvantages.  |             |
|          | 1.2.2        | Formulations & combination formulation, Different dosage forms (including Patches & Adhesives, emphasis on sustained release formulations and enteric coated tablets).   |             |
|          | <b>1.3</b>   | <b>Pharmacodynamic agents:</b> A brief introduction of the following pharmacodynamic agents and the study with respect to their chemical structure, chemical class, therapeutic uses, and side effects.  |             |
|          | <b>1.3.1</b> | <b>CNS Drugs:</b><br>Classification based on pharmacological actions: CNS Depressants & CNS Stimulants. Concept of sedation and hypnosis, anaesthesia. <ul style="list-style-type: none"> <li>• Phenytoin (Hydantoin)</li> <li>• Trimethadione (Oxazolidinediones) (<b>Synthesis from acetone</b>)</li> <li>• Alprazolam (Benzodiazepines)</li> <li>• Levetiracetam (Pyrrolidines)</li> <li>• Amphetamine (Phenethylamine) (<b>Asymmetric synthesis from phenyl acetic acid</b>)</li> <li>• Chlorpromazine (Phenothiazines)</li> </ul> | <b>(4L)</b> |

**UNIT-II (Drugs)**

|          |            |  |             |
|----------|------------|--|-------------|
| <b>2</b> | <b>2.1</b> | <b>Analgesics, Antipyretics and Anti-inflammatory Drugs.</b> | <b>(4L)</b> |
|----------|------------|--|-------------|

### Unit III (Dyes)

|          |            |  |             |
|----------|------------|--|-------------|
| <b>3</b> | <b>3.1</b> | Introduction to the dye-stuff Industry   | <b>(5L)</b> |
|          | 3.1.1      | Dyes   |             |
|          |            | <p>Definition of dyes, requirements of a good dye i.e. Colour, Chromophore and Auxochrome, Solubility, Linearity, Coplanarity, Fastness, Substantivity, Economic viability.</p> <p>Definition of fastness and its properties and Mordants with examples</p> <p>Explanation of nomenclature or abbreviations of commercial dyes with at least one example suffixes – G, O, R, B, K, L, C, S H, 6B, GK, 6GK,</p> <p>Naming of dyes by colour index (two examples) used in dye industries.</p>                                    |             |
|          | 3.1.2      | Natural and Synthetic Dyes   |             |
|          |            | <p>Natural Dyes: Definition and limitations of natural dyes. Examples and uses of natural dyes w.r.t Heena, Turmeric, Saffron, Indigo, Madder, Chlorophyll –<b>names</b> of the chief dyeing material/s in each natural dye <b>[structures not expected]</b>,</p> <p>Synthetic dyes: Definition of synthetic dyes, primaries and intermediates. Important milestones in the development of synthetic dyes – Emphasis on Name of the Scientist, dyes and the year of the discovery is required. (structure is not expected)</p> |             |
|          | <b>3.2</b> | Substrates for Dyes : Types of fibres  | <b>(3L)</b> |
|          | 3.2.1      | Natural: cellulosic and proteinaceous fibres, examples – wool, silk and cotton structures and names of dyes applied on each of them.   |             |
|          | 3.2.2      | Semi – synthetic: definition and examples [structures not expected]  |             |
|          | 3.2.3      | Synthetic: Nylon, Polyesters and Polyamides structures and names of dyes applied on each of them   |             |
|          | 3.2.4      | Blended fabrics: definition and examples [structures not expected]   |             |
|          | 3.2.5      | Binding forces of dyes on substrate: ionic forces, covalent linkages, hydrogen bonding, vander-walls forces  |             |
|          | <b>3.3</b> | Classification of dyes based on applications and dyeing methods  | <b>(7L)</b> |
|          | 3.3.1      | Dyeing methods   |             |
|          |            | <p>Basic Operations involved in dyeing process:</p> <p>i. Preparation of fibres                      ii. Preparation of dyebath</p> <p>iii. Application of dyes                      iv. Finishing</p>   |             |
|          |            | <p>Dyeing Method of Cotton Fibres:</p> <p>(i) Direct dyeing                      (ii) Vat dyeing</p> <p>(iii) Mordant dyeing                      (iv) Disperse dyeing</p>   |             |

