



शिक्षण प्रसारक मंडळाचे  
**चांदमल ताराचंद बोर महाविद्यालय**  
कला-वाणिज्य-विज्ञान  
स्थापना १९६८

## 2.6.1: Programme Outcomes (POs) and Course Outcomes (COs)

**Choice Based Credit System CBCS -2019 Pattern**

**Shirur Shikshan Prasarak Mandal's,**  
**Chandmal Tarachand Bora College**  
**of Arts, Commerce and Science, Shirur Dist. Pune**  
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**Shirur Shikshan Prasarak Mandal's,**  
**Chandmal Tarachand Bora College**  
**of Arts, Commerce and Science, Shirur Dist. Pune**  
**B. A. (Credit System) from the Academic Year 2019-20**  
**Under the Faculty of Humanities**  
**PO's, PSO's, CO's**

Shirur Shikshan Prasarak Mandal's. Chandmal Tarachand Bora College Arts, Commerce, Science Shirur, Dist. Pune (MS), India is affiliated to Savitribai Phule Pune University, Pune (formerly University of Pune) *ID. NO.=PU/PN/ASC/019 (1968)* B.A. program in the college is recognized by Savitribai Phule Pune University, Pune, and follows the syllabus prescribed by the university. English is a compulsory subject for our B.A program. Apart from this, our students are allowed to choose any of the one subject from the cluster of Marathi, Hindi, English, Economics, History, Psychology and Geography for special level and to choose any of the two subjects from the cluster of Marathi, Hindi, English, Economics, History, Psychology, Geography, Logic and Ancient Indian History, Culture and Archeology for general level B.A. program in our college meets the standards prescribed by general humanities education.

## Bachelor of Arts Course Structure

### 1. For first year: student has to select 6 core courses offered by the college/institute.

- i) **F.Y. B.A. – Semester – I** student has to select among 6 Core Courses, a total of 18 credits (Compulsory English included)
- ii) **F.Y. B.A. – Semester – II** student has to select among 6 Core Courses, a total of 18 credits (Compulsory English included)

### 2. For second year: student has to select 5 subjects among the courses offered by the college/institute.

- i) **S.Y. B.A.- Semester -III** student has to select among 5 courses, a total of 22 credits (2 Core Courses, 1 Ability Enhancement Compulsory Course (AEC), 2 Skill Enhancement Courses (SEC), 2 Discipline Specific Elective Courses (DSE) and Compulsory English)
- ii) **S.Y. B.A.- Semester -IV** student has to select among 5 courses, a total of 24 credits (2 Core Courses, 1 Ability Enhancement Compulsory Course (AEC), 2 Skill Enhancement Courses (SEC), 2 Discipline Specific Elective Courses (DSE) and Compulsory English)

### 3. For third year: Student has to select 6 different subjects among the subjects offered by the college/institute.

- i) **T.Y. B.A.- Semester -V** student has to select among 5 courses, a total of 25 credits [2 Core Courses, 1 Ability Enhancement Compulsory Course (AEC) MIL (Language/Communication), 2 Skill Enhancement Courses (SEC), 2 Discipline

Specific Elective Courses (DSE), 2 Generic Elective (GE) and Compulsory English]

ii) **T. Y. B. A.- Semester -VI** student has to select among 5 courses, a total of 25 credits [2 Core Courses, 1 Ability Enhancement Compulsory Course (AEC) MIL (Language/Communication), 2 Skill Enhancement Courses (SEC), 2 Discipline Specific Elective Courses (DSE), 2 Generic Elective (GE) and Compulsory English]

**Savitribai Phule Pune University RULES AND REGULATIONS for UG Choice Based Credit System for BA Programme under the Faculty of Humanities**

### **Compulsory Courses to all Graduate Program**

**1. Ability Enhancement Compulsory Course - Environment Studies (2 credit) for under graduate (For All Faculties - Second Year - Semester III)**

[http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Environmental%20Studie%20Syllabus%20-%20for%20All%20Faculties\\_22.122020.pdf](http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Environmental%20Studie%20Syllabus%20-%20for%20All%20Faculties_22.122020.pdf)

**2. Democracy, Election and Governance (2 Credit) to all UG Courses**

[http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Democracy,%20Election%20and%20Governance%20Syllaus\\_22.09.2021.pdf](http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Democracy,%20Election%20and%20Governance%20Syllaus_22.09.2021.pdf)

**3. Introduction to Constitution (2 Credit) to all UG Courses**

[http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Introduction%20to%20Constitution\\_13.072020.pdf](http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Introduction%20to%20Constitution_13.072020.pdf)

## **B. A. Marathi (Credit System)**

### **Under the Faculty of Humanities**

#### **Program Outcome (PO)**

**A student completing the three-year study in Marathi will be able to:**

- PO1** Understand the employ of humanistic qualitative and quantitative, theoretical or philosophical methods for recording and explaining human experience.
- PO2** Develop the skill to analyse interpret and understand interrelationship's author texts and specific social political and historical
- PO3** Develop a sense of love and social commitment towards nation among students.
- PO4** Investigate the variety of human.

#### **Program Specific Outcome (PSO)**

**A student completing the three-year study in Marathi will be able to:**

- PSO1** Able to understand language fully and use it appropriately.
- PSO2** Understand the concept of history of literature.
- PSO3** Understand the art of content writing in Marathi for Media.
- PSO4** Understand the basis of the classification of Marathi literature.
- PSO5** Introducing the nature of criticism, the usefulness of criticism and the qualities of criticism to students.
- PSO6** Let the students know the definitions of language and various variations of language.
- PSO7** Understand the origin of Marathi language and its literature.

## Course Outcomes (CO's)

### Semester I

**Core Course- 1A (CC-1A), (3 Credits)**

**Course Code: 11021 A**

**Course Title: Marathi Sahitya –Katha Ani Bhashik Kaushalya Vikas - 1A**

**On completing the course, the student will be able to:**

- CO 1** Have a basic knowledge of Marathi Language which will help the students in their day-to-day life.
- CO 2** Understand basic grammar, conversational Marathi, reading newspaper, short stories, watching movie and creative writing.
- CO 3** Develop a sense of love and social commitment towards the nation .
- CO 4** Developing student's creative power.

**Core Course- 1A (CC-1A), (3 Credits)**

**Course Code: 11021 B**

**Course Title: Vyawaharik va upyojit Marathi- 1A**

**On completing the course, the student will be able to:**

- CO 1** Have a basic knowledge of Marathi Language which will help the students in their day-to-day life.
- CO 2** Understand basic grammar, conversational Marathi, reading newspaper, short stories, watching movie and creative writing.
- CO 3** Develop a sense of love and social commitment towards nation.
- CO 4** Developing student's creative power.

### Semester II

**Core Course- 1B (CC-1B), (3 Credits)**

**Course Code: 11022 B**

**Course Title: Vyawaharik va upyojit Marathi - 1A**

**On completing the course, the student will be able to:**

- CO 1** Understand basic grammar, conversational Marathi, reading newspaper, short stories, watching movie and creative writing.
- CO 2** Develop a sense of love and social commitment towards the nation among students.
- CO 3** Let the students know the definitions of language and various variations of literature.
- CO 4** Understand the basic elements of short stories and essays.

**Core Course- 1B (CC-1B), (3 Credits) Course Code: 11022 A**

**Course Title: Marathi Sahitya –Ekankika Ani Bhashik Kaushalya Vikas - 1A**

**On completing the course, the student will be able to:**

- CO 1** Understand basic grammar, conversational Marathi, reading newspaper, short stories, watching movie and creative writing.
- CO 2** Develop a sense of love and social commitment towards the nation among students.
- CO 3** Let the students know the definitions of language and various variations of literature.
- CO 4** Understand the basic elements of short stories and essays.

### **Semester III**

**Core Course- 1C (CC-1C), (3 Credits) Course Code: 23023**

**Course Title: BHASHIK KAUSHALYAVIKAS AANI ADHUNIK MARATHI  
SAHITYAPRAKAR – Kadambri**

**On completing the course, the student will be able to:**

- CO 1** Understand basic grammar, conversational Hindi, reading newspaper, short stories, watching movie and creative writing.



- CO 2 Developing student's ability to taste Marathi novels and Drama.
- CO 3 Understand the basic elements of short stories and novel.
- CO 4 Students Know to Marathi story writers and Poets.

**Core Course- 1D (CC-1D), (3 Credits)**

**Course Code: 23025**

**SEC Course Title: PRAKASHANVYAWAHAR AANI SANPADAN**

**On completing the course, the student will be able to:**

- CO 1 Undertake the formal study of literature by engaging in critical reading, appreciation and analysis of texts in an interactive and participatory classroom setting.
- CO 2 Learn the basic elements of Kavyashastra.
- CO 3 Understand and interpret the concept, structure and meaning of poetry.
- CO 4 Students learn objectives of literature.

**Modern Indian Language (2 Credits)**

**Course Code: 23011**

**Course Title: MARATHI BHASHIK SANDNYAPAN KAUSHALYE**

**On completing the course, the student will be able to:**

- CO 1 Introduction of the medieval Marathi language and literature
- CO 2 Have a basic knowledge of Hindi Language which will help the students in their life.
- CO 3 Learn the history, effect, ethics and creative writing in Media.
- CO 4 Understand and apply concepts such as plot, structure, characterization, point of view and narrative technique in the context of short stories

**Discipline Specific Elective Course- 1A (3 Credits)**

**Course Code: 23021(S1)**

**Course Title: ADHUNIK MARATHI SAHITYA- PRAKASWATA**

**On completing the course, the student will be able to:**

- CO 1** Undertake the formal study of literature by engaging in critical reading, appreciation and analysis of texts in an interactive and participatory classroom setting.
- CO 2** Learn the basic elements of literature.
- CO 3** Understand and interpret the concept, structure and meaning of poetry.
- CO 4** Students learn types of literature.

**Skill Enhancement Course- 2A (DEC-1B) (3 Credits) Course Code: 23022 (S2)**

**Course Title: SAHITYAVICHAR**

**On completing the course, the student will be able to:**

- CO 1** Learn the history, effect, ethics and creative writing in Media.
- CO 2** Gather acquaintance with basic workings in radio, T.V., Cinema etc, Media.
- CO 3** Understand the basic workings of television and film industry.
- CO 4** Learn the basic elements of Media writing

**Semester IV**

**Core Course- 1C (CC-1C), (3 Credits) Course Code: 23024**

**Course Title: BHASHIK KAUSHALYAVIKAS AANI ADHUNIK MARATHI SAHITYAPRAKAR – Lalit Gadhya**

**On completing the course, the student will be able to:**

- CO 1** Understand basic grammar, conversational Hindi, reading newspaper, short stories, watching movie and creative writing.
- CO 2** Developing student's ability to taste Marathi novels and Drama.
- CO 3** Understand the basic elements of short stories and novel.
- CO 4** Students Know to Marathi story writers and Poets.

**Core Course- 1D (CC-1D), (3 Credits)**

**Course Code: 24025 SEC**

**Course Title: UPYOJIT LEKHANKAUSHALYE**

**On completing the course, the student will be able to:**

- CO 1** Understand and interpret the concept, structure and meaning of upyojit lekhankushalye.
- CO 2** Creating ability to review students based on the varied criteria of Marathi lekhankaushalye.
- CO 3** Learn the basic elements of Marathi upyojit lekhankushalye.

**Core Course- 1D (CC-1D), (3 Credits)**

**Course Code: 24011**

**Course Title: NAVMADHYAME AANI SAMAJ MADHYAMANSATHI MARATHI**

**On completing the course, the student will be able to:**

- CO 1** Students Know to Marathi Irony literature writers.
- CO 2** Developing student's ability to taste Irony literature.
- CO 3** Understand the basic elements of Irony literature.
- CO 4** Understand basic grammar, conversational Marathi, reading newspaper, and creative writing.

**Discipline Specific Elective Course- 2A (DSE-2A) (3 Credits) Course Code: 24021**

**Course Title: MAMADHYAYUGIN MARATHI SAHITYA (NIVADAK MADHYAYUGIN GADYA, PADYA)**

**On completing the course, the student will be able to:**

- CO 1** Introduction of the historical survey of medieval Marathi literature
- CO 2** Acquaint with different elements of Drama.
- CO 3** Understand the concept and meaning of Madhyayugin poetry.

CO 4 Students Know to Marathi Drama writers.

**Skill Enhancement Course- 2A (3 Credits)**

**Course Code: 24022**

**Course Title: SAHITYA SAMIKSHA**

**On completing the course, the student will be able to:**

- CO 1 Interrelation between literature and society
- CO 2 Obtaining the skills of literary criticism. Illustrating the nature of literary forms like one act-play, travelogue, short story and poetry.
- CO 3 Introduction of the medieval Marathi language and literature.
- CO 4 Introduction of the medieval Marathi language and literature.

### **Semester V**

**Core Course- 1E (CC-1E), (3 Credits)**

**Course Code: 3027**

**Course Title: BHASHIK KAUSHALYA VIKAS ANI ADHUNIK MARATHI SAHITYAPRAKAR - PRVASVRNAN**

**On completing the course, the student will be able to:**

- CO 1 Understanding the nature and features of Modern Marathi literature.
- CO 2 Getting motivation for creative writing.
- CO 3 students learn method of writing letters.
- CO 4 Acquire appropriate communication skills for effective college learning.

**Core Course- 1E (CC-1E), (3 Credits)**

**Course Code: 3027**

**Course Title: Vyawaharik va upyojit Marathi**

**On completing the course, the student will be able to:**

- CO 1 Understand basic grammar, conversational Marathi, reading newspaper, short stories, watching movie and creative writing.
- CO 2 Develop a sense of love and social commitment towards the nation.

- CO 3 Students know the definitions of language and various variations of literature.  
CO 4 Understand the basic elements of short stories and essays.

**Discipline Specific Elective Course- 2C (4 Credits)**

**Course Code :3029**

**Course Title: Bhashavigyan Varnanthamak BHAG 01**

**On completing the course, the student will be able to:**

- CO 1 Understand the concept of linguistics.  
CO 2 Learn the history of linguistics & Marathi Language.  
CO 3 Learn the basic elements of linguistics.  
CO 4 Know the types of words, phonetic, Semantics, Morphology etc.

**Discipline Specific Elective Course- 2C (4 Credits)**

**Course Code: 3028**

**Course Title: MADHYAUGIN MARATHI VANGMYACHA SHUL EITHIHA  
PRARAMBHA TE 1600**

**On completing the course, the student will be able to:**

- CO 1 To study the socio-cultural and political background of 1300 to 1600 periods  
CO 2 Special studies of ancient literature  
CO 3 Inspiration of ancient Marathi literature, by studying the tendency  
CO 4 Special studies of devotional literature

**Semester VI**

**Discipline Specific Elective Course 1C (4 Credits)**

**Course Code: 3027**

**Course Title- Bhashik Kaushalya Vikas Ani Adhunik Marathi Sahityaprakar –Kavita**

**On completing the course, the student will be able to:**

- CO 1 Understand the origin of Marathi language and its literature.  
CO 2 Understand the basis of the classification of Marathi literature  
CO 3 Understand the basic elements of s stories and Poems.

**CO 4** Understand the concept of history of literature.

**Core Course- 1E (CC-1E), (3 Credits)**

**Course Code: 3027**

**Course Title: Vyawaharik va upyojit Marathi**

**On completing the course, the student will be able to:**

**CO 1** Understand basic grammar, conversational Marathi, reading newspaper, short stories, watching movie and creative writing.

**CO 2** Develop a sense of love and social commitment towards nation.

**CO 3** Students know the definitions of language and various variations of literature.

**CO 4** Understand the basic elements of short stories and essays.

**Discipline Specific Elective Course- 2C (DSE-2C) (4 Credits) Course Code:3029**

**Course Title- : Bhashavigyan Varnanthamak BHAG 02**

**On completing the course, the student will be able to:**

**CO 1** Understand the concept of language.

**CO 2** Students know definitions of language and various variations of literature.

**CO 3** Learn the basic elements of language.

**CO 4** Know the importance of Devnagari Script.

**Discipline Specific Elective Course- 2C (4 Credits)**

**Course Code: 3028**

**Course Title: MADHYAUGIN MARATHI VANGMYACHA SHUL EITHIHAS -1601 to 1817**

**On completing the course, the student will be able to:**

**CO 1** The uniqueness of Marathi literature of Shiva period

**CO 2** Special studies of scholarly literature

**CO 3** Interrelation between literature and society

**Savitribai Phule Pune University, Pune**  
**B. A. Hindi (Credit System)**  
**Under the Faculty of Humanities**

**Program Outcome (PO's)**

**A student completing the three-year study in Hindi will be able to:**

- PO1** Knowing the history of the history of Hindi literature & understand origin of Hindi language and its literature.
- PO2** Understand the basis of the classification of Hindi literature & able to understand language fully and use it appropriately.
- PO3** Develop sense of love & social commitment towards nation among students.
- PO4** Have basic knowledge of Hindi Language which will help students in their day-to-day life.

**Program Specific Outcome (PSO's)**

**A student completing the three-year study in Hindi will be able to:**

- PSO1** Able to understand language fully and use it appropriately.
- PSO2** Understand the concept of history of literature.
- PSO3** Understand the art of content writing in Hindi for Media.
- PSO4** Understand the basis of the classification of Hindi literature.
- PSO5** Introducing the nature of criticism, the usefulness of criticism and the qualities of criticism to students.
- PSO6** Let the students know the definitions of language and various variations of language.
- PSO7** Understand the origin of Hindi language and its literature.