|  |  |       |   |  |
|--|--|-------|---|--|
|  |  |       |   |  |
|  |  | 3.3.2 | <p>Classification of dyes based on applicability on substrates (examples with structures)</p> <p>(a) Acid Dyes- Orange II,<br/> (b) Basic Dyes-methyl violet,<br/> (c) Direct cotton Dyes- Benzofast Yellow 5GL<br/> (d) Azoic Dyes – Diazo components; Fast yellow G, Fast orange R. Coupling components. Naphthol AS, Naphthol ASG<br/> (e) Mordant Dyes-Eriochrome Black A, Alizarin.<br/> (f) Vat Dyes- Indanthrene brown RRD,<br/> (g) Sulphur Dyes- Sulphur Black T (no structure)<br/> (h) Disperse Dyes-Celliton Fast brown 3R,<br/> (i) Reactive Dyes- Cibacron Brilliant Red B,</p> |  |
|  |  | 3.3.3 | <p>Optical Brighteners: General idea, important characteristics of optical brighteners and their classes [Stilbene, Coumarin, Heterocyclic vinylene derivatives, Diaryl pyrazolines, Naphthylamide derivatives] general structure of each class.</p>  |  |
|  |  |       |   |  |

#### Unit – IV (Dyes)

|          |            |       |  |             |
|----------|------------|-------|--|-------------|
| <b>4</b> | <b>4.1</b> |       | <b>Colour and Chemical Constitution of Dyes</b>  | <b>(4L)</b> |
|          |            | 4.1.1 | Absorption of visible light, Colour of wavelength absorbed, Complementary colour.  |             |
|          |            | 4.1.2 | Relation between colour and chemical constitution.   |             |
|          |            |       | <p>(i) Armstrong theory (quinonoid theory) and its limitations.<br/> (ii) Witt's Theory: Chromophore, Auxochrome, Bathochromic &amp; Hypsochromic Shift, Hypochromic &amp; Hyperchromic effect<br/> (iii) Valence Bond theory, comparative study and relation of colour in the following classes of compounds/dyes: Benzene, Nitrobenzene, Nitroanilines, Nitrophenols, Benzoquinones, Azo, Triphenyl methane, Anthraquinones.<br/> (iv) Molecular Orbital Theory.</p> |             |
|          | <b>4.2</b> |       | <b>Unit process and Dye Intermediates</b>  |             |
|          |            | 4.2.1 | <b>A brief idea of Unit Processes</b>  | <b>(3L)</b> |
|          |            |       | Introduction to primaries and intermediates  |             |
|          |            |       | <p>Unit processes: definition and brief ideas of below unit processes:<br/> (a) Nitration                      (b) Sulphonation                      (c) Halogenation<br/> (d) Diazotization: (3 different methods &amp; its importance)<br/> (e) Ammonolysis                      (f) Oxidation<br/> NB: Definition, Reagents, Examples of each unit processes mentioned above with reaction conditions (mechanism is not expected)</p>                               |             |
|          |            |       |  |             |



|     |  |  |      |
|-----|--|--|------|
|     |  | <p>4. p-Acetyl amino benzenesulphonyl chloride from Aniline</p> <p>5. Epichlorohydrine from propene</p>  |      |
| 2.6 |  | <p><b>Nano particles in Medicinal Chemistry</b><br/> Introduction; Carbon nano particles (structures) and Carbon nano tubes:</p> <ul style="list-style-type: none"> <li>• Functionalization for Pharmaceutical applications</li> <li>• Targeted drug delivery</li> <li>• In vaccine (Foot and mouth disease)</li> <li>• Use in Bio-physical treatment.</li> </ul> <p>Gold nano particles in treatment of: Cancer; Parkinsonism; Alzheimer.</p> <p>Silver nano particles: Antimicrobial activity.</p> | (4L) |
| 2.7 |  | <p><b>Drugs and Environmental Aspects</b></p> <ul style="list-style-type: none"> <li>• Impact of Pharma-industry on environment,</li> <li>• International regulation for human experimentation with reference to: "The Nuremberg Code" and "The Helsinki Declaration".</li> </ul>  | (2L) |