## Course Outcomes (CO's)

### Semester I

**Core Course- 1A (CC-1A), (3 Credits)**

**Course Code: 11091B**

**Course Title: Vaikalpik Hindi Prashnpatra- 1A**

**On completing the course, the student will be able to:**

- CO 1** Have a basic knowledge of Hindi Language which will help the students in their day-to-day life.
- CO 2** Understand basic grammar, conversational Hindi, reading newspaper, short stories, watching movie and creative writing.
- CO 3** Develop a sense of love & social commitment towards nation among students.
- CO 4** Developing student's creative power.

### Semester II

**Core Course- 1B (CC-1B), (3 Credits)**

**Course Code: 11092B**

**Course Title: Vaikalpik Hindi Prashnpatra- 1A**

**On completing the course, the student will be able to:**

- CO1** Understand basic grammar, conversational Hindi, reading newspaper, short stories, watching movie and creative writing.
- CO2** Develop a sense of love & social commitment towards nation among students.
- CO3** Let students know definitions of language & various variations of literature.
- CO4** Understand the basic elements of short stories and essays.

### Semester III

**Core Course- 1C (CC-1C), (3 Credits)**

**Course Code: 2309**

**Course Title: Adhunik Kavya, Kahani thatha Vyavaharik Hindi**

**On completing the course, the student will be able to:**

- CO 1** Understand basic grammar, conversational Hindi, reading newspaper, short stories, watching movie and creative writing.



- CO 2** Developing student's ability to taste Hindi novels and Drama.
- CO 3** Understand the basic elements of short stories and Poems.
- CO 4** Students Know to Hindi story writers and Poets.

**Discipline Specific Elective Course- 1A (DSE-1A), (3 Credits) Course Code: 23091**

**Course Title: Kavyashastra**

**On completing the course, the student will be able to:**

- CO 1** Undertake the formal study of literature by engaging in critical reading, appreciation and analysis of texts in an interactive and participatory classroom setting.
- CO 2** Learn the basic elements of Kavyashastra.
- CO 3** Understand and interpret the concept, structure and meaning of poetry.
- CO 4** Students learn objectives of literature.

**Discipline Specific Elective Course- 2A (DSE-2A) (3 Credits) Course Code: 23092**

**Course Title: Madhyayugin Kavya thatha Upanyas Sahitya**

**On completing the course, the student will be able to:**

- CO 1** Understand and interpret the concept, structure and meaning of Madhyayugin poetry.
- CO 2** Creating ability to review students based on the varied criteria of Hindi novel.
- CO 3** Learn the basic elements of Hindi Novels.

**Skill Enhancement Course-2A (SEC-2A) (2 Credits) Course Code: 23096**

**Course Title: Anuwad Swaroop evam Vyavahar,**

**On completing the course, the student will be able to:**

- CO 1** Have a basic knowledge of translation, which will help students in their life.

- CO 2** Have a basic knowledge of English to Hindi, Marathi to Hindi translation, which will help them in their career.
- CO 3** Understand the basic elements of translation.
- CO 4** Learn to translation effectively.

**Modern Indian Language- Hindi (MIL Hindi) (2 Credits) Course Code: 23012**

**Course Title: Hindi Bhasha Shikshan,**

**On completing the course, the student will be able to:**

- CO 1** Have a basic knowledge of Hindi grammar, which will help the students in their day-to-day life.
- CO 2** Have a basic knowledge of Hindi Language.
- CO 3** Understand the basic elements of short stories.
- CO 4** Understand and apply concepts such as plot, structure, characterization, point of view and narrative technique in the context of short stories

**Semester IV**

**Core Course- 1D (CC-1D), (3 Credits)**

**Course Code: 24093**

**Course Title: Adhunik Hindi Vyangya Sahitya thatha Vyavaharik Hindi**

**On completing the course, the student will be able to:**

- CO 1** Students Know to Hindi Irony literature writers.
- CO 2** Developing student's ability to taste Irony literature.
- CO 3** Understand the basic elements of Irony literature.
- CO 4** Understand basic grammar, conversational Hindi, reading newspaper, and creative writing.

**Discipline Specific Elective Course- 1B (DSE-1B), (3 Credits) Course Code: 24091**

**Course Title: Sahitya ke Bhed,**

**On completing the course, the student will be able to:**

- CO 1** Undertake the formal study of literature by engaging in critical reading, appreciation and analysis of texts in an interactive and participatory classroom setting.
- CO 2** Learn the basic elements of literature.
- CO 3** Understand and interpret the concept, structure and meaning of poetry.
- CO 4** Students learn types of literature.

**Discipline Specific Elective Course- 2B (DSE-2B) (3 Credits) Course Code: 24092**

**Course Title: Madhyayugin Kavya thatha Natak Sahitya**

**On completing the course, the student will be able to:**

- CO 1** Creating ability to review students based on the varied criteria of Hindi drama.
- CO 2** Acquaint with different elements of Drama.
- CO 3** Understand the concept and meaning of Madhyayugin poetry.
- CO 4** Students Know to Hindi Drama writers.

**Skill Enhancement Course- 2B (SEC-2B) (2 Credits) Course Code: 24096**

**Course Title: Madhyam Lekhan**

**On completing the course, the student will be able to:**

- CO 1** Learn the history, effect, ethics and creative writing in Media.
- CO 2** Gather acquaintance with the basic workings in radio, T.V., Cinema etc, Media.
- CO 3** Understand the basic workings of television and film industry.
- CO 4** Learn the basic elements of Media writing.

**Modern Indian Language- Hindi (MIL Hindi) (2 Credits) Course Code: 24012**

**Course Title: Hindi Bhasha Shikshan**

**On completing the course, the student will be able to:**

- CO 1** Have a basic knowledge of Hindi grammar, which will help the students in their day-to-day life.
- CO 2** Have a basic knowledge of Hindi Language which will help the students in their life.
- CO 3** Understand the basic elements of Songs.
- CO 4** Understand and apply concepts such as Subject, structure, point of view and narrative technique in the context of Songs.

**Semester V**

**Core Course- 1E (CC-1E),**

**(3 Credits)**

**Course Title: Kathetar Vidhayen,**

**Subject Code : 35093**

**On completing the course, the student will be able to:**

- CO 1** Understand the basic elements of Sansmaran (Reminiscence) & Rekhachitra (Sketches)
- CO 2** Students Know to Hindi Sansmaran (Reminiscence) & Rekhachitra (Sketches) writers.
- CO 3** students learn method of writing letters.
- CO 4** Acquire appropriate communication skills for effective college learning.

**Discipline Specific Elective Course 1C (DSE-1C),**

**(4 Credits)**

**Course Title: Hindi Sahitya ka Itihas (Adikal, Bhaktikal, Ritikal) Subject Code : 35091**

**On completing the course, the student will be able to:**

- CO 1** Understand the origin of Hindi language and its literature.
- CO 2** Understand the basis of the classification of Hindi literature.

**CO 3** Understand the importance and basis of the names given to each period of Hindi literature.

**CO 4** Understand the concept of history of literature.

**Discipline Specific Elective Course- 2C (DSE-2C)**

**(4 Credits)**

**Course Title: Bhashavigyan (Samanya Parichay),**

**Subject Code : 35092**

**On completing the course, the student will be able to:**

**CO 1** Understand the concept of linguistics.

**CO 2** Learn the history of linguistics & Hindi Language.

**CO 3** Learn the basic elements of linguistics.

**CO 4** Know the types of words, phonetic, Semantics, Morphology etc.

**Skill Enhancement Course- 2C (SEC-2C)**

**(2 Credits)**

**Course Title: Patakatha Lekhan**

**Subject Code: 35096**

**On completing the course, the student will be able to:**

**CO 1** Understand the basic elements of Script writing.

**CO 2** Understand the concept of Script writing.

**CO 3** learn Script writing.

**CO 4** Know the films & this Script writing.

**Semester VI**

**Core Course- 1F (CC-1F),**

**(3 Credits)**

**Course Title: Ghazal Vidha aur Patrachar,**

**Subject Code: 35093**

**On completing the course, the student will be able to:**

**CO 1** Understand the basic elements of Ghazal.

**CO 2** Students Know to Hindi Ghazal.

**CO 3** students learn method of types of letters.

**CO 4** Creating ability to understand Ghazal.

**Discipline Specific Elective Course- 1D (DSE-1D), (3+1=4 Credits)**

**Course Title: Hindi Sahitya ka Itihas (Adhunik Kal-Samanya Parichay)**

**Subject Code : 36091**

**On completing the course, the student will be able to:**

**CO 1** Understand the basis of the classification of Hindi literature

**CO 2** Understand the Hindi literature.

**CO 3** know the history of khadiboli Hindi literature.

**CO 4** Understand the importance and basis of the names given to each period of Hindi literature.

**Discipline Specific Elective Course-2D (DSE-2D) (3+1=4 Credits)**

**Course Title: Hindi Bhasha aur Usaka Vikas,**

**Subject Code : 36092**

**On completing the course, the student will be able to:**

**CO 1** Understand the concept of language.

**CO 2** Identify the dialects of Hindi language family.

**CO 3** Learn the basic elements of language.

**CO 4** Understand the concept of Devnagari Script.

**CO 5** Know the importance of Devnagari Script.

**Skill Enhancement Course-2D (SEC-2D) (2 Credits)**

**Course Title: Sahitya aur Filmantaran,**

**Subject Code : 36096**

**On completing the course, the student will be able to:**

**CO 1** Understand the basic elements of filming.

**CO 2** Understand the concept of literature and filming.

**CO 3** learn about film making.

**CO 4** Know the literature and this transformation in film.

## Savitribai Phule Pune University, Pune

### B.A. English (Credit System)

#### Under the Faculty of Humanities

### Program Outcomes (POs)

A student completing the three-year study in English will be able to:

- PO1** Human Values and Ethics: Understand different value systems including one's own, understand the morality, ethics and acceptance and pursuance.
- PO2** Understanding of Social issues and interactions, Effective Communication, Environmental Awareness.
- PO3** Life-long Learning, Critical Thinking
- PO4** Knowledge of Digital platforms, Field and Project Work, Research Attitude, Verbal skills

### Program Specific Outcomes (PSO's)

- PSO-01** To learn to use the English language effectively
- PSO-02** To familiarize with Western literature and culture
- PSO-03** To familiarize with literary history, critical terms and concepts
- PSO-04** To read and appreciate major English writers and their works
- PSO-05** To learn literary interpretation in tune with contemporary needs.

## Course Outcomes (CO's) Semester- I

### Compulsory English

**Course Title: Literary Glean: An Anthology of Prose and Poetry (Board of Editors Orient Black Swan)**

**On completing the course, the student will be able to:**

#### Course Objectives:

1. To expose students to the best examples of prose and poetry in English so that they realize the beauty and communicative power of English
2. To instill human values and develop character of students
3. To develop the ability to appreciate ideas and think critically
4. To develop communication skills
5. To know the grammatical units

#### Course Outcomes:

1. Students can read selected prose and poetry in English
2. Students can build up their personality
3. Students will communicate effectively in English
4. Students can learn grammatical units

### Optional English

**Prescribed Text: *Initiations: Minor Literary Forms & Basics of Phonology* (Board of Editors- Orient Black Swan)**

#### Course Objectives:

1. To introduce students to the basics of literature and language and develop an integrated view about language and literature in them.
2. To familiarize them with minor forms of literature in English and help them to appreciate the creative use of language in literature



3. To introduce students to the basics of phonology of English so that they can pronounce better and speak English correctly.

**Course Outcomes:**

1. Students will be familiar with the basics of English language and literature.
2. Students will understand the minor forms of literature and appreciate the creative use of language in literature.
3. Students will be familiarized with the basics of phonology.

**Semester- II**

**Prescribed Text: Literary Gleam: An Anthology of Prose and Poetry (Board of Editors Orient BlackSwan)**

**Course Objectives:**

1. To influence students to read important prose and poems
2. To develop reading skills
3. To make students responsible at all levels
4. To enhance employability of the students by developing their linguistic competence and communicative skills
5. To revise and reinforce structures already learnt in the previous stages of learning.

**Course Outcomes:**

1. Students can know the importance of literature
2. Students reading skills will be improved
3. Students will become responsible citizens in their life
4. Students will be able to communicate in English

**Pedagogy:** Lectures / Critical Analysis / Assignments / Test/ e-learning/ Visual Presentation

**Prescribed Text: *Initiations: Minor Literary Forms & Basics of Phonology* (Board of Editors- Orient Black Swan)**

### **Course Objectives:**

1. To expose students to the basics of phonology of English to pronounce better and speak English correctly.
2. To prepare students to go for a detailed study and understanding of literature and language.
3. To introduce the concept of syllable, word stress and different standards of pronunciation.
4. To enhance the job potential of students by improving their language skills.

### **Course Outcomes:**

1. Students will understand the basics of phonology and start speaking in English with correct pronunciation.
2. Students will start a detailed study of language and literature.
3. Students will understand the concept of syllable, word stress and standards of pronunciation.

## **Semester-III**

**Compulsory English: Prescribed Text: *Panorama: Values and Skills through Literature* (Board of Editors- Orient BlackSwan)**

### **Course Objectives:**

1. To expose students to the best examples of literature in English and to contribute to their emotional quotient as well as independent thinking.
2. To inculcate universal human values in students through best pieces of literature in English
3. To improve students' communication skills by developing ability to use right words in the right context.

### **Course Outcomes:**

1. Students will be familiar with the best examples of literature in English.

2. Students will understand and learn the universal human values through literature.
3. Students will improve their communication skills.

### **Skill Enhancement Course-SEC-1A**

#### **Title of the Paper: Advanced Study of English Language**

*Prescribed Text: Linguistics: An Introduction- (Ed. Board of Editors, Orient BlackSwan)*

#### **Course Objectives:**

1. To familiarize students with the various components of language.
2. To develop overall linguistic competence of the students.
3. To introduce students to some advanced areas of language study.
4. To prepare students to go for detailed study and understanding of language.

#### **Course Outcomes:**

1. Students get familiarized with the various components of language
2. Students get developed overall linguistic competence
3. Students know some advanced areas of language study
4. Students understand language in details

**Pedagogy:** Lectures / Critical Analysis / Assignments / Test/ e-learning/ Visual Presentation.

### **Semester-IV**

#### **Compulsory English : Prescribed Text: *Panorama: Values and Skills through Literature* (Board of Editors- Orient BlackSwan)**

#### **Course Objectives:**

1. To familiarize students to the best pieces of literature in English and to contribute to them emotional quotient as well as independent thinking.
2. To enhance employability of the students by developing their basic soft skills.

3. To revise and reinforce the learning of some important areas of grammar for better linguistic competence.

**Course Outcomes:**

1. Students will be familiar with best pieces of literature and also start thinking independently.
2. Students will learn the basics and develop their soft skills.
3. Students will learn grammar and develop their linguistic competence.

**Skill Enhancement Course-SEC-1A**

**Title of the Paper: Advanced Study of English Language**

*Prescribed Text: Linguistics: An Introduction- (Ed. Board of Editors, Orient BlackSwan)*

**Course Objectives:**

1. To introduces students with the all components of language.
2. To enhance linguistic competence of the students.
3. To familiarize students to some advanced areas of language study.
4. To prepare students to go for detailed study and understanding of language.

**Course Outcomes:**

1. Students get introduced with the components of language
2. Students develop their linguistic competence
3. Students understand advanced areas of language
4. Students study language in details

**Pedagogy:** Lectures / Critical Analysis / Visual Presentation / Assignments / Test/ e-learning

**Discipline Specific Course (DSC-1A) Appreciating Drama (03 Credit Course)**

**UNIT –I Theory of Drama**

## **UNIT –II A Midsummer Night's Dream by William Shakespeare**

### **Course Objectives:**

1. To introduce Drama as a major form of literature
2. To introduce minor forms of Drama
3. To acquaint and enlighten students regarding the literary and the performing dimensions of drama
4. To acquaint and familiarize the students with the elements and the types of Drama
5. To introduce students to the Renaissance theatre and its conventions
6. To introduce students to the works of Shakespeare

### **Discipline Specific Course (DSC-2A) (Old Special Paper-II)**

#### **Title of the Paper: Appreciating Poetry**

**Prescribed Text: *Mirage: An Anthology of English Poetry* Ed. Board of Editors, Orient Blackswan**

### **Course Objectives:**

1. To familiarize and understand the basic terminology in poetry criticism (i.e. the terms used in appreciation and critical analysis of poems)
2. To encourage students to make a detailed study of a few sample masterpieces of English poetry
3. To enhance students' awareness in the aesthetics of poetry and to empower them to read, appreciate and critically evaluate the poetry independently.

### **Course Outcomes:**

1. Students will understand the basic terminology in poetry criticism.
2. Students will start applying this terminology in appreciation and critical analysis of poems.
3. Students will start making a detailed study of poems.

## **Skill Enhancement Course-(SEC-2A)**

**Title of the course: “A Certificate Course in Skill Development” 2 credit course**

### **Course Objectives:**

1. Enhancing the skill of using English for everyday communication
2. To acquaint the students with the verbal and nonverbal communication
3. To create opportunities to access exposure of speaking in various contexts
4. To acquaint and familiarize the students with soft skills
5. To develop interest among the students to interact in English

## **Semester-IV**

**Title of the Paper: Appreciating Drama**

**UNIT-I Arms and the Man by George Bernard Shaw**

**UNIT-II The Fire and the Rain by Girish Karnad**

### **Course Objectives:**

1. To encourage students to make a detailed study of a few sample masterpieces of English Drama from different parts of the world.
2. To develop interest among the students to appreciate and analyze drama independently
3. To enhance students' awareness regarding aesthetics of Drama and to empower them to evaluate drama independently
4. To introduce students to modern drama
5. To acquaint students with the Indian theatrical traditions
6. To develop the ability to interpret the works of Indian English writers

**Prescribed Text: *Mirage: An Anthology of English Poetry* Ed. Board of Editors, Orient Blackswan**

**Course Objectives:**

1. To introduce and familiarize the best masterpieces of English poetry in terms of appreciation and critical analysis of poems.
2. To encourage students to make a detailed study of a few sample masterpieces of English poetry
3. To create students' awareness in the aesthetics of poetry and to empower them to read, appreciate and critically evaluate the poetry independently.

**Course Outcomes:**

1. Students will be familiar and start appreciation and critical analysis of a few masterpieces of English poetry.
2. Students will make a detailed study of poems.
3. Students will start understanding of the aesthetics of poetry and critically analyse poems independently.

**Title of the course: “A Certificate Course in Skill Development”**

**Course Outcomes:**

1. Developing skills among students to meet requirements of work places
2. Promoting participatory learning among students
3. Learning enhancement through interactive sessions
4. To create self-confidence among students to express themselves
5. To prepare students to face challenges in the context of globalization

**SEMESTER-V**

**CC-Core Course- 03 Credit**

**Prescribed Text: *Exploring New Horizons* (Ed-Board of Editors- Orient BlackSwan)**

**Course Objectives:**

- a) To familiarize students with some excellent pieces of prose and poetry in English so that they realize the beauty and communicative power of English.
- b) To enable students to become competent and effective users of English in real life situations.
- c) To contribute to the overall personality development of the students.
- d) To make students able to impart knowledge of soft skills

**Course Outcomes:**

- a) Students get familiarized with some excellent pieces of prose and poetry
- b) Students became the effective users in real life situation
- c) Students get developed their personality
- d) Student use soft skills in their real life situations

**Skill Enhancement Course (SEC 1-C)**

**Title of the Paper: Enhancing Employability Skills (Credit-3)**

**Prescribed Text- Aspirations: English for Careers (Board of Editors- Orient Black Swan)**

**Course Outcomes:**

1. To get the awareness of career opportunities available to them.
2. To identify the career opportunities suitable to them.
3. To understand the use of English in different careers.
4. To develop competence in using English for the career of their choice.
5. To develop communication skills

**Course Objectives:**

1. Students get aware of career opportunities in various fields
2. Students identify suitable career opportunities
3. Students' use of English in different careers.



4. Students get developed competence in using English for the career
5. Students develop their communication skills

### **Discipline Specific Elective (DSE-1C)**

#### **Title of the Paper: Appreciating Novel (Credit-3+1=4)**

##### **Course Objectives:**

1. To expose students to the basics of novel as a literary form.
2. To introduce them to the historical development and nature of novel.
3. To create awareness about different types and aspects of novel in students.
4. To develop literary sensibility and sense of cultural diversity in students
5. To expose and introduce students to some of the best examples of novel.

##### **Course Outcomes:**

1. Students will be familiar with novel as a literary form.
2. Students will understand the historical development and nature of novel.
3. Students will be aware about the various types and aspects of novel.

### **Discipline Specific Elective (DSE-2C)**

#### **Title of the Paper: Introduction to Literary Criticism(Credit-3+1=4)**

Introduction to literary criticism, classical, neoclassical, romantic and Victorian criticism

##### **Course objectives:**

- 1) To introduce students to the basics of literary criticism
- 2) To make them aware of the nature and historical development of criticism
- 3) To make them familiar with the significant critical approaches and terms
- 4) To encourage students to interpret literary works in the light of the critical approaches
- 5) To develop aptitude for critical analysis

## **Skill Enhancement Course (SEC 2-C)**

**Title of the Paper: *Mastering Life Skills and Life Values***

### **Course objectives:**

1. To equip the students with the social skills
2. To train the students interpersonal skills
3. To build self-confidence and communicate effectively

To Encourage the students to think critically

## **SEMESTER-VI**

### **Compulsory English**

**Prescribed Text: *Exploring New Horizons* (Ed-Board of Editors-Orient BlackSwan)**

### **Course Objectives:**

- a) To develop students communication skills
- b) To instill humanitarian values and foster sympathetic attitude in the students.
- c) To train the students in practical writing skills required in work environment.
- d) To impart knowledge of some essential soft skills to enhance their employability.

### **Course Outcomes:**

- a) Students develop their communication skills
- b) Student develop their human values and sympathetic attitude
- c) Students learn writing skills
- d) Students acquire some required soft skills

## **Skill Enhancement Course (SEC 1-D)**

**Prescribed Text- *Aspirations: English for Careers* (Board of Editors- Orient Black Swan)**

**Course Outcomes:**

1. To use proper body language in effective communicative skills
2. To enhance skills required for their placement.
3. To use English effectively in the career of their choice.
4. To exercise verbal as well as nonverbal communication effectively for their career.

**Course Objectives:**

1. Students use proper body language in effective communicative skills.
2. Students get enhance skill for their placement
3. Students use effective English in the career
4. Students use verbal and nonverbal communication in their career

**Discipline Specific Elective (DSE-1D)****Title of the Paper: Appreciating Novel****Course Objectives:**

1. To develop literary sensibility and sense of cultural diversity in students.
2. To expose and introduce students to some of the best examples of novel.
3. To encourage them to make a detailed study and analyze the novels prescribed.
4. To develop students' interpretative abilities and enhance their analytical skills.

**Course Outcome:**

1. Students will learn about literary sensibility and sense of cultural diversity in the society.
2. Students will be familiar and study the masterpieces of novels.
3. Students will start analyzing and appreciating novels independently.

**Discipline Specific Elective (DSE-2D)****Modern criticism, new criticism, critical terms and concepts****Course outcomes**

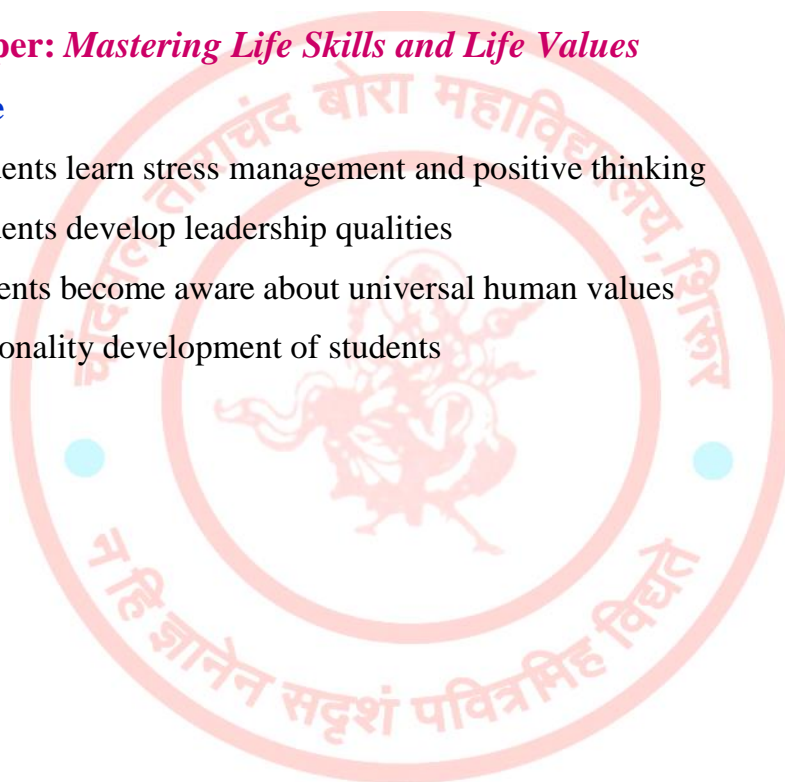
- 1) Make students aware of recent trends in literary criticism
- 2) Students are introduced to advanced critical tools and concepts
- 3) Develop the ability to come forward with original response to literary texts
- 4) Encourage critical thinking
- 5) Promote interpretative skills.

### **Skill Enhancement Course (SEC 2-D)**

**Title of the Paper: *Mastering Life Skills and Life Values***

#### **Course outcome**

1. Students learn stress management and positive thinking
2. Students develop leadership qualities
3. students become aware about universal human values
4. Personality development of students



**Savitribai Phule Pune University, Pune**  
**B. A. History and AIHC&A (Credit System)**  
**Under the Faculty of Humanities**

**Program Outcome (PO)**

- PO-1.** Human Values and Ethicality: Understand different value systems including one's own, understand the morality, ethics and acceptance and pursuance.
- PO-2** Understanding of Social issues and interactions, Effective Communication, Environmental Awareness.
- PO-3** Life-long Learning, Critical Thinking
- PO-4** Knowledge of Digital platforms, Field and Project Work, Research Attitude, Oral Examination.

**Program Specific Outcome (PSO)**

- PSO-01** To learn history based on facts and evidences
- PSO-02** To develop a logic and critical thinking of historical facts, events and interpretations.
- PSO-03** To understand causes and effects of events.
- PSO-04** To have a conceptual knowledge of multiculturalism.
- PSO-05** To learn applied aspects of History including skill-oriented knowledge.

**Semester-I**

**Early India: From Prehistory to the Age of the Mauryas**

**Course Outcome:**

1. The history of Early India is a crucial part of Indian history. It is a base for understanding the entire Indian history.
2. The course is aimed at helping the student to understand the history of early India from the prehistoric times to the age of the Mauryas.
3. It attempts to highlight the factors and forces behind the rise, growth and spread of civilization and culture of India along with the dynastic history.
4. It also attempts to help the students to understand the contribution of Early Indians to polity, art, literature, philosophy, religion and science and technology.
5. It also aims to foster the spirit of enquiry among the students by studying the major developments in early Indian history.

## **Semester-II**

### **Early India: Post Mauryan Age to the Rashtrakutas**

#### **Course Objectives:**

1. The history of India after the Mauryas is very important to understand the developments in early India after the Mauryas, which finally led to the transition to medieval India.
2. The course is aimed at introducing the students to the developments in different parts of India through a brief study of regional kingdoms up to the tenth century C.E.
3. It attempts to highlight the consequences of the foreign invasions, particularly on the polity, economy, society and art and architecture.
4. The attempt is also to instill the spirit of enquiry among the students.

## **Semester -III**

### **History of the Marathas: (1630-1707)**

#### **Course Objectives:**

1. To introduce the students to the regional history of medieval Maharashtra and India.

2. To study political, social and conceptual history of the Marathas in an analytical way with the help of primary sources.
3. To evaluate contribution of Chhatrapati Shivaji Maharaj to the establishment of Swarajya, contribution of successors and later development of the Maratha kingdom.
4. To study administrative Institutions of the Marathas.

**Learning Outcome:**

1. Student will develop the ability to analyses sources for Maratha History.
2. Student will learn significance of regional history and political foundation of the region.
3. It will enhance their perception of 17th century Maharashtra and India in context of Maratha history.
4. Appreciate the skills of leadership and the administrative system of the Marathas.

**Medieval India - Sultanate Period**

**Course objectives:**

1. Demonstrate thinking skills by analyzing, synthesizing, and evaluating historical information from multiple sources.
2. Develop the ability to distinguish between fact and fiction while understanding that there is no one historical truth.
3. To Learn foundation of Delhi Sultanate and Sultanate Administration.
4. To understand the socio, economic condition of Delhi Sultanate

**Course outcome:**

1. Provides examples of sources used to study various periods in history.
2. Relates key historical developments during medieval period occurring in one place with another.
3. Analysis's socio - political and economic changes during medieval period
4. Estimate the foreign invasion and the achievement of rulers

## **Glimpses of the Modern World - Part I**

### **Learning Objectives:**

1. This paper is designed to introduce the students to the history of the Modern World with its socio- religious, political and economic developments.
2. It will enable students to study interesting historical developments in the countries other than India, which had a significant impact on almost all over the Modern World.
3. It will enable students to understand the significant impact of the modern concepts such as Renaissance, Nationalism, Communism, Imperialism, etc.
4. It will get students acquainted with the major revolutions, and political developments which led to the World War I and its consequences.

### **Learning Outcomes:**

1. It will enable students to develop the overall understanding of the Modern World.
2. The students will get acquainted with the Renaissance, major political, socio-religious and economic developments during the Modern World.
3. It will enhance their perception of the history of the Modern World.
4. It will enable students to understand the significance of the intellectual, economic, political developments in the Modern World.

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which led to the World War I and its consequences.

**Learning Outcomes:**

1. It will enable students to develop the overall understanding of the Modern World.
2. The students will get acquainted with the Renaissance, major political, socio-religious and economic developments during the Modern World.
3. It will enhance their perception of the history of the Modern World.
4. It will enable students to understand the significance of the intellectual, economic, political developments in the Modern World.

**Skill Enhancement Course (SEC-1A) – (2 Credits)**

**1) Brahmi Script**

**Course Objectives:**

1. This paper is designed to introduce the students to the Brahmi Script, which is essential to understand the history of Early India.
2. It will enable students to read and understand Brahmi Script and thus they will be able to
3. unfold Early Indian History.
4. It will get students acquainted with the primary sources such as Ashokan Pillars, some of the Buddhist texts, written in Brahmi script.

**Course Outcome:**

1. Students will learn to understand the Brahmi Script so as to understand important sources of the history of Early India.
2. They will be able to read and understand the Brahmi Script.
3. They will have an overall understanding of the history of Early India.

**Art and Architecture of Early India (From 3000 B.C. to 12th Century A.D.)**

**Course Objectives:**

1. This paper is designed to introduce the students to the emergence and development of art

and architecture in early India.

2. It will enable students to understand the process of development of art and architecture in the early Indian history on the socio-religious and economic background.
3. It will get students acquainted with the emergence and changes in the styles of the art and architecture during the early India up to the 6th century B.C.E.

**Course Outcome:**

1. Students will get an overall understanding of the emergence and development of the art and architecture in Early India.
2. They will understand the emergence of the Pottery, Terracotta figures, Ornaments, Town Planning, preparation of seals and coins.
3. They will have an understanding of the art and architecture in early India.

**Digital Documentation**

**Course Objectives:**

1. This paper is designed to introduce the students to the Digital Documentation.
2. It will enable students to prepare files in various formats; to scan photos, documents and to edit videos, images.
3. It will get students acquainted with the process of online archiving.

**Course Outcome:**

1. Students will get an overall understanding of the process of digital documentation.
2. They will learn to scan photos, documents and to edit videos, images.
3. They will be able to prepare documents in various digital formats.

**Tourism Management**

**Course Objectives:**

1. This paper is designed to introduce the students to Tourism Management.
2. It will get students acquainted with all the processes of Tourism Industry to work with great potential.

3. It will enable students to seek self-employment by starting their own tourism related business.

**Course Outcome:**

1. Students will get an overall understanding of the process of Tourism Management.
2. They will learn to work in the Tourism Management with great potential.
3. They will be able to seek self-employment by starting their own tourism related business.

**Semester -IV**

**History of the Marathas: (1707-1818)**

**Learning Objectives:**

1. To understand changed nature of Maratha Polity during the Peshwa Period.
2. To examine the dynamics of Maratha Confederacy and reciprocity.
3. To examine role of Marathas and regionality in National politics of 18th Century India.
4. To study administrative system, society and economy of the Peshawa period

**Learning Outcome:**

1. Students will be able to analyze the Marathas policy of expansionism and its consequences.
2. They will understand the role played by the Marathas in the 18th century India.
3. They will be acquainted with the art of diplomacy in the Deccan region.
4. It will help to enrich the knowledge of the administrative skills and profundity of diplomacy.

**Pedagogy:** Lectures/Visual presentation/ Role play/ Critical analysis/Assignments/Tests/Quiz/ e-learning

**Medieval India: Mughal Period**

**Course objectives:**

1. Produce well researched written work that engages with both primary sources and the secondary literature.

2. To learn the Mughal ruler and incidents regarding Deccan policies. 3.To understand the analytical studies of Medieval South India
4. Maps- important centers in Mughal Empire under Akbar and Aurangzeb

**Course outcome:**

1. Draws comparisons between policies of different rulers.
2. Understanding Role of Akbar in the consolidation of Mughal rule in India.
3. Understand Aurangzeb's conflict with Rajputas, Maratha and weakening Mughals age.
4. Analyses factors which led to the emergence of new religious ideas and movements (bhakti and Sufi)

**Glimpses of the Modern World - Part II**

**Learning Objectives:**

1. This paper is designed to introduce the students to the political history of the Modern World.
2. It will enable students to study remarkable historical developments in the various countries including India, which had a significant impact on almost all over the Modern World.
3. It will enable students to understand the significant impact of the modern concepts such as Dictatorship, Cold War, Nationalism, Communism, Imperialism, Polarization, etc.
4. It will get students acquainted with the major nationalist movements, the World War II and its consequences, the Cold War and its Consequences.