#### Reference Books (For Units I & II):

1. Foye's principles of medicinal chemistry. 6th Edition, Edited by Davis William & Thomas Lemke, Indian edition by B I Publication Pvt Ltd, Lippincott Williams & Wilkins.
  2. Text book of organic medicinal & pharmaceutical chemistry. Wilson & Gisovolds, 11th Edition by John H Block, John M Beale Jr.
  3. Medicinal chemistry. Ashutosh Kar, New Age International Pvt. Ltd Publisher. 4<sup>th</sup> edition.
  4. Burger's Medicinal Chemistry, Drug Discovery & Development. Abraham & Rotella. Wiley
  5. Medicinal chemistry. Ashutosh Kar, New Age International Pvt. Ltd Publisher. 4<sup>th</sup> edition.
  6. Medicinal chemistry. V.K. Ahluwalia and Madhu Chopra, CRC Press.
  7. Principle of medicinal chemistry. Vol 1 & 2 S. S. Kadam, K. R. Mahadik, K. G. Bothara
  8. The Art of Drug synthesis. Johnson and Li. Wiley, 2007.
  9. The organic chemistry of drug design & drug action. 2<sup>nd</sup> ed. By Richard B Silvermann, Academic Press.
  10. The Organic Chemistry of Drug Synthesis. Lednicer and Mitscher, Wiley.
  11. Text book of drug design and discovery. Povl-Krog-Sgaard-Larsen, Tommy Liljefors and ULF Madsen, 3rd Edition Taylor & Francis.
  12. Bio-applications of nanoparticles. Edited by Warren C.W. Chan, Springer Publication.
  13. Nanoparticle and technology for drug delivery (Drugs and pharmaceutical sciences). Ram B.Gupta & Uday B.Kompella Pub. Informa Healthcare.
  14. Nano forms of carbon and its applications. Edited by Maheshwar Sharon and Madhuri Sharon. Monad Nanotech Pvt. Ltd.
  15. Environmental Chemistry. A. K. De
  16. Text Book on Law and Medicine. Chokhani and Ghormade. 2<sup>nd</sup> Edition. Hind Law House, Pune.
  17. Essentials of Medical Pharmacology. K D Tripathi, Jaypee Brothers Medical publishers Pvt. Ltd.
- Practical organic chemistry, Vogel.

**SEMESTER VI**

**Unit – III (Dyes)**

|          |            |  |              |
|----------|------------|--|--------------|
| <b>3</b> | <b>3.1</b> | <p><b>Classification of Dyes based on Chemical Constitution and Synthesis of Selected Dyes</b> (Synthesis of the dyes marked with * is expected)</p> <p><b>i) Nitro Dye:</b> Naphthol Yellow S</p> <p><b>ii) Nitroso Dye:</b> Gambine Y</p> <p><b>iii) Azo dyes:</b><br/>                     a) Monoazo dyes: Orange IV *(from sulphanilic acid) &amp; Eriochrome Black T* (from <math>\beta</math>- naphthol)<br/>                     b) Bisazo dyes: Congo Red* (from nitrobenzene)<br/>                     c) Trisazo Dye: Direct Deep Black EW* (from benzidine)</p> <p><b>iv) Diphenylmethane dye:</b> Auramine O* (from N,N-dimethyl aniline)</p> <p><b>v) Triphenylmethane dye:</b><br/>                     a) Diamine series: Malachite Green* (from benzaldehyde)<br/>                     b) Triamine series: Acid Magenta<br/>                     c) Phenol series: Rosolic acid</p> <p><b>vi) Heterocyclic Dyes:</b><br/>                     a) Thiazine dyes: Methylene Blue<br/>                     b) Azine dyes: Safranin T* (from o-toluidine)<br/>                     c) Xanthene Dyes: Eosin* (from phthalic anhydride)<br/>                     d) Oxazine Dyes: Capri Blue<br/>                     e) Acridine Dyes: Acriflavine</p> <p><b>vii) Quinone Dyes:</b><br/>                     a) Naphthaquinone: Naphthazarin<br/>                     b) Anthraquinone Dyes: Indanthrene Blue* (from anthraquinone)</p> <p><b>viii) Indigoid Dyes:</b> Indigo* (from aniline + monochloroacetic acid)</p> <p><b>ix) Phthalocyanine Dyes:</b> Monastral Fast Blue B</p> | <b>(12L)</b> |
|          | <b>3.2</b> | <p><b>Health and Environmental Hazards of Synthetic Dyes and their Remediation Processes</b></p> <p><b>3.2.1 Impact of the textile and leather dye Industry on the environment with special emphasis on water pollution</b></p> <p><b>3.2.2 Health Hazards: Toxicity of dyes w.r.t food colours.</b></p> <p><b>3.2.3 Effluent Treatment Strategies:</b><br/>                     Brief introduction to effluent treatment plants (ETP)<br/>                     Primary Remediation processes:(Physical Processes) Sedimentation, Aeration, Sorption (activated charcoal, fly ash etc.)<br/><br/>                     Secondary Remediation processes: Biological Remediation – Biosorption, bioremediation and biodegradation<br/><br/>                     Chemical Remediation: Oxidation Processes (chlorination), Coagulation-flocculation-Precipitation</p>  | <b>(3L)</b>  |