**Learning Outcomes:**

1. It will enable students to develop the overall understanding of the Modern World.
2. The students will get acquainted with the major nationalist movements, the World War II and its consequences, the Cold War and its Consequences.
3. It will enhance their overall perception of the history of the Modern World.
4. It will enable students to understand the significance of the strategic political developments in the Modern World.

## History of West Asia

### Learning Objectives:

1. The course is designed to enable students to understand the history of Modern East Asia.
2. It will acquaint students with the notable events in contemporary Asia.
3. It will orient students to understand the economic transition in Asia during 20th century and the impact of all this on world politics.
4. It will enable students to understand the history of West Asian countries.

### Learning Outcomes:

1. It will enable students to develop the overall understanding of the West Asian countries.
2. The students will get acquainted with the modernization of Turkestan, Arab Nationalism and the Arab-Israel Conflict.
3. It will enhance their perception of the developmental policies of the Asian Countries.
4. It will enable students to understand the significance of the West Asian countries in the Modern World.

**Pedagogy:** Lectures / Visual presentation/ Role play / Critical analysis/Assignments /Tests / Quiz / e-learning

## Modi Script

### Course Objectives:

1. This paper is designed to introduce the students to the Modi Script.
2. It will get students acquainted with details of the Modi Script.
3. It will enable students to understand Maratha History in detail.

### Course Outcome:

1. Students will get an overall understanding of the Modi Script.
2. They will be able to know the history of the Marathas.
3. They will be able to read and write in Modi Script.

## **Medieval Indian Arts and Architecture (1206 To 1857)**

### **Course Objectives:**

1. Students will get understanding of development of Medieval Art and Architecture.
2. They will understand the changing patterns of the Art and Architecture during the Medieval India.
3. They will have an understanding of the impact of Persian Art on Islamic Art and Architecture in Medieval India.

## **Popular Indian Culture**

### **Course Objectives:**

1. This paper is designed to introduce the students to the Popular Culture in India.
2. It will enable students to understand Visual Arts, Performances, Audio-Visual expressions, Fairs, Festivals and Rituals.
3. It will get students acquainted with the development of Popular Indian Culture.

### **Course Outcome:**

1. Students will get an overall understanding of the the Popular Culture in India.
2. They will understand the Visual Arts, Performances, Audio-Visual expressions, Fairs, Festivals and Rituals.
3. They will have an understanding of the importance of Popular Indian Culture.

## **Travel Agency and Tour Business**

### **Course Objectives:**

1. This course is designed to create awareness about Travel Agency, Education and Job opportunities among the students.
2. It aims in training students on both Theory and Practical aspect and Travel Agency and creating professionals for tourism industry.

3. It will enable student to seek self-employment by starting their own Travel Agency related to business.

**Course Outcome:**

1. The students will understand the details of the business of Travel Agency.
2. They will be trained on both Theory and Practical aspect and Travel Agency and creating professionals for Tourism Industry.
3. It will enable student to seek self-employment by starting their own Travel Agency related to business.

## **Semester V**

**Indian National Movement (1885-1947) Learning (Course) Objectives:**

1. The course is designed to make the students aware about the making of Modern India and the struggle for independence.
2. To make the students aware of the multi-dimensionality of Modern India.
3. To highlight the ideas, institutions, forces and movements that contributed to be shaping of Indian Modernity.
4. To acquaint the students with various interpretative perspectives.

**Learning Outcomes:**

1. It will enable students to develop an overall understanding of Modern India.
2. It will increase the spirit of healthy Nationalism, Democratic Values and Secularism among the Students.
3. Students will understand various aspects of the Indian Independence Movement and the creation of Modern India.

**Pedagogy:** Lectures/Visual Presentation/Critical Analysis/ Assignments /Test/ e-learning

**History of Civilization**

**(3 Credit)**

**Course Title: - World Civilization and Heritage (Part I)**

**Course Objectives:**

- 1.To Introduce students to the various concept and theories of World Civilization. 2.To study the types of Stone Culture and its various aspects.
- 3.To acquaint the students with rise and growth of Ancient Civilization in West Asia. 4.To understand about Ancient Civilization of China and its various parts.
- 5.To enable the students to understand the Ancient Indian Civilization and its town planning, socio- economic, religious life as well as Vedic Civilization.

**Course Outcomes:**

1. Students will be aquanaut with the knowledge of how the Human Civilization process was start
2. The History of World Civilization course will be developing the curiosity in students the rise and growth of Ancient Civilization in world.
3. This curriculum develops the attitude of contemporary students towards the World Civilization.

**Core Course 3: History of Civilization (3 Credit)**

**Course Title: - World Civilization and Heritage (Part I)**

**Course Objectives:**

- 1.To Introduce students to the various concept and theories of World Civilization. 2.To study the types of Stone Culture and its various aspects.
- 3.To acquaint the students with rise and growth of Ancient Civilization in West Asia. 4.To understand about Ancient Civilization of China and its various parts.
- 5.To enable the students to understand the Ancient Indian Civilization and its town planning, socio- economic, religious life as well as Vedic Civilization.

**Course Outcomes:**

1. Students will be aquanaut with the knowledge of how the Human Civilization process was start
2. The History of World Civilization course will be developing the curiosity in students the



rise and growth of Ancient Civilization in world.

3. This curriculum develops the attitude of contemporary students towards the World Civilization.

**Pedagogy:** Lectures/Visual Presentation/Critical Analysis/ Assignments/ Test/ e-learning

**Discipline Specific Elective Courses (DSE-4D)-**

**(3) Credit**

**Course Title: Maharashtra in the 19th Century**

**Course Objectives:**

1. To Introduce the students to the history of 19th century in Maharashtra
2. To study Political, Social, Economic and conceptual History of the 19th Century Maharashtra in an analytical way with the help of primary sources.
3. To evaluate contribution of 19th century in Maharashtra to the establishment of Maharashtra state contribution of successors and later development of the 19th century Maharashtra
4. To study Socio-religious System of the 19th Century in Maharashtra.

**Course Outcomes:**

1. Student will develop the ability to analyse sources for 19th century Maharashtra History.
2. Student will learn significance of Regional History and Socio- religious reformism foundation of the region.
3. It will enhance their perception of 19th Century Maharashtra.
4. Appreciate the skills of leadership and the Socio-religious System of the Maharashtra.

**Pedagogy:**

Lectures / Visual Presentation / Critical Analysis / Assignments / Test/ e-learning.

**Discipline Specific Elective Courses (DSE-4D)-**

**(3) Credit**

**Course Title- Constitutional Development in India (1773-1853)**

**Course Objectives:**

1. To Introduce the students to evolution of Constitution of India.
2. To study Factors and Situations that shaped the Constitutions.

**Course Outcomes:**

1. Students will understand evolution of Constitution of India.
2. Student will learn factors and conditions that contributed to constitution of India
3. Students will understand the Democratic Processes and thereby strengthen Democracy.

**Pedagogy:**

Lectures / Visual Presentation / Critical Analysis / Assignments / Test/ e-learning

**Discipline Specific Elective Courses (DSE-4D)-****(3) Credit****Course Title- Constitutional Development in India (1773-1853)****Course Objectives:**

1. To Introduce the students to evolution of Constitution of India.
2. To study Factors and Situations that shaped the Constitutions.

**Course Outcomes:**

1. Students will understand evolution of Constitution of India.
2. Student will learn factors and conditions that contributed to constitution of India
3. Students will understand the Democratic Processes and thereby strengthen Democracy.

**Pedagogy:**

Lectures / Visual Presentation / Critical Analysis / Assignments / Test/ e-learning

**Skill Enhancement Courses (SEC 2 C) –****(2 Credits)****10 Research Paper Writing****Objectives**

1. To describe importance of Inter-Disciplinary Research.
2. To introduce students to the Basics of Research.

3. To Describe the Research Outline

**Course Outcomes:**

1. Students will be introduced to the information and importance of Historiography.
2. Students can study the interdisciplinary approach History.

**Skill Enhancement Courses (SEC 2 C) – (2 Credits)**

**SEC: 11 Course Title: - Museology**

**Objectives:**

1. To acquaint the students with the rise and development of Museum.
2. To impart to the students an understanding of the importance of material history through Museum.
3. To encourage the students to collect the material or sources of History for local, regional and National History through Museum.
4. To enable the students to collect Various Articles as a tool of History.

**Course Outcomes:**

1. Students will understand Concepts of Museum and learn basic Principles of Museology
2. Students will gain Comprehensive Knowledge of the Process of Create and Conserving Museum of objects

**Semester VI**

**Course Title: - India After Independence- (1947-1991)**

**Course Objectives:**

1. To make the students aware about the making of Contemporary India and events that panned out in the Post-Independence Era.
2. To make the students aware of the Multi-Dimensionality of Modern India.
3. To highlight the ideas, institutions, forces and movements that contributed to the shaping of Indian Modernity.
4. To acquaint the students with various Interpretative and Analytical perspectives.

**Course Outcomes:**

1. It will enable students to develop an overall understanding of the Contemporary India.
2. To increase the spirit of healthy Nationalism, Democratic Values and Secularism among the students.
3. Students will understand various aspects of India's domestic and foreign policies that shaped Post- Independence India.

**Core Course 4 History of Civilization****(3 Credit)****Course Title: -World Civilization and Heritage (Part II)****Course Objectives:**

1. To Orient students about Western Classical Civilization of Greece and Roman.
2. To introduce students to the Arab Civilization and its various aspects.
3. To study various Concept and theory's in Medieval Europe.
4. To understand the Renaissance- Reformation Movement and impact of various Past Civilizations.
5. To create motivation and curiosity among the students through the age of discoveries in Ancient and Medieval times.

**Course Outcomes:**

1. Students will be oriented about Western Classical Civilization of Greece and Rome.
2. Students will be introduced to Arab Civilization and its impact on world Civilization.

**Discipline Specific Elective Courses (DSE-3C) -****( 3 Credit)****Semester –VI, Course Title: Applied History****Course Outcome :**

1. To Introduce students to information and importance of Applied History.
2. To help students understand the usefulness of history in the 21st century, its changing perspectives, the new ideas that have been invented, and the importance of History in a

Competitive World.

3. To inform the students about the historical significance of Archaeology and Archives and the opportunities in the field of Archaeology and Archives through this course.
4. To inform the students about the opportunities in the field of Media, Museums through this Course.

**Course Outcomes:**

1. Students will be introduced to the information and importance of applied history.
2. Student will learn about the Historical significance of Archaeology and Archives and opportunities in the field of Archaeology and Archives.
3. Through this course, students will be informed about the opportunities in the field of Media, Museums.
4. the about learn will Student's usefulness of history in the 21st Century, its changing Perspectives, the new ideas that have been invented, and the importance of History in a Competitive World.

**Pedagogy:** Lectures / Visual Presentation / Critical Analysis / Assignments / Test/ e-learning

**Discipline Specific Elective Courses (DSE-4D)-**

**(3) Credit**

**Course Title: History of Maharashtra in the 20<sup>th</sup> Century**

**Course Objectives:**

1. To Introduce the students to the history of 20th Century in Maharashtra
2. To study Political, Social, Economic and Conceptual History of the 20th Century Maharashtra in an Analytical way with the help of Primary Sources.
3. To evaluate contribution of 20th Century in Maharashtra to the establishment of Maharashtra state contribution of successors and later development of the 19th century Maharashtra
4. To study Socio-Religious System of the 20th Century in Maharashtra.

**Course Outcomes:**

1. Student will develop the ability to analyse sources for 20th Century Maharashtra History.
2. Student will learn significance of regional history and Socio- Religious Reformism foundation of the region.
3. It will enhance their Perception of 20th Century Maharashtra.
4. Appreciate the skills of leadership and the Socio-Religious System of the Maharashtra.

**Pedagogy:**

Lectures / Visual Presentation / Critical Analysis / Assignments / Test/ e-learning

**Discipline Specific Elective Courses (DSE-4D)- (3) Credit**

**Constitutional Development in India (1858-1950)**

**Course Objectives:**

1. To Introduce the Students to evolution of Constitution of India.
2. To Study factors and Situations that shaped the Constitutions.

**Course Outcomes:**

1. Student will understand evolution of Constitution of India.
2. Student will learn factors and conditions that contributed to Constitution of India
3. Students will understand democratic processes and thereby strengthen Democracy

**Skill Enhancement Courses (SEC 2 D) – 2 Credits**

**SEC: 12 Course Title: -Heritage Management**

**Course Objectives:**

1. To understand the introduction of Heritage Management to the Students
2. To get an Opportunity to seek self-employment to the students

**Course Outcomes:**

1. Student will understand over all process of Heritage Management
2. Student will get the knowledge about scope and the fact of Heritage Management.
3. The students will enable to understand about legal and commercial framework of Heritage

**Skill Enhancement Courses (SEC 2 D) –**

**(2 Credits)**

**Course Title: - Archaeology**

**Course Objectives:**

1. This paper is designed to introduce the students to the Key Concepts and practical approaches in Archaeology, highlighting their applications in interpreting the Human past.
2. It will enable students to understand the definition, aims and scope of Archaeology and its development as a discipline will be introduced to the students.
3. The nature of the Archaeological record and the unique role of science in Archaeology is explained to the students.
4. Legislation related to Archaeology and the role of Archaeology in Heritage Management is also discussed in this course.

**Course Outcomes:**

1. Students will learn to understand the definition, aims and scope of Archaeology so as to understand its applications in interpreting the human past.
2. They will be able to understand the nature of the archaeological record and the unique role of science in archaeology.
3. They will have an overall understanding of the Archaeology.

**Skill Enhancement Courses (SEC 2 D)**

**(2 Credits)**

**SEC:14 Course Title: Numismatics**

**Course Objectives:**

1. This paper is designed to introduce the students to the Currency system of Ancient India.
2. It aims at acquainting the students about the development in the Coinage System.

**Course Outcomes:**

1. Students will be able to identify and decipher the Coins.

2. They will also be able to understand the Socio-Political background that accure through the coinage of that time; thus, getting holistic picture of that economic system prevalent in Ancient India.

## **F. Y. B. A. Ancient Indian History, Culture and Archaeology**

### **SEMESTER I**

#### **An Introduction to Prehistory and Protohistory of India**

##### **Course Outcome:**

1. At the end of course student will be able to use extensive information on Archaeology in order to study and analyze the archaeological context.
2. Student will acquire fundamental logical skills to study the subject Archaeology.
3. Student will learn the basic periodization and chronology of archaic past.
4. Student will acquire the necessary skills related with methods of collection of Archaeological data useful for interpretation.
5. Student will get a knowledge of Pre and Protohistory which will be helpful for the advanced and specialized studies in Archaeology.

### **SEMESTER II**

#### **An Introduction to Ancient History of India.**

##### **Course Outcome: -**

1. At the end of course student will be able to use the large amount of information on Ancient Indian History in order to study and analyze the historical context.
2. Student will obtain fundamental logical skills for the further study of the subject Ancient History and Culture.
3. Student will learn the basic periodization and chronology of Ancient Indian History.



## SEMESTER III

### CC-1 : Political and Legal institutions in Ancient India

#### Course Outcome:

1. Student will learn the basic concepts of Political and legal institutions in Ancient India.
2. At the end of course student will be able to apply, conceptual information of Ancient Indian Institutions in order to study and analyze the historical context.
3. Student will acquire fundamental logical skills to study Political and Legal institutions in Ancient India.
4. Student will acquire the necessary skills related to the methods of collection of historical data useful for interpretation.
5. Student will get a knowledge of Politico-legal institutions which will be helpful for the advanced and specialized studies in Ancient Indian History and Culture.

## SEMESTER IV

### Socio-economic Institutions of Ancient India.

#### Course Outcome: -

1. Student will learn the basic concepts of Social and Economic institutions in Ancient India.
2. At the end of course, student will be able to apply conceptual information of Ancient Indian Institutions in order to study and analyze the historical context.
3. Student will acquire fundamental logical skills to study Socio-economic institutions of Ancient India.
4. Student will acquire the necessary skills related to the methods of collection of historical data useful for interpretation.
5. Student will get knowledge of Socio-economic institutions which will be helpful for the advanced and specialized studies in Ancient Indian History and Culture.

### **Course Title :- CC-3(3) : Religion and Philosophy in Ancient India**

#### **Course Outcome:**

1. Student will learn the basic concepts of religious and philosophical institutions in Ancient India.
2. At the end of course student will be able to apply, conceptual information of religious and philosophical institutions in Ancient India in order to study and analyze the historical context.
3. Student will acquire fundamental logical skills to study religious and philosophical institutions in Ancient India.
4. Student will acquire the necessary skills related to the methods of collection of historical data useful for interpretation.
5. Student will get a knowledge of Religion-philosophical texts which will be helpful for the advanced and specialized studies in Ancient Indian History and Culture.

### **Course Title :- CC-4 (3) Ancient Heritage and Heritage Management**

#### **Course Outcome: -**

1. Student will learn the basic concepts of Ancient Heritage and Heritage Management.
2. At the end of course student will be able to apply conceptual information of Ancient Indian Institutions in order to study and analyze the historical context.
3. Student will acquire fundamental logical skills to study of heritage and its management.
4. Student will acquire the necessary skills related to the methods of collection of historical data useful for interpretation in Heritage and its management.
5. Student will get knowledge of heritage which will be helpful for the advanced and specialized studies in ancient heritage.

## Savitribai Phule Pune University, Pune

### B. A. Economics (Credit System) from Academic Year 2019-20

#### Under the Faculty of Humanities

#### Program Outcome (PO)

- PO-1** Students would have knowledge about the nature and classical theories of Economic development.
- PO-2** Students would be able to apply economic theories and concepts to contemporary social issues, as well as formulation and analysis of policy and recognize the role of ethical values in economic decisions.
- PO-3** Understanding of Economic issues and interactions, Effective Communication and Economic Environmental Awareness
- PO-4** Knowledge of digital Platform Field and Project Work Research Attitude Oral Examination

#### Program Specific Outcome (PSO)

- PSO -01** To learn economics based on facts and evidences
- PSO -02** To develop a logic and critical thinking of economics
- PSO -03** To understand causes and effects of Indian Economy
- PSO -04** To have Conceptual Knowledge of multiculturalism
- PSO -05** To learn applied aspect of Economics including killed oriented Knowledge.

## Course Outcome

### Semester – I & II

#### Indian Economic Environment – I & II

1. Ability to develop an understanding of the economic environment and the factors affecting economic environment.
2. Ability to develop awareness on the various new developments in the different sectors of economy – agriculture, industry, services, banking, etc.
3. Ability to compare and contrast Indian Economy with other world economies.
4. At the end of the course, the student should be able discuss and debate on the various issues and challenges facing the Indian Economic Environment.

### Semester – III & IV

#### I. Financial System-I & II

1. The Student got the knowledge of various financial and non-financial institutions.
2. They students get the knowledge of Indian financial system for better financial decision making

#### II. Micro Economics- I & II

1. The Students understood of basic theories of micro economics and their application.
2. The students got the Knowledge of conceptual and theoretical frameworks of inflation, deflation and stagflation, Business Cycle.
3. Understand monetary and fiscal policies in fulfilling the macroeconomic objectives of stability, full employment and growth.

#### III. Macro Economics- I & II

1. Know about the basic differences between microeconomics and macroeconomics

2. Know about the various concepts of national income
3. Student understood the various theory of keynesian macroeconomic theoretical framework of consumption and investment functions.

### **Skill Enhancement Course (SEC-1A)**

#### **IV. Basic Concept of Research Methodology**

1. Demonstrate his/her understanding of sampling methods and the ability to use collection of data
2. Identify the appropriate sample techniques for different kinds of research questions
3. Identify the appropriate source of data in relation to the collection of research data.
4. Able to classify and present collected data in the form of graph, bar diagram, chart etc

### **Semester – V & VI**

#### **I. G3 Indian Economic Development – I & II**

1. Student Learn the basic concept and indicators of Economic Development.
2. Understand the concept and indicators of Human Development.
3. Explain the characteristics of Developing and Developed Countries.

#### **II. S3 – International Economics – I & II**

1. Learn the basic concepts of International Economics and International Trade.
2. Knowledge about the theories of international trade.
3. The Student understood the issues relating to Terms of Trade and Balance of Payment.
4. It gives them an opportunity to understand and analyses the real-world trade related issues.

#### **III. S4 –Public Finance – I & II**

1. Learn the basic Concepts of Public Finance.

2. Students got the Information about Public Revenue, Public Expenditure and reasons for rising Public Expenditure.

3. The Student understood types of Public Debt and its effects.

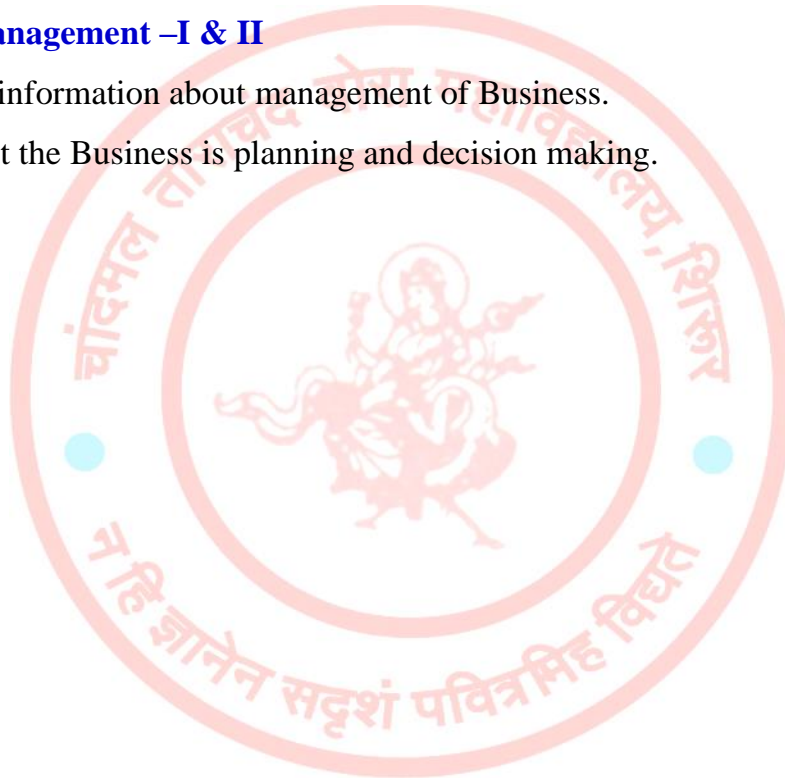
4. Given the limited resources and unlimited demand and desires, the subject helps students understand how government should use the funds of the public.

### **Skill Enhancement Course (SEC-1A)**

#### **IV. Business Management –I & II**

Students got the information about management of Business.

Knowledge about the Business is planning and decision making.



**Savitribai Phule Pune University, Pune**

**B.A. Geography (Credit System) from Academic Year 2019-20**

**Under the Faculty of Humanities**

**Department of Geography**

**Program Outcome (PO)**

1. To acquaint the utility and application of geography in different region and environment.
2. Study Tour, Field visits, Project work, City Survey, Oral Examination.

**Program Specific Outcome (PSO)**

1. To introduce the Students to the Basic Concept in Geography.
2. To Develop theoretical, Applied and Computational Skills.
3. Environmental Awareness amongst the Students.
4. To acquaint the students to past, present and future utility and potentials of resources at regional, national and global level.
5. To explain the elementary and essential principles of practical work of geography.

**Course Outcome (CO)**

**Semester-I**

**GG-110 A - Physical Geography**

**Objectives:**

1. To introduce the students to the basic concepts in Physical geography.
2. To introduce latest concept in Physical geography

3. To acquaint the students with the utility and application of Physical geography indifferent regions and environment.
4. To make the students aware about Earth system (Lithosphere, Atmosphere, Biosphere and Hydrosphere)

**Course Outcome:**

Upon successful completion of this course, the student will be able to:

1. The geographical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.

**Semester-II**

**GG- 110 B - Human Geography**

**Objectives:**

1. To introduce the students to the basic concepts in Human geography.
2. To introduce latest Introduction to Human Geography.
3. To acquaint the students with the utility and application of Human geography in different regions and environment.
4. To make the students aware about Population, Settlements, Agriculture.

**Course Outcome:**

Upon successful completion of this course, the student will be able to:

1. The geographical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.

**Semester III**

**Gg.210 Environment Geography- I**



**Objectives:**

1. To create the awareness about dynamic environment among the student.
2. To acquaint the students with fundamental concepts of environment geography for development in different areas.
3. The students should be able to integrate various factors of Environment and dynamic aspect of Environmental geography.
4. To make aware the students about the problems of environment, their utilization and conservation in the view of sustainable development

**Gg.220 (A) Geography of Maharashtra****Objectives:**

1. To acquaint students with Geography of our State.
2. To make students aware of the magnitude of problems and prospects in Maharashtra.
3. To help students understand the inter relationship between the subject and the society.
4. To help students understand the recent trends in regional studies

**Gg. 201 Scale and Map Projection Practical Geography-I****Objectives of Course:**

1. To introduce the basic concepts in Practical Geography
2. To enable students to use various Scales and Projection Techniques in Geography.
3. To acquaint students with the utility of various Projections in Geographical knowledge.
4. To explain the elementary and essential principles of practical work in Geography.

**Course Outcome:**

After the successful completion of the course, the students will be able to:

1. Develop practical skill and use of map scale and projection.
2. To make students aware of the new techniques, accuracy and skills of map making.

## SEMESTER IV

### **Gg.210 (B) Environment Geography- II**

1. To create awareness about dynamic environment among the students.
2. To acquaint students with the fundamental concepts of Environment Geography.
3. To acquaint students about the past, presents and future utility and potentials of natural resources.
4. To make aware students about the problems of environment, its utilization and conservation in the view of sustainable development.

### **Gg.220 Geography of Maharashtra,**

#### **Course Objective:**

1. To make students aware about the Agriculture problems and prospects of Maharashtra.
2. To understand the population distribution and settlement pattern in Maharashtra.
3. To understand the concept of rural development.
4. To understand the prospectus in Tourism activity in Maharashtra and the role of MTDC and Role of MIDC in industrial development in rural area of Maharashtra.

### **Gg. 201 (B) Cartographic Techniques, Surveying and Excursion / Village / Project Report**

#### **Objectives of Course:**

1. To introduce the students to the basic and contemporary concepts in Cartography.
2. To acquaint the students with the utility and applications of various Cartographic Techniques.
3. To introduce the latest concepts regarding the modern cartography in the field of

Geography.

4. To explain the elementary and essential principles of practical work in Geography.

**Course Outcome:**

After the successful completion of the course, the students will be able to:

1. Develop practical knowledge and application of cartographical techniques.
2. To make students aware of the new techniques, accuracy and skills of Map Making.

**SEMESTER V**

**Geography of Tourism- I CC1E**

**Course Objectives:**

- 1) To understand the history of Tourism
- 2) To introduce the students to the basic concepts in Tourism Geography.
- 3) To understand the types of Tourism
- 4) To gain knowledge different aspects of Tourism Geography

**Geography of India -I DSE 1 C**

**Course Objective:**

1. To acquaint the students with geography of our Nation.
2. To make the student aware of the magnitude of problems and Prospects at National level.
3. To help the students to understand the inter relationship between the subject and the society.
4. To help the students to understand the recent trends in regional studied.

## **Practical Geography- I (Techniques of Spatial Analysis) DSE- 2 C.**

### **Course Objective:**

1. To introduce the basic concepts and techniques of Geographical Analysis.
2. To introduce the students with SOI Toposheets and acquire the Knowledge of Toposheet interpretation.
3. To introduce the students with Weather Maps and acquire the Knowledge of its interpretation.
4. To introduce the students with Aerial Photographs and Satellite Images and acquire knowledge to interpret it .
5. To acquaint students with the spatial and structural characteristics of Practical Geography.
6. To explain the elementary and essential principles on field of practical work.

## **Value/Skill based Course Research Methodology - I**

### **Course Objectives:**

1. To develop the understanding of the basic concept of research
2. To develop the understanding of the basic framework of sampling and data collection
3. To develop the understanding of various sampling methods and techniques

## **Geography of Tourism- II CC1F**

### **Course Objectives:**

1. To understand the history of Tourism
2. To introduce the students to the basic concepts in Tourism Geography.
3. To understand the types of Tourism
4. To gain knowledge different aspects of Tourism Geography.

## SEMESTER VI

### Geography of India -II DSE1 D

#### Course Objective:

1. To acquaint the students with geography of our Nation.
2. To make the student aware of the magnitude of problems and Prospects at National level.
3. To help the students to understand the inter relationship between the subject and the society.
4. To help the students to understand the recent trends in regional studied.

### Practical Geography- II (Techniques of Spatial Analysis, Surveying and Excursion /Village/ Project Report) DSE- 2 D.

1. To introduce the students to the basic concepts Geographical, Data & its. Basic Analysis
2. To Calculation of Central Tendency, & Dispersion
3. To understand Testing and Application of Hypothesis
4. Understanding of the conducting survey Field Excursion /Village Survey / Project Report

### Value/ Skill based Course Research Methodology – II

#### Objectives:

1. To identify various sources of information for data collection.
2. Understanding of the conducting survey on various issues and develop the Report writing skill of students.

## Savitribai Phule Pune University, Pune

### B. A. Psychology and Logic (Credit System) Academic Year 2019-20

#### Under the Faculty of Humanities

#### Programme Outcome (PO)

B.A. program in the college is recognized by Savitribai Phule Pune University, Pune, and follows the syllabus prescribed by the university. English is a compulsory subject for our B.A program. Apart from this, our students are allowed to choose any of the one subject from the cluster of Marathi, Hindi, English, Economics, History, Psychology and Geography for special level and to choose any of the two subjects from the cluster of Marathi, Hindi, English, Economics, History, Psychology, Geography, Logic and Ancient Indian History, Culture and Archeology for general level B.A. program in our college meets the standards prescribed by general humanities education.

- PO-1 Cognitive skills:** Students will be better able to appreciate different Cognitive skills, or cognitive abilities, that include attention, remembering, reasoning, problem-solving, thinking, reading and learning.
- PO-2** Understanding of Social issues and related coping skills, Importance of interpersonal relations, To acquire effective communication skills, Importance of organizational behavior and group dynamics
- PO-3 Employability:** On graduating, the students will be eligible for employment in education area, psychological service centers, social service centers, industrial and organizational sector etc. Students become employable in government and non-governmental organizations. They will also be able to appear for competitive examinations

**PO-4 Values:** Humanities education is designed in such a way that it lays particular emphasis on human values. Students on completion of the undergraduate degree will be better able to appreciate the social and cultural diversity. It equips them to think critically about the human values and ethical issues.

### **Program Specific Outcome (PSO)**

- PSO-1** The Department of Psychology and Logic emphasizes the training of theoretical and applied psychological skills aimed at providing students with an objective and scientific knowledge of the basic concepts and phenomena of psychology.
- PSO-2** The various realms of life - cognition, emotion, behavior and spirituality are explored with ample amount of space given to both objectivity and subjectivity of human nature.
- PSO-3** The course is designed to enhance not only knowledge of concepts but also introduce skills required for research and profession as psychologists.
- PSO-4** The course is designed to enhancement of various life skills (E.g.-stress management, coping skill). Enabling to measure general and special abilities, values, personality traits. Introduction to counseling process and its techniques. Illustration of mental disorder and treatment.
- PSO5** Empathetic understanding of the socio-cultural and cross-cultural aspects of community living fine-tunes students to become responsible individuals and citizens in a highly globalized environment.

### **Course Outcome (CO)**

#### **SEMESTER - I**

#### **Course - DSC-PSY- 1A: Foundations of Psychology**

- CO1** Students will be able to understand the basic psychological processes and their applications in day to day life.
- CO2** After the completion of this course students will be able to develop the ability to evaluate cognitive processes, learning and memory of an individual
- CO3** They will understand the importance of motivation and emotion of the individual.
- CO4** They will understand the personality and intelligence of the individuals by developing their psychological

## **SEMESTER - II**

### **Course - DSC-PSY- 1B : Introduction to Social Psychology**

- CO1** After the completion of this course students will be able to understand the basics of social psychology.
- CO2** They will be able to understand the nature of self, concept of attitude and prejudice of the individual.
- CO3** They will be acquiring the ability to assess the interactional processes, love and aggression in our day today life.
- CO4** They will be able to understand the importance of group dynamics and individual in the social world.

## **SEMESTER-III**

### **Course - DSE-1A: PSYCHOLOGY OF ABNORMAL BEHAVIOR-I**



- CO1** After the completion of this course students will be able to acquire the knowledge about the symptoms, diagnostic criteria, and causes of various psychological disorders
- CO2** They will examine multiple probable causes and correlates of behavior.
- CO3** They will be able to understand critiques, limitations, and implications of diagnosis and classification of psychological diseases.
- CO4** They will create awareness about mental health problems in society.

### **Course - DSE-2A: DEVELOPMENTAL PSYCHOLOGY**

- CO1** After the completion of this course students will be able to understand the importance, characteristics and concern in lifespan development
- CO2** They will be able to understand biological, cognitive, and socio-emotional processes of life span development
- CO3** They may understand the periods of development, the significance of age, and discuss developmental issues.
- CO4** Understand Psychoanalytic, Cognitive, Behavioral and Social Cognitive, Ethological, Ecological and Eclectic theories of development
- CO5** Understand methods of data collection and research designs used in Life-span development research

### **Semester-III**

#### **Course - SEC- 1A: Health Psychology**

- CO1** After the completion of this course students will be able to understand health psychology and arrive at the introduction to the role of psychology in health.
- CO2** Understand the nature of stress and coping
- CO3** Understand various factors related to health and diseases.