### Unit – IV (Dyes)

|          |            |       |   |             |
|----------|------------|-------|---|-------------|
| <b>4</b> | <b>4.1</b> |       | <b>Non-textile uses of dyes:</b>  | <b>(8L)</b> |
|          |            | 4.1.1 | <b>Biomedical uses of dyes</b><br>i) Dyes used in formulations (Tablets, capsules, syrups etc)<br>Indigo carmine, Sunset yellow, Tartrazine<br>ii) Biological staining agents<br>Methylene blue, Crystal violet and Safranin T<br>iii) DNA markers<br>Bromophenol blue, Orange G, Cresol red<br>iv) Dyes as therapeutics<br>Mercurochrome, Acriflavine, Crystal Violet, Prontosil |             |
|          |            | 4.1.2 | <b>Dyes used in food and cosmetics:</b><br>i) Properties of dyes used in food and cosmetics<br>ii) Introduction to FDA and FSSAI<br>iii) Commonly used food colours and their limits  |             |
|          |            | 4.1.3 | <b>Paper and leather dyes</b><br>i) Structural features of paper and leather<br>ii) Dyes applicable to paper and leather  |             |
|          |            | 4.1.4 | <b>Miscellaneous dyes</b><br>i) Hair dyes<br>ii) Laser dyes<br>iii) Indicators<br>iv) Security inks<br>iv) Coloured smokes and camouflage colours   |             |
|          | <b>4.2</b> |       | <b>Pigments</b>   | <b>(3L)</b> |
|          |            |       | Definition of pigments, examples, properties of pigments, difference between dyes and pigments.<br>Definition of Lakes and Toners   |             |
|          | <b>4.3</b> |       | <b>Dyestuff Industry - Indian Perspective</b>   | <b>(4L)</b> |
|          |            | 4.3.1 | Growth and development of the Indian Dyestuff Industry  |             |
|          |            | 4.3.2 | Strengths, Weaknesses, Opportunities and Challenges of the Dyestuff industry in India   |             |
|          |            | 4.3.3 | Make in India - Future Prospects of the Dye Industry  |             |



### References (For Units III & IV)

1. Chemistry of Synthetic Dyes, Vol I – IV, Venkatraman K., Academic Press 1972
2. The Chemistry of Synthetic Dyes and Pigments, Lubs H.A., Robert E Krieger Publishing Company, NY ,1995
3. Chemistry of Dyes and Principles of Dyeing, Shenai V.A., Sevak Publications, 1973
4. Environmental Studies, Joseph Benny, Tata McGraw Hill Education, 2005
5. Fundamental Concepts of Environmental Chemistry, Sodhi. G. S., Alpha Science International, 2009
6. Planning Commission, Niti Aayog, FSSAI and FDA websites
7. Green Chemistry for Dyes Removal from Waste Water- Research Trends and Applications, Ed. Sharma S.K., Wiley, 2015
8. Environmental Pollution- Monitoring and Control, Khopkar S.M., New Age International (P) Ltd, New Delhi, 1982

### Practicals

#### SEMESTER V

#### (Drugs and Dyes)

**COURSE CODE: USACDD6P1**

**CREDITS: 02**

1. O-Methylation of  $\beta$ -naphthol.
2. Preparation of Paracetamol from p-aminophenol.
3. Preparation of Fluorescein
4. TLC of a mixture of dyes (safranin-T, Indigo carmine, methylene blue)

**II] Preparation of monograph of any one drug from syllabus by I.P. method.**

**OR**

**Industrial visit Report.**

\*\*\*\*\*



**UNIVERSITY OF MUMBAI**  
**No. UG/110 of 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 11<sup>th</sup> 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](http://www.mu.ac.in)) and that the same has been brought into force with effect from the academic year 2017-18.