**CO4** Understand quality of life and promoting the good health

**Course - SEC-2A: Health Promotion Life Skills**

**CO1** After the completion of this course students will be able to understand health psychology and Hygienic behavior

**CO2** They may able to understand the Types, Signs and symptoms of infectious diseases and prevention strategies

**CO3** Understand various factors related to Interpersonal relationship

**CO4** Understand various factors related to competency and self-management

**SEMESTER-IV**

**Course - DSE-1B: Psychology of Abnormal Behavior-II**

**CO1** Learn descriptions, and theories underlying diagnostic nosology of psychiatric disorders

**CO2** Learn and understand benefits, critiques, limitations, and implications of diagnosis and classification

**CO3** It helps students to acquire the knowledge about the symptoms, diagnostic criteria, and causes of various psychological disorders

**CO4** It helps students to examine multiple probable causes and correlates of behavior.

**CO5** Create awareness about mental health problems in society

**Course - DSE-2B: Theories of Personality**

**CO1** Understand the concept of personality with various theories of personality on the basis of personality psychology.

**CO2** Understand different framework and theoretical aspects of personality.

- CO3** Understand and observe, interpret individual differences in behavior in the light of sound theoretical systems of personality.
- CO4** Understand comprehensive overview of the major theory's personality.

### **Course - SEC- 1B: Positive Psychology**

- CO1** Understand how the positive psychology as the science of happiness, human strengths, positive aspects of human behavior and 'psychology of well-being.'
- CO2** Students will be able to understand that how we lead our lives, find happiness and satisfaction, and face life's challenges.
- CO3** Students will be able to understand that how positive psychology has become an evolving mosaic of research and theory from many different areas of psychology.

### **Course - SEC-2A : Health Promotion Life Skills**

- CO1** After the completion of this course students will be able to understand the counseling process scientifically
- CO2** They may able to understand the various types of counseling skills
- CO3** Understand various factors related to ethical issues and dilemmas in counseling.

## **SEMESTER-V**

### **Course-SEC 1 C (3): Industrial and Organizational Psychology**

- CO1** Students may describe the concept of industrial and organizational psychology, selection and training, evaluation and motivation at workplace.
- CO2** They will explain job profile, job analysis, recruitment techniques and employee training.
- CO3** They will be able to identify and classify the appraisal rating system.

- CO4** They may acquire the ability to compare different theories of motivation
- CO5** They will evaluate the training Programme and job performance.

## **SEMESTER-V**

### **DSE 1 C (3): Psychological Testing (THEORY) + (1) TESTING PROJECT**

- CO1** After the completion of this course students will be able to describe the concept of psychological test, reliability, validity and norms.
- CO2** They may classify and categorize psychological tests and the types of reliability, validity and norms
- CO3** They may identify the reliability and validity of psychological tests,
- CO4** They may evaluate the types of norms
- CO5** May achieve the skill to conduct psychological testing for project and behavior analysis

### **Course - DSE 2 C (3): Psychological Tests + (1) STATISTICS**

- CO1** After the completion of this course students will be able to describe the scientific procedure of mapping of human behavior.
- CO2** They may understand and explain testing about general ability, personality, adjustment and attitude.
- CO3** May able to identify and classify the intellectual ability and personality patterns.
- CO4** They will be conduct testing and evaluate intellectual ability, personality traits, adjustment and attitudes of participant.
- CO5** They may analyze statistical methods employed in analysis

**Course - SEC 2 C (2) (VALUE/SKILL-BASED COURSE): Personality Development-1**

- CO1** After the completion of this course students will be able to describe the concept of personality
- CO2** They may able to identify and classify various personality traits.
- CO3** Correlate real life behavioral patterns with theoretical assumptions
- CO4** Apply psychological skills in daily life situations

**SEMESTER-VI**

**Course - SEC 1 D (3): Applied Psychology**

- CO1** Student should be able to describe the concept of applied psychology, educational psychology, family structure and developmental patterns.
- CO2** Students may know the clinical psychology related mechanisms, social issues, and criminal behavior.
- CO3** Students will be able to classify the intellectual ability, abnormality, criminal behavior.
- CO4** Students may identify the problems and solutions in the field of education, health and society.
- CO5** They should evaluate the interpersonal relations.
- CO6** They should apply psychological remedies to assess abnormal behaviour, to tackle the social issues and to rectify the problematic behavior.

**Course - DSE 1 D (3): Experimental Psychology (Theory) + (1) Research Project**

- CO1** Student should be able to describe the process of experiments in psychology, and concept of psychophysics

- CO2** Student should be able to explain the terms like problem statement, hypothesis, variables, sampling in experiment.
- CO3** They should identify and classify the learning system, and methods of psychophysics.
- CO4** They may compare laws of psychophysics, types of hypotheses
- CO5** Acquire the ability to conduct research-based project

### **Course - DSE 2 D (3): Psychological Experiments + 1 Statistics**

- CO1** After completing the course, student should be able to explain psychophysics, various cognitive processes of human being
- CO2** Students should be classified and compare psychological experiments.
- CO3** Students should be able to conduct laboratory experiments.
- CO4** They may analyze statistical base of human behavior.

### **SEC2D (2) (Value/Skill-Based Course): Personality Development-2**

- CO1** After the completion of this course students will be able to describe the concept of self-esteem and personality development.
- CO2** They may able to identify and classify behavioral assessment techniques
- CO3** They may evaluate personality of individuals.

# Savitribai Phule Pune University, Pune

## Under Faculty of Commerce

### B. Com. CBCS 2019 Pattern

#### Program Outcome (PO)

- PO – 1** To develop students be able to adapt to new industrial and commerce condition.
- PO – 2** To equip the enable our young graduates to accept the upcoming century.
- PO – 3** To accommodate latest happenings, researches, modules, information, technologies in each subject of the faculty of commerce.
- PO – 4** To develop appropriate skills in the students so as to make them self-reliant, competent and motivate them for self-employment.

#### Program Specific Outcome (PSO)

- PSO-01** To develop dynamic students who can easily adapt to all local & global changes in trade & commerce.
- PSO-02** To learn new upcoming technology in trade & commerce as well as accounting.
- PSO-03** To develop entrepreneurial, marketing, banking& costing skills required for upcoming era.
- PSO-04** To develop graduates for upcoming competitive world.
- PSO-05** To train the student effectively in communication skills.

## Course Outcome (CO)

### SEMESTER- I

#### **Subject: Financial Accounting I.**

**On completing the course, the student will be able to:**

1. Students will be able to acquire in-depth knowledge of Accounting Concepts, Conventions and Principles and an overview of Emerging Trends in Accounting as well as Piecemeal distribution of cash.
2. Students will be able to understand the process and importance of conversion of single entry into double entry system.
3. Students will gain knowledge about GST and its implications.

#### **Subject: Business Mathematics & Statistics I.**

**On completing the course, the student will be able to:**

1. Students will be able to apply concepts of interests and annuities to calculate EMI, prepare amortization schedule, calculate insurance premiums etc.
2. Students will be able calculate dividend, brokerage on shares and mutual funds. Also, students will be able to identify the contribution of shares and mutual funds in systematic investment plans and to select best investment options. Students will be able to recognize and classify different types of data.
3. Students will be able to take a sample of appropriate size using suitable method of sampling. Students will be able to calculate measures of central tendency and measures of dispersion.
4. Students will be able to use appropriate measure of central tendency or measure of dispersion for given data to given problems from business or economics.

### **113 Business Economics (Micro) I & II**



**On completing the course, the student will be able to:**

1. Analyze the decisions taken by firms and households due to scarcity of resources.
2. Calculate the elasticity of demand and supply.
3. Describe the laws and various concepts in production and costs.
4. Evaluate the various microeconomic theories
5. Examine the causes of scarcity
6. Understand basic theories, concepts of micro economics and their application

### **117 B Bhasha Sahitya Ani Kaushalya Vikas**

**On completing the course, the student will be able to:**

1. Have a basic knowledge of Marathi Language which will help the students in their day-to-day life.
2. Let the students know the definitions of language and various variations of literature.
3. Develop a sense of love and social commitment towards the nation among students.
4. A great story of successful people who have achieved great success in various fields.

### **117C Vaikalpik Hindi**

**On completing the course, the student will be able to:**

1. Have a basic knowledge of Hindi Language which will help the students in their day-to-day life.
2. Let the students know the definitions of language and various variations of literature.
3. Develop a sense of love and social commitment towards the nation among students.
4. Know the Hindi story writers and Poets.

### **Compulsory English**

**Prescribed Text: *Success Avenue* (Board of Editors- Orient Blackswan)**

1. To offer relevant and practically helpful pieces of prose and poetry to students so that they not only get to know the beauty and communicative power of English but also its practical application
2. To expose students to a variety of topics that dominate the contemporary socio-economic and cultural life
3. To develop oral and written communication skills of the students so that their employability enhances
4. To develop overall linguistic competence and communicative skills of students

### **Additional English**

#### **Prescribed Text: Pearls of Wisdom (Board of Editors-Orient BlackSwan)**

1. To expose students to a good blend of old and new literary extracts having various themes that are entertaining, enlightening and informative so that they realize the beauty and communicative power of English
2. To make students aware of the cultural values and the major problems in the world today
3. To develop literary sensibilities and communicative abilities among students

### **115 B Banking and Finance [Fundamentals of Banking] –I**

#### **On completing the course, the student will be able to:**

1. The Banking and financial system in India.
2. About commercial banks and its products.
3. How to build customer relationship in banking sector.
4. The modern banking services e.g. e-banking, embanking and internet banking

### **Elements of Commercial Geography-I.**

#### **Course Objective: -**

1. To Create the awareness of about Commercial Geography, Nature, Scope, and Developments.
2. To introduce the students to the basic concepts Economic Activities of Man.
3. To Understand the meaning, and types of Resources.

### **Organizational Skills Development - I.**

#### **Course Objectives:**

1. To introduce the students to the emerging changes in the modern office environment.
2. To develop the conceptual, analytical, technical and managerial skills of student's efficient office organization and records management.
3. To develop the organizational skills of students.
4. To study the meaning, characteristics and advantage and Disadvantage of Population
5. To develop technical skills among the students for designing and developing effective means to manage records, consistency and efficiency of work flow in the administrative section of an Organization.
6. To develop employability skills among the students.

#### **Course Outcomes:**

1. Conceptual Clarity on meaning of Modern Office, internal and external factors of an office environment.
2. Conceptual clarity on the meaning of Scientific office management and understanding various techniques for scientific management.
3. Technical skills and Critical analysis skills OF Office management & Development of Technical and Analytical abilities of Office work.

### **Marketing and Salesmanship – I (Fundamentals of Marketing).**

#### **Course Objectives:**

1. To introduce the basic concepts in Marketing.

2. To give the insight of basic knowledge of Market Segmentation & Marketing Mix.
3. To impart knowledge on Product and Price Mix.
4. To establish link between commerce, business and marketing.
5. To understand the segmentation of markets and Marketing Mix.
6. To enable students to apply this knowledge in practicality by enhancing their skills in the field of Marketing.

**Course Outcomes:**

1. Student will get acquainted with the basics of marketing field.
2. It will highlight on the core marketing concepts namely 'Marketing Mix'. It will help students to implement this knowledge in practicality by enhancing their skills in the field of market segmentation.
3. Students will develop the skills of Pricing the product along with gaining knowledge on Product Mix.
4. It will help the students to apply the various techniques of Promotion and understand the various channels of distribution.

**Business Environment & Entrepreneurship - I.**

**Course Objectives:**

1. To understand the concept of Business Environment and its aspects.
2. To make students aware about Business Environment issues and problems of Growth.
3. To examine personality competencies most common to majority of successful entrepreneurs and to show how these competencies can be developed or acquired.
4. To understand difference between Entrepreneurial and non-Entrepreneurial

behaviour.

5. To provide knowledge of the significance of Entrepreneurship in economy.
6. To familiarize the students with contribution of selected institutes working to promote Entrepreneurship.
7. To generate entrepreneurial inspiration through the study of successful Entrepreneurs.

### **Course Outcomes:**

1. Understanding of various aspects business environment useful for would be entrepreneurs.
2. Understanding of various aspects of pollution and its ill effects.
3. Understanding of Problems and their causes and remedies.
4. Understanding the concept of entrepreneur, competencies of a successful entrepreneur.

## **Semester- II**

### **122 Financial Accounting - II.**

#### **Course Objectives:**

1. To impart knowledge of various software used in accounting.
2. To impart knowledge about final accounts of charitable trusts.
3. To impart knowledge about valuation of intangible assets.
4. To impart knowledge about accounting for leases.

#### **Course Outcomes:**

1. Students will be able to acquire in-depth knowledge of software used in accounting.
2. Students will be able to acquire in-depth knowledge of Final Accounts of Charitable Trust (Clubs, Hospitals, Libraries etc.)

3. Students will be able to acquire in-depth knowledge of Valuation of Intangibles.
4. Students will be able to acquire in-depth knowledge of Accounting for Leases.

## **Business Mathematics & Statistics - II.**

### **Course Objectives:**

1. To introduce the basic concepts in Finance and Business Mathematics and Statistics.
2. To familiar the students with applications of Statistics and Mathematics in Business.
3. To acquaint students with some basic concepts in Statistics.
4. To learn some elementary statistical methods for analysis of data.
5. The main outcome of this course is that the students are able to analyze the data by using some elementary statistical methods.

### **Course Outcomes:**

1. Students will be able to acquire in-depth knowledge of software used in accounting.
2. Students will be able to acquire in-depth knowledge of Final Accounts of Charitable Trust (Clubs, Hospitals, Libraries etc.).
3. Students will be able to acquire in-depth knowledge of Valuation of Intangibles.
4. Students will be able to acquire in-depth knowledge of Accounting for Leases.

## **125a Organizational Skills Development - II.**

### **Course Objectives:**

1. To imbibe among the students the qualities of a good manager and develop the necessary skill sets cements and digitalization.
3. To develop the communication skills of students and introducing them to the latest tools in communication.

4. To develop writing, presentation, interpersonal skills of the students for effective formal corporate reporting.
5. To educate the students on the recent trends in communication technology and tools of office automation

**Course Outcomes:**

1. Conceptual clarity goals setting & goal measurement, enhancing the time management skills.
2. Enhancing communication skills, usability latest communication media.
3. Developing technical and analytical skills.

**126c Marketing and Salesmanship – II (Fundamentals of Marketing).**

**Course Objectives:**

1. To introduce the concept of Salesmanship.
2. To give insight about various techniques required for the salesman.
3. To inculcate the importance of Rural Marketing.
4. To acquaint the students with recent trends in marketing and social media marketing.

**Course Outcomes:**

1. Students will get knowledge of the basics of salesmanship which is a vital aspect of marketing.
2. It will help the students to implement this knowledge in practicality by enhancing their skills in the field of marketing by using various techniques of salesmanship.
3. It will help the students to gain insights about Rural Marketing and its uniqueness.
4. It will help the students to gain the insights about recent trends in marketing field.

## 126e Business Environment & Entrepreneurship - II

### Course Objectives:

1. To understand the difference between entrepreneurial and nonentrepreneurial personalities and thereby getting inspiration to make students personality entrepreneurial.
2. To make students aware about the Business Environment issues and problems of Growth
3. To examine personality competencies most common to majority of successful entrepreneurs and to show how these competencies can be developed or acquired
4. To understand the difference between Entrepreneurial and non-Entrepreneurial behaviour.

### Course Outcomes:

1. Understanding the difference between entrepreneurial and nonentrepreneurial personalities and thereby getting inspiration to make students personality entrepreneurial.
2. Understanding the significance of entrepreneurship in economy thereby getting inspiration to become entrepreneur.
3. Knowing the functions of related institutions.
4. Inspiration from study of Biographies to become entrepreneurs

### Compulsory English

#### Prescribed Text: *Success Avenue* (Board of Editors- Orient Blackswan)

1. To offer relevant and practically helpful pieces of prose and poetry to students so that they not only get to know the beauty and communicative power of English but also its practical application



2. To expose students to a variety of topics that dominate the contemporary socio-economic and cultural life
3. To develop oral and written communication skills of the students so that their employability enhances
4. To develop overall linguistic competence and communicative skills of students

### **Additional English**

#### **Prescribed Text: Pearls of Wisdom (Board of Editors-Orient BlackSwan)**

1. To expose students to a good blend of old and new literary extracts having various themes that are entertaining, enlightening and informative so that they realize the beauty and communicative power of English
2. To make students aware of the cultural values and the major problems in the world today
3. To develop literary sensibilities and communicative abilities among students

#### **127 C Bhasha ani Kaushalya Vikas**

##### **On completing the course, the student will be able to:**

- CO 1 Understand the basic elements of Vyvaharik Marathi.
- CO 2 Develop a sense of love and social commitment towards nation among students.
- CO 3 Let students know the definitions of language and various variations of literature.
- CO 4 Understand the basic elements Skill of Marathi writing

#### **127C Vaikalpik Hindi**

##### **On completing the course, the student will be able to:**

1. Understand the basic elements of s stories and Poems.
2. Develop a sense of love and social commitment towards the nation among students.

3. Let the students know the definitions of language and various variations of literature.
4. Understand the basic elements of stories and Poems.

## **Semester- III**

### **231 Business Communication - I.**

#### **Course Objectives:**

1. To understand the concept, process and importance of communication.
2. To acquire and develop good communication skills requisite for business correspondence.
3. To develop awareness regarding new trends in business communication.
4. To provide knowledge of various media of communication.
5. To develop business communication skills through the application and exercises.

#### **Course Outcomes:**

1. Understanding of basic knowledge of Business Communication.
2. Understanding the importance and Essentials Qualities of business letters.
3. Understanding the knowledge about soft skills. To create awareness about soft skill among the students.
4. To create ability among the students for writing resume and Job application letter. To create ability among the students for Business Correspondence.

### **232 Corporate Accounting - I.**

#### **Course Objectives:**

1. To acquaint the student with knowledge about various Concepts, Objectives and applicability of some important accounting standards associated with corporate accounting.
2. To develop understanding among the students on the difference between

commencement and incorporation of a company and the accounting treatment for transactions during the two phases.

3. To update the students with knowledge for preparation of final accounts of a company as per Schedule III of the Companies Act 2013.
4. To empower to students with skills to interpret the financial statements in simple and summarized manner for effective decision-making process.

**Course Outcomes:**

1. Developing understanding on applicability of various Accounting Standards.
2. Knowledge about types of profit and their apportionment.
3. Conceptual Clarity and Practical understanding.
4. Analytical skills enhancement and Decision-making skills of students will be developed.

**234 Business Management - I.**

**Course Objectives:**

1. To provide basic knowledge and understanding about various concepts of Business Management.
2. To help students to develop cognizance of importance of management principles.
3. To provide an understanding about various functions of management.
4. To provide them tools and techniques to be used in the performance of managerial job.

**Course Outcomes:**

1. Students will get an idea about the basic managerial process.
2. Students will get an idea about how planning works in real life.

3. Students will understand the process of implementation of both the concepts.
4. Students will understand importance of proper direction and team work

### **234 Elements of Company Law.**

#### **Course Objectives:**

1. To develop general awareness of Elements of Company Law among the students.
2. To understand the Companies, Act 2013 and its provisions.
3. To have a comprehensive understanding about the existing law on formation of new company in India.
4. To create awareness among the students about legal environment relating to the company law.
5. To acquaint the students on e-commerce, E governance and e-filing mechanism relating to Companies.
6. To enhance capacity of learners to seek the career opportunity in corporate sector.

#### **Course Outcomes:**

1. Acquaint with knowledge and maturity to understand Company law 2013.
2. To Acquaint knowledge and application of formation and incorporation of Company.
3. To understand the knowledge about the principal documents of the company.
4. To inculcate skills and knowledge about the shar capital of the company.

### **236e Cost and Works Accounting - I.**

#### **Course Objectives:**

1. To prepare learners to know and understand the basic concepts of cost.
2. To understand the elements of cost.
3. To enable students to prepare a cost sheet.

4. To facilitate the learners to understand, develop and apply the techniques of inventory control.

**Course Outcomes:**

1. To remember and understand basic concept of cost accounting.  
Development of an overall outlook of Cost Accounting.
2. Ability to prepare a cost sheet
3. Ability to understand which procedures are used for purchasing the material
4. Understand the documentation for purchase procedures
5. Understanding methods used for controlling the inventory.

**236g Business Entrepreneurship (Special Paper - I).**

**Course Objectives:**

1. To understand the concepts in Business Entrepreneurship and its aspects.
2. To make students aware about the entrepreneur and entrepreneurship.
3. To study the new age of entrepreneur and to know in details of entrepreneurship.
4. To understand the creativity and innovation required or necessary in the entrepreneurship.
5. To study the types of ethics and society responsibilities are followed in the conventional and corporate sector in the new edge followed by the rules and regulations.
6. To familiarize the students with practical survey or through project work will be able to understand the concepts in the subject thoroughly.
7. To create entrepreneurial encouragement through the study of successful entrepreneurs.

**Course Outcomes:**

1. Understanding the difference in Entrepreneur and entrepreneurship.

2. Understanding the new age entrepreneur and will learn each.
3. Students will be able to do the SWOT analysis of their business model.
4. Student will practically study the practices followed by the organization.

### **236H Marketing Management.**

#### **Course Objectives:**

1. To introduce the concept of Marketing Management.
2. To give the students the basic knowledge of Marketing Management to be a successful modern marketer.
3. To inculcate knowledge of various aspects of marketing management through practical approach.
4. To interpret the issues in marketing and their solutions by using relevant theories of marketing management.

#### **Course Outcomes:**

1. Student will get acquainted with the basics of Marketing Management subject.
2. It will help students to know the preferences, likes and dislikes of the consumer which lead to the further modernization of the sales strategies by marketer.
3. It will help them to implement this knowledge practical situations by enhancing their skills in the field of Marketing.
4. To enable the students to study the effect of external environment on decision-making of the firm.

## **SEMESTER- IV**

### **241 Business Communications - II.**

#### **Course Objectives:**

1. To understand the concept, process and importance of communication.
2. To acquire and develop good communication skills requisite for

businesscorrespondence.

3. To develop awareness regarding new trends in business communication.
4. To provide knowledge of various media of communication.
5. To develop business communication skills through the application and exercises.

**Course Outcomes:**

1. Understanding of basic knowledge of Report Writing and Internal Correspondence and Import-Export Correspondence
2. Learning the Recent Trends in Business Communication
3. To create ability among the students for Drafting of Business Letters
4. To create ability among the students about Writing Formal Mails and Blog writing.

**Subject: 242 Corporate Accounting - II.**

**Course Objectives:**

1. To acquaint the student with knowledge of corporate policies of investment for expansion and growth through purchase of stake in or absorption of smaller units.
2. To develop the knowledge among the student about consolidation of financial statement with the process of holding.
3. To update the students with knowledge of the process of liquidation of a company
4. To introduce the students with the recent trends in the field of accountancy

**Course Outcomes:**

1. Developing understanding on accounting
2. Conceptual understanding, practical application skills in the process of accounting for absorption.
3. Practical understanding process of liquidation on companies.

4. Updating of knowledge on recent advances in the field of Accountancy.

## **244 Business Management - II.**

### **Course Objectives:**

1. To provide idea about basic motivational tools used in field of Business Management.
2. To help the students to develop cognizance of the importance of management principles.
3. To provide an understanding about various functions of management.
4. To provide them tools and techniques to be used in the performance of the managerial job.

### **Course Outcomes:**

1. Students will get an idea about the basic motivational tools used in the field of management
2. Students will get an idea about how leadership influences organizational success.
3. Students will understand the significance of coordination and control in modern business management.
4. Students will come across various emerging trends in management.

## **245 Elements of Company Law.**

### **Course Objectives:**

1. To develop general awareness among the students about management of company
2. To have a comprehensive understanding about Key managerial Personnel of company and their role in Company administration.
3. To acquaint the students about E Governance and E Filing under the Companies Act, 2013.



4. To equip the students about the various meetings of Companies and their importance.
5. To make students capable of becoming good human resource of the corporate sector.

**Course Outcomes:**

1. To acquaint knowledge and maturity to understand Company management.
2. To Acquaint with knowledge and role of key managerial person of the Companies and Rules about CSR.
3. To get training in to various types of meeting and procedure.
4. To enhance skills and knowledge about the E- governance of the company and winding-up of the company.

**246e Cost and Works Accounting - I.**

**Course Objectives:**

1. To know the documents that is used in stores and how to calculate the issuing price of material.
2. To provide knowledge to students on classification and codification.
3. To equip students with knowledge regarding the ascertainment of Labor cost.
4. To understand the concept of payroll.
5. To know the concepts of Labor turnover and merit rating.
6. To understand recent trends in cost accounting.

**Course Outcomes:**

1. Understanding various methods used in the pricing of the issue of materials
2. Enabling to calculate wage payment and incentives.
3. Understanding the process of job analysis, job evaluation and merit rating.
4. Insight into recent processes used for cost reduction.

## **246g Business Entrepreneurship (Special Paper - I).**

### **Course Objectives:**

1. To understand the concept Individual Entrepreneurship and Group Entrepreneurship along with their significance.
2. Students should know to service sector and its role in National Economy also have to detail knowledge of benefits of industries in rural and urban areas.
3. To study the real-life well-known examples of entrepreneurs and enterprises in India, to motivate the students to enhance their competencies and create interest in, to become an enterpriser or to be an entrepreneur.
4. Students should be able to understand the challenges in entrepreneurship development and how these environmental factors affect the business so the students should be known how to overcome on these factors or challenges.

### **Course Outcomes:**

1. Understanding the basics difference in Individual
2. Entrepreneur and Group Entrepreneurship and details in SHG.
3. Students will identify the opportunities of entrepreneurship in the present market, in terms of production, trading or by providing services.
4. Students will be able to study.

## **246h Marketing Management.**

### **Course Objectives:**

1. To create awareness and impart knowledge about the basics of Marketing Management which is the basic foundation of marketing subject.
2. To orient the students in recent trends in marketing management.
3. To understand the concept of Green Marketing.
4. To enable students to apply this knowledge in practical by enhancing their

skills in the field of Marketing.

**Course Outcomes:**

1. Students will understand how Green Marketing is necessary for marketers to use resources efficiently, so that organizational objectives are achieved without waste of resources.
2. It will help the student to apply the various techniques and methods of E-Marketing practically.
3. It will help them to implement the knowledge of Digital Marketing in practical by enhancing their skills in the field of Marketing.
4. It will help them to gain a solid understanding of the theoretical and conceptual knowledge of international marketing.

**Semester- V**

**351 Business Regulatory Framework.**

**Course Objectives:**

1. To provide conceptual knowledge about the framework of business Law in India.
2. To orient the students about the legal aspect of business.
3. To create awareness among the students about legal environment relating to the Contract Law, Partnership Act, Sale of Goods Act in India.
4. To understand the emerging issues relating to e-commerce, e-transaction issues and E-Contracts
5. To seek the career opportunity in corporate sector relating to business law in India.
6. To acquaint students with the basic concepts, terms & provisions of Mercantile and Business Laws.

**Course Outcomes:**

1. Acquaint knowledge and maturity to understand Contract Law.

2. To Acquaint knowledge and application of Partnership Deed.
3. To get training to face emerging issues relating Sale of Goods Act.
4. To give Comprehensive insight about the emerging trend of Arbitration and conciliation and its regulatory mechanism.

### **351 Advanced Accounting - II.**

#### **Course Objectives:**

1. To acquaint the student with knowledge about various concepts, objectives, and applicability of some important accounting standards.
2. To develop the knowledge among the students about reorganization of business regarding restructuring the capital.
3. To update the students with knowledge for preparation of final accounts of a Banking Companies with the provisions of Banking Regulation Act 1949.
4. To empower to students with skills to prepare the investment account in simple and summarized manner.

#### **Course Outcomes:**

1. Developing understanding on applicability of various Accounting Standards.
2. Knowledge about of the Accounting for Capital Restructuring.
3. Conceptual Clarity and Practical understanding of preparation of final accounts of banking companies.
4. Developing knowledge about Investment Accounting.

### **354 Auditing**

#### **Course Objectives:**

1. To acquaint themselves about the Definition, Nature, Objectives and Advantages of Auditing, Types of Audits, Errors and Fraud, Audit Program, Notebook,

Working Paper, Internal Control, Check.

2. To get knowledge about concept of Checking, Vouching, Verification and Valuation, Types of Audit Report and Auditing Assurance Standard.
3. To understand the provision related Qualification, Disqualification, Appointment, Removal, Rights, Duties and Liability of Company Auditor and Provisions regarding Tax Audit as per Income Tax Act 1961 (Section 44 AA to 44AE).
4. To know the various new concepts in computerized system and Forensic Audit.

**Course outcomes:**

1. Acquaint with knowledge and maturity to understand concept of Auditing, types of Audits and Audit Process.
2. Conceptual Clarity and Practical understanding of Vouching Verification and valuation and Types of Audit Report.
3. Practical knowledge about appointment, reappointment and other related provision. Practical knowledge about Tax Audit as per I.T. Act 1961 (Form 3CA, 3CB & 3CD).
4. Understanding new concepts under Audit of Computerized Systems & Forensic Audit

**355e Cost and Works Accounting (Special Paper - II)**

**Course Objectives:**

1. To provide knowledge about the concepts and principles of overheads.
2. To Introduce the cost accounting standards and the cost accounting standard board.
3. To understand the stages involved in the accounting of overheads.
4. To build an ability towards strategic overhead accounting under Activity Based Costing.

**Course outcomes:**

1. To remember and understand the concept of overhead and classification of overheads.
2. Understanding the significance of overheads in the total cost of product/service.
3. Ability to understand the stages in the process of accounting overheads.
4. Application of Accounting treatment for under and over absorption.  
Knowledge about detection of overheads to different activities.

**355g Business Entrepreneurship (Special Paper - II)****Course Objectives:**

1. To develop understanding of MSME and its formation
2. To Develop Knowledge and understanding in creating and managing new venture.
3. To equip students with necessary tools and techniques to set up their own business venture
4. To help students to bring out their own business plan.
5. To make students aware about business crises and sickness.

**Course outcomes:**

1. Understanding the concept and government schemes related to MSME.
2. Gaining practical knowledge related to formation of MSME.
3. Students will be able to prepare business plan and formulate project report.
4. Understanding the role and schemes of various institutions in Project assistance.

**355h Marketing Management-II.****Course Objectives:**

1. The objective of this course is to facilitate understanding of the conceptual

framework of marketing and its applications in decision making under various environmental constraints.

2. The course will make learners understand how to make effective marketing decisions, including assessing marketing opportunities and developing marketing strategies and implementation plans.

**Course outcomes:**

1. And Jute Industry, Sugar Industry, Service Industry, Information Technology Industry Health Sector. To apprise students regarding various aspects of Agricultural marketing. To understand the functions and Problem of Agricultural Marketing.
2. To understand the role of Agricultural Processing.
3. To make the students know about Problems & remedial measures of Agricultural Processing.
4. To understand the Role, Importance and Growth of Agricultural Industry, Textiles.

**356e Cost and Works Accounting (Special Paper -III)**

**Course Objectives:**

1. To prepare learners to understand the basic techniques in Cost Accounting
2. To understand the learner, application of Cost Accounting techniques in cost control and decision making.
3. To enable the learners to prepare various types of Budgets.
4. To learn the basic concept of Uniform Costing and Inter-firm comparison
5. To enhance the knowledge of students about MIS and Supply Chain Management.

**Course outcomes:**

1. Development of overall outlook of Marginal Costing.

2. Develop the Knowledge about preparation of various types Budgets.
3. Understand the implementation n of Interfirm comparison
4. Understand the implementation of modern costing environment.

### **356g Business Entrepreneurship (Special Paper - III)**

#### **Course Objectives:**

1. To acquaint students with knowledge and skills required for organizing and carrying out entrepreneurial activities.
2. To develop the ability of analyzing and understanding business situations.
3. To study the interdependent, fast-changing and diverse world of entrepreneurship and innovation.
4. To familiarize students with various concepts and processes involved in entrepreneurship and business formation and development.
5. To provide students with the knowledge, skills and motivation to encourage entrepreneurial approach in a variety of settings. 6) To study the application of group dynamics to counselling, personal growth and other psychologically-oriented groups.

#### **Course outcomes:**

1. Capacity to:
  - i. Analyze Individual and group behaviour, and understand the implications of organizational behaviour on the process of management.
  - ii. Demonstrate the applicability of the concept of organizational behaviour to understand the Behavior of people in the organization.
  - iii. Analyze the complexities associated with management of the group behaviour in the Organization.
2. Capacity to:
  - i. Analyze the complexities associated with management of the group behaviour in the organization.



- ii. Develop the necessary managerial and personal skills which are essential to the current business environment.
3. Understanding the new age entrepreneur and will learn each.
4. Understanding to interpret their own business plan.

### **356H Marketing Management (Special Paper -III)**

#### **Course Objectives:**

1. To introduce the concept of advertising and advertising media.
2. To provide the students the knowledge about appeals and approaches in advertisement.
3. To acquaint the students to the economic, social and regulatory aspects of advertising.
4. To make the student understand the role of Brand Management in marketing.
5. To enable the students to apply this knowledge in precise by enhancing their skills in the field of advertising

#### **Course outcomes:**

1. Student will understand the concept of advertising and advertising media.
2. To enable the students to study the Appeals and Approaches in Advertisement.
3. It will help the students to apply the various Economic and social aspects of advertising. It will help them to implement this knowledge in practical situations by enhancing their skills in the field of Marketing.

**Department of Bachelor of  
Business Administration (B.B.A.)**

**Program Outcome (PO)**

- PO 1-** To develop precise understanding about business environment and organizations.
- PO 2-** To develop leadership aptitude among the students in order to work independently and in organized groups.
- PO 3-** To inculcate among the students the qualities of a dynamic manager, capable of taking various decisions and communicating effectively to different groups of people.
- PO 4-** To understand and gain knowledge of various financial institutions and agencies.

**Program Specific Outcome (PSO)**

- PSO 1-** To learn management-based facts.
- PSO 2-** To learn applied aspects of management including skill-oriented knowledge.
- PSO 3-** To understand basic concept regarding org. Business Administration.
- PSO 4-** To develop managerial skills among the students.
- PSO 5-** To understand what is the role of communication in personal and business world.