MUMBAI – 400 032

१३/७ July, 2017

  
REGISTRAR

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

१३/७ 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.

  
REGISTRAR

...PTO

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

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



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

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



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

| SEMESTER IV USBOT P4<br>PRACTICALS Paper II – FORM AND FUNCTION- II   | Cr<br>1 |
|---|---------|
| <b>Anatomy</b>  |         |
| 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   |         |
| <b>Plant Physiology and Plant Biochemistry</b>  |         |
| 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).  |         |
| <b>Ecology and Environmental Botany</b>   |         |
| 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   |         |

**PROPOSED SYBSC SYLLABUS FOR ACADEMIC YEAR 2017-18**

| Course Code   | Title                              | Credits                    |
|---|------------------------------------|----------------------------|
| USBO303   | CURRENT TRENDS IN PLANT SCIENCES I | 2 Credits<br>(45 lectures) |
| <b>Unit1: Pharmacognosy and phytochemistry</b> <ul style="list-style-type: none"> <li>• Introduction to pharmacopoeia</li> <li>• Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia</li> <li>• Study of Monograph from pharmacopoeia</li> <li>• Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations</li> <li>• Adulterants: <i>Saraca asoca, Polyalthia longifolia</i><br/><i>Terminalia arjuna, Terminalia tomentosa</i><br/><i>Bacopa monnieri, Centella asiatica</i><br/><i>Abrus, Glycyrrhiza</i><br/><i>Phyllanthus amarus (Bhuiamla)</i></li> </ul> |                                    | 15 Lectures                |
| <b>Unit 2: Forestry and Economic Botany</b> <ul style="list-style-type: none"> <li>• Forestry: Outline of types of forest in India</li> <li>• Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture</li> <li>• Economic Botany:</li> <li>• Types of fibers: Jute and cotton,</li> <li>• Current trends in Fiber industries</li> <li>• Spices and condiments: Saffron and cardamom</li> <li>• Commercial market of spices</li> </ul>  |                                    | 15 Lectures                |
| <b>Unit 3: Industry based on plant products</b> <ul style="list-style-type: none"> <li>• Aromatherapy- Introduction, Uses with few examples, Jojoba, lemon, jasmin</li> <li>• Botanical and nutraceuticals -<i>Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia, Chlorella, and Kale.</i></li> <li>• Enzymes industry: Cellulases, Papain, Bromelain</li> <li>• Biofuels.</li> </ul>   |                                    | 15 Lectures                |

| <b>Semester III USBOP3</b>                                      |  | <b>Cr 1</b> |
|---|--|-------------|
| <b>PRACTICAL - Paper III CURRENT TRENDS IN PLANT SCIENCES I</b> |  |             |
| <b>1</b>  | <i>Study of Phyllanthus amarus</i><br><i>Saraca asoka</i><br><i>Bacopa monieri</i>   |             |
| <b>2</b>  | Study of biodiversity<br>(Visit to National Park/ Botanical Garden)<br>Sources of : Fibres & Paper<br>Spices & condiments<br>Preparation of herbal cosmetics (Face pack/ De-tanning cream) |             |
| <b>3</b>  | Estimation of crude fibre in cereals & their products  |             |
| <b>4</b>  | Preparation & evaluation of probiotic foods  |             |
| <b>5</b>  | Evaluation of nutraceutical value of mushroom/ wheat germ  |             |



| Course Code  | Title                              | Credits                    |
|--|------------------------------------|----------------------------|
| USBO403  | CURRENT TRENDS IN PLANT SCIENCES I | 2 Credits<br>(45 lectures) |
| <p><b><u>Unit I : Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture Gardening:</u></b></p> <ul style="list-style-type: none"> <li>• Locations in the garden- edges, hedges, lawn, flower beds, avenue, water garden (with names of two plants for each category).<br/>Focal point.</li> <li>• <b>Types of garden</b> <ul style="list-style-type: none"> <li>○ Formal and informal gardens</li> <li>○ National Park: Sanjay Gandhi National Park.</li> <li>○ Botanical Garden: Veer Mata Jijabai Udyan (Victoria Garden).</li> </ul> </li> </ul>                                      |                                    | 15 Lectures                |
| <p><b><u>Unit II : Biotechnology</u></b></p> <ul style="list-style-type: none"> <li>• <b>Introduction to plant tissue culture</b> <ul style="list-style-type: none"> <li>○ Laboratory organization and techniques in plant tissue culture</li> <li>○ Totipotency</li> <li>○ Organogenesis</li> <li>○ Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.</li> </ul> </li> <li>• <b>R-DNA technology-</b> <ul style="list-style-type: none"> <li>○ Gene cloning</li> <li>○ Enzymes involved in Gene cloning</li> <li>○ Vectors used for Gene cloning.</li> </ul> </li> </ul> |                                    | 15 Lectures                |
| <p><b><u>Unit III : Biostatistics and Bioinformatics</u></b></p> <ul style="list-style-type: none"> <li>• <b>Biostatistics:</b> <ul style="list-style-type: none"> <li>○ The chi square test.</li> <li>○ Correlation – Calculation of coefficient of correlation.</li> </ul> </li> <li>• <b>Bioinformatics</b> ○ Information technology: History and tools of IT, Internet and its uses.</li> </ul>  |                                    | 15 Lectures                |

|  |  |
|--|--|
| <ul style="list-style-type: none"> <li>○ Introduction to Bioinformatics- goal, need, scope and limitation</li> <li>○ Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez,</li> <li>○ BLAST</li> <li>○ Bioinformatics programme in India.</li> </ul> |  |
|--|--|

| <b>Semester III USBOP3</b>                                      |  | <b>Cr 1</b> |
|---|--|-------------|
| <b>PRACTICAL - Paper III CURRENT TRENDS IN PLANT SCIENCES I</b> |  |             |
| <b>Horticulture</b>   |  |             |
| 1   | Study of five examples of plants for each of the garden locations as prescribed for theory |             |
| 2   | Preparation of garden plans – formal and informal gardens                                  |             |
| 3   | Bottle and dish garden preparation.  |             |
| <b>Biotechnology</b>  |  |             |
| 4   | Various sterilization techniques   |             |
| 5   | Preparation of Stock solutions, Preparation of MS medium.                                  |             |
| 6   | Seed sterilization, callus induction   |             |
| 7   | Regeneration of plantlet from callus.  |             |
| 8   | Identification of the cloning vectors – pBR322, pUC 18, Ti plasmid.                        |             |
| <b>Biostatistics and Bioinformatics</b>                         |  |             |
| 9   | Chi square test  |             |
| 10  | Calculation of coefficient of correlation  |             |
| 11  | Web Search – Google, Entrez.   |             |
| 12  | BLAST  |             |

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  |
| <b>UNIT I</b>                |   | <b>15</b> |    |
| <b>ALGAE</b>                 |   |           |    |
| 1                            | Structure, life cycle and systematic position of <i>Nostoc</i> and <i>Spirogyra</i> .   |           |    |
| 2                            | Economic importance of Algae.   |           |    |
| <b>UNIT II</b>               |   | <b>15</b> |    |
| <b>FUNGI</b>                 |   |           |    |
| 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).                              |           |    |
| <b>UNIT III</b>              |   | <b>15</b> |    |
| <b>BRYOPHYTA</b>             |   |           |    |
| 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**

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

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 USBOP1                              |   | L  | Cr |
|--|---|----|----|
| <b>PRACTICAL Paper I – Plant Diversity 1</b>   |   | 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.   |    |    |
| <b>PRACTICAL PAPER II- FORM AND FUNCTION 1</b> |   | 30 | 1  |
| 1  | Examining various stages of mitosis in root tip cells ( <i>Allium</i> )   |    |    |
| 2  | <b>Cell inclusions:</b> 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  | <b>Identification of plants adapted to different environmental conditions:</b> 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  
Board of Studies in Botany  
FYBSc Syllabus Credit System 2014-2015 onwards

**AC 7/4/2014**  
**Item No. 4.23**

|    |   |  |  |
|----|---|--|--|
| 6  | Xerophytes : Succulent ( <i>Opuntia</i> ); Woody Xerophyte ( <i>Nerium</i> ); Halophyte ( <i>Avicennia pneumatophore</i> )<br>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> .  |  |  |