# Course Outcomes COs

## Semester - I

### Subject: GC 101 Principals of Management.

#### Course Objectives:

1. To understand basic concept regarding org. Business Administration
2. To examining how various management principles
3. To develop managerial skills among the students

### Subject: SC 102 Business Communication Skills.

#### Course Objectives:

1. To understand what is the role of communication in personal and business world.
2. To understand system and communication and their utility
3. To develop proficiency in how to write business letters and other communications required in business

### Subject: GC 103 Business

#### Accounting. Course Objectives:

1. To develop right understanding regarding role and importance of monetary and financial transactions in business
2. To cultivate right approach towards classifications of different transactions and their implications
3. TO develop proficiency preparation of basic financial as to how to write basis accounting statement - Trading and P&L

### Subject: GC 104 Business Economics -

#### Micro. Course Objectives:

1. To understand role of economics as it influences society and business
2. To study how different decisions are taken in relation to price demand and supply.
3. To develop right understanding regarding Monopoly, perfect competition, revenue Etc.

### Subject: GC 105 Business Mathematics.

#### Course Objectives:

1. To cultivate right understanding regarding numerical aptitude.
2. To develop appropriate understanding as how to use mathematic like computation interest, profit etc.
3. To develop logical approach towards analytical approach data.

### **Subject: SC 106 Business Demography. Course**

#### **Objectives:**

1. To give proper understanding regarding concept of demography in modern economic setup.
2. To study how population and structure changes affecting quality of life and business.
3. To develop clarity of concept regarding social economic process and urbanization and its impact on society.

### **Semester - II**

### **Subject: GC 201 Business Organizations and Systems.**

#### **Course Objectives:**

1. To understand role and functions of modern business
2. To develop right understanding regarding business environment
3. To study how a business institution functions in a given economic set up

### **Subject: GC 202 Principals of Marketing**

#### **Course Objectives:**

1. To develop write understanding regarding marketing environment in the country.
2. To develop appropriate conceptual understanding as to develop basic marketing concept.
3. To develop new understanding regarding services, rural marketing and new trends in marketing.

### **Subject: GC 203 Principals of Finance.**

#### **Course Objectives:**

1. To cultivate right approach towards money, finance, and their role in business.
2. To develop right understanding regarding various sources of finance and their role and utility in business.
3. To develop basic skills as to concept of capital structure and concept of capital structure.

### **Subject: GC 204 Basic of Cost Accounting.**

#### **Course Objectives:**

1. To develop rational understanding regarding concept of cost expenditure in business.
2. To develop understanding how overheads, influence the cost structure of cost
3. To develop skills for computation of total cost for a particular product.

### **Subject: GC 205 Business Statistics. Course**

#### **Objectives:**

1. To understand role and importance of statistics in various business situations.
2. To develop skills related with basic statistical technique.
3. Develop right understanding regarding regression, correlation and data interpretation.

### **Subject: GC 206 Fundamentals of Computers.**

#### **Course Objectives:**

1. To develop concept of information and their role in modern businesses.
2. To develop rational approach as to how computers can be used in data process analysis in business.
3. To develop understanding regarding cautions to be taken security, safety and security while using net-based service.

### **Semester - III**

### **Subject: GC 301 Principals of Human Resource Management.**

#### **Course Objectives:**

1. To introduce the basic concepts of Human Resource Management.
2. To cultivate right approach towards Human Resource and their role in business.
3. To create awareness about the various trends in HRM among the students.

### **Subject: GC 302 Supply Chain Management. Course**

#### **Objectives:**

1. To enable the students to have a comprehensive understanding of Supply Chain Management.
2. To understand key concepts and issues of Logistics and Inventory Management.
3. To understand Warehousing and its role in Space Management.

### **GC 303 Global Competencies and Personality Development.**

#### **Course Objectives:**

1. To build self-confidence, enhance self-esteem, and improve overall personality of students.
2. To enhance global and cultural competencies of the students.
3. To groom the students for appropriate behaviour in social and professional circles.

### **GC 304 Fundamentals of Rural Developments.**

#### **Course Objectives:**

1. To understand the development issues related to rural society.
2. To find the employment opportunities for rural youth.
3. To create interest among the rural youth to participate in rural development programs and schemes for sustainable development.
4. To discourage seasonal and permanent migration to urban areas.

### **DSE - C - 305 Organizational Behavior (OB).**

#### **Course Objectives:**

1. To describe the major theories, concepts, models and frameworks in the field of organizational behaviour.
2. To explain determinants of Organizational Behaviour at Individual, Group and Organizational Level.
3. To give knowledge about approaches to line-up individual, groups & managerial behaviour in order to achieve organizational goals.

### **DSE-C-306 (HRM) Legal Aspects in Human Resources.**

#### **Course Objectives:**

1. To study and explain rights of employees work place.

2. To understand the Applications of different Legal Aspects in HR.

### **DSE-B-305 (FM) Management Accounting.**

#### **Course Objectives:**

1. To impart basic knowledge of management accounting.
2. To understand the implications of various financial ratios in decision making.
3. Application and use of various tools of management accounting in the business.

### **Subject: DSE-B-306 (FM) Banking & Finance.**

1. Study of banking function and its operations.
2. To study the functioning of Regulatory Authorities in India.
3. To study recent technology in banking industry.

## **Semester – IV**

### **Subject: GC 401 Entrepreneurship and Small Business Management.**

#### **Course Objectives:**

1. To understand the concept and process of Entrepreneurship.
2. To Acquire Entrepreneurial spirit and resourcefulness.
3. To get acquainted with the concept of Small Business Management.
4. To understand the role and contribution of Entrepreneurs and Small Businesses in the growth and development of individual and the nation.

### **Subject: GC 402 Production and Operation Management.**

#### **Course Objectives:**

1. To understand the key concepts of Production and Operation Management.
2. To understand the various manufacturing methods and role in managing business.
3. To create awareness about the various safety measures and ergonomics in industries.

### **Subject: GC 403 Decision Making and Risk Management.**

### **Course Objectives:**

1. To learn the key topics in decision making and risk management so that they can improve decision making and reduce risk in their management activities and organizations.
2. Find the best alternative in a decision with multiple objectives and uncertainty.
3. Describe the process of making a decision.
4. Analyze an organization's decision-making system.
5. Develop a risk management process.

### **Subject: GC 404 International Business Management.**

#### **Course Objectives:**

1. To acquaint the students with emerging trends and issues in International Business.
2. To study the impact of International Business Environment on foreign market operations.
3. To analyze international trade models.
4. To analyze the International Investment and its risks associated.
5. To understand financial aspects in world economies, their need and functionality.

### **DSE-C-405-HRM Human Resource Management Functions & Practices. Course**

#### **Objectives:**

1. To acquire comprehensive Knowledge of Human Resource Management Functions & Practices.
2. To explain the methods of Performance Appraisal, Training, Executive Development and Employee Compensation.
3. To acquire knowledge about various HR practices adopted by the organization.

### **Subject: DSE-B-405 (FM) Business Taxation.**

1. To understand different concepts & definitions under Income Tax Act 1961.
2. To understand the importance of Taxation to the students.
3. To update the students with the latest development in the subject of Taxation.

### **DSE-C-406-HRM Employee Recruitment & Record Management. Course**

#### **Objectives:**



1. To study and explain employee acquisition and its importance in industry.
2. To cultivate right approach towards employee recruitment and record management.

**Subject: DSE-B-406-(FM) Financial Services.**

1. To Study in detail financial services in India.
2. To study & Understand working of Indian financial system.
3. To make the students well acquainted regarding financial markets.

## **Semester - V**

**Subject: GC 501 Research Methodology.**

**Course Objectives:**

1. To develop an understanding of the right approach of Research Methodology and its role in Business.
2. To develop an understanding of the basic framework of the identification of various sources of information for data collection.
3. To develop an understanding of various Designs, Tools and Techniques of Research Study.
4. To enable the students in conducting Research work and write Research Paper and Research Project Report.

**Subject: GC 502 Database Administrations and Data Mining. Course**

**Objectives:**

1. To understand the Database Management System.
2. To understand the Data Mining Concepts.
3. To understand the current trends in Data Management.

**Subject: GC 503 Business Ethics.**

**Course Objectives:**

1. To provide a comprehensive understanding of the concepts of Business Ethics.
2. To develop theoretical tools to understand current ethical issues and their impacts on business.
3. To analyze the role of Ethics in business, Government and Society.
4. To analyze the Ethical scenario concerning to Environment and consumer protection.

**Subject: GC 504 Management of Corporate Social Responsibility.**

### **Course Objectives:**

1. To understand the concept and process of CSR.
2. To understand the industrial contribution for CSR Policy.
3. To understand the context of CSR of present-day Management.
4. To understand the contribution of CSR for the development of Society.

### **Subject: DSE-C-505 HRM Cultural HR & Industrial Relations.**

#### **Course Objectives:**

1. To make students understand Cultural Variables in Multinational Enterprises.
2. To learn some basic business etiquette and dining etiquette that will help to work in different countries across the globe.
3. To make students understand the relationship between Cross-Culture Management and Human Resource Management.
4. To explain how employees can be prepared for international assignments.
5. To provide students with the fundamental knowledge of Industrial Relations.
6. To provide the knowledge to students of provisions under The Industrial Disputes Act, 1947, The Factories Act, 1948 and The Maternity Benefit Act 2017.

### **DSE-C-506 (HRM) Cases in Human Resource Management + Project Work.**

#### **Course Objectives:**

1. To understand the application of theory into practice.
2. Design critical thinking by making judgments related to problems in Case Studies of Human Resource.
3. Develop critical thinking for solving Case Studies of Human Resource.
4. To analyze the broad fundamental components of HRM.

### **Subject: DSE-B-505 (FM) Analysis of Financial Statements.**

1. To develop the conceptual framework of financial analysis and provide practical exposure to apply various tools of Financial Statement Analysis.
2. To enable to use of various types of ratios for financial and investment decisions.
3. To impart knowledge about Cash Flow and Fund Flow Statements and their importance in financial analysis.

### **Subject: DSE-B-506 (FM) Legal Aspects of Finance & Security Laws**

1. To understand the Legal Aspects of Finance & Security Laws.
2. To know the legal provisions to obtain finance from various source of finance.
3. To explore various finance & securities-related laws in India.

## **Semester - VI**

### **Subject: GC 601 Essentials of E Commerce.**

#### **Course Objectives:**

1. To understand the importance, role, and activities of E-Commerce.
2. To understand various E-Money and E-Payment systems used in E-Commerce.
3. To understand the concept of E-Marketing and its tools in E-Commerce.
4. To understand the concept of Cyber Space and Cyber Security in E-Commerce.

### **Subject: GC 602 Management Information System.**

#### **Course Objectives:**

1. To describe the basic concept of Information Technology and Management Information System.
2. To describe the role of information technology and information systems in business.
3. To contrast and compare how MIS support business processes.
4. To introduce the fundamental knowledge of Structured System Analysis and Design.

### **Subject: GC 603 Business Project Management. Course**

#### **Objectives:**

1. To develop a significant understanding of Project Management.
2. To develop a concept-based approach towards Management of Business Projects.
3. To develop the relationship between the significance of Businesses Projects & their Management.

**Subject: GC 604 Management of Innovations and Sustainability. Course**

**Objectives:**

1. To understand the concepts of Innovation and Sustainability in a practical sense.
2. To better know the significance of Organizational sustainable development and the economic implications of sustainable development.
3. To learn about the most common errors made when handling sustainable growth.
4. To understand the concept of Sustainability Innovation. Understand socio-political aspects of sustainable development – social responsibility aspect.

**Subject: DSE-C-605 (HRM) Global Human Resource Management. Course**

**Objectives:**

1. To understand the concepts, theoretical framework, and issues of HRM in Global Perspective
2. Identify and Understand issues and practices about the major HRM functions within the context of the global environment.
3. To learn how to conduct strategic human resource management in an international setting.
4. To learn how companies, manage their expatriates.
5. To look at HRM in a broader, comparative, and international perspective to deal with complex issues and manifold risks.
6. To study understanding of international approaches to dealing with people in organizations.

**Subject: DSE-C-606 (HRM) Recent Trends & HR Accounting + Project.**

**Course Objectives:**

1. To make students understand the theoretical and practical fundamental knowledge of Recent Trends in HRM and HR Accounting.
2. To describe various Employee Engagement Strategies to enhance Employee Engagement.
3. To discuss the uses of Human Resource Information Systems in organizations.
4. To explain the different methods used to calculate the value of human Resources.
5. To define Human Resource Audit and outline its scope.
6. To study the methods of Human Resource Valuation.

**Subject: DSE-B-605 (FM) Financial Management.**

1. To know various sources of finance of business
2. To study and understand the capital structure of the company and its cost of capital
3. To study optimum capital mix & concept of over capitalisation & undercapitalization.

**Subject: DSE-B-606 (FM) Cases in Finance +Project.**

1. To Study & understand the core areas of finance.
2. To study the practical applications of finance.
3. To prepare project reports based on the internship & understanding of core areas of finance.



## Department of Bachelor of Business Administration (Computer Application) (B.B.A.(C.A))

### Program Outcome (PO)

- PO-1** To produce skill oriented human resource.
- PO-2** To impart practical skills among students.
- PO-3** To make industry ready resource.
- PO-4** To bring the spirit of entrepreneurship.

### Program Specific Outcome (PSO)

- PSO-01** **Knowledge of Computing Systems:** An ability to understand the principles and working of computer systems.
- PSO-02** **Project Development Skills:** An ability to understand the structure and development methodologies of software systems.
- PSO-03** **Software Development Skills:** Familiarity and practical competence with a broad range of programming language and open-source platforms.
- PSO-04** **Mathematical Skills:** An ability to apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm.

## Course Outcome (CO)

### Semester - I

#### Subject: 101 Business Communication Skills.

##### Course Objectives:

1. To understand what is the role of communication in personal and business world.
2. To understand system and communication and their utility.
3. To develop proficiency in how to write business letters and other communications in required.

##### Course Outcomes:

1. To understand the basic purpose of communication & Ability to understand and comprehend the meaning of different forms of communication
2. To understand how to write effective messages and different types of communication, & Ability to write meaningful and concise and effective messages
3. To understand how to make effective business Correspondence & Ability to write precise business letters and understanding about business correspondence
4. To understand how modern technology effects businesses and media based communication is working in present context.
5. Effects of new media on business is affecting on interpersonal relations and groups & Ability to use different formats of social communication and technology-based communication effectively.

#### Subject: 102 Principals of Management.

##### Course Objectives:

1. To understand basic concept regarding org. Business Administration
2. To examining how various management principles
3. To develop managerial skills among the students

##### Course Outcomes:

1. Basic aspects of management thinking & Develop ability of managerial thinking and

cultivate business acumen.

2. To understand different approaches to management thoughts and philosophy & Ability to understand approaches to philosophy of management thinking
3. To understand the importance of functions of management and their roles & Ability to organize various programs and events.
4. To know what are the themes in modern management and changes in the business & to learn about new systems and trends in modern management.

### **Subject: 103 C Programming.**

#### **Course Objectives:**

1. To develop Analytical / Logical Thinking and Problem-Solving capabilities
2. To develop Problem Solving abilities using computers
3. To teach basic principles of programming
4. To develop skills for writing programs using 'C'

#### **Course Outcomes:**

1. Explore algorithmic approaches to problem solving.
2. Develop modular programs using control structures and arrays in 'C'.

### **Subject: 104 Database Management Systems.**

#### **Course Objectives:**

1. To understand data processing using computers.
2. To teach basic organization of data using files.
3. To understand creations, manipulation and querying of data in databases.

#### **Course Outcomes:**

1. Solve real world problems using appropriate set, function, and relational models.
2. Design E-R Model for given requirements and convert the same into database tables.
3. Use SQL.

### **Subject: 105 Business Statistics. Course**

#### **Objectives:**



1. To understand role and importance of statistics in various business situations.
2. To develop skills related with basic statistical technique.
3. Develop right understanding regarding regression, correlation and data interpretation.

### **Course Outcomes:**

1. Explains the history, definition and scope of Statistics.
2. Differentiates population and sample.
3. Recognizes central tendency and various measures of central tendency
4. Explains and evaluates various measures of central tendency.

### **Subject: 106 Computer Laboratory Based on C Programming and Database Management Systems.**

#### **Course Objectives:**

1. Solve simple computational problems using modular design and basic features of the 'C' language.
2. Understand basic database management operations.
3. Use of SQL queries to create, alter and drop table and Insert, update and delete for data operations in a table.

#### **Course Outcomes:**

1. Write algorithm and draw flowchart for computational problems.
2. Write, compile and run simple programs in 'C'.
3. Create database tables in Oracle.
4. Write and execute simple, nested queries.

## **Semester - II**

### **Subject: 201 Organizational Behavior & Human Resource Management. Course**

#### **Objectives:**

1. To understand basic concept of HRM & OB.
2. To make aware students about traditional & modern methods of procurement &

development in organization.

3. To know the major trends in HRM & OB.

**Course Outcomes:**

1. To develop group cohesiveness.
2. Up gradation of knowledge of new trends in Recruitment and Selection.
3. Up gradation of skill.
4. To develop decision making skill.

**Subject: 202 Financial Accounting.**

**Course Objectives:**

1. To develop right understanding regarding role and importance of monetary and financial transactions in business.
2. To cultivate right approach towards classifications of different transactions and their implications.
3. To develop proficiency preparation of basic financial as to how to write basis accounting statement - Trading and P&L.

**Course Outcomes:**

1. To learn about importance of acc. in business.
2. Ability to distinguish between different tractions and its nature.
3. Ability to prepare and interpret bank reconciliation statement.
4. Appling software basic financial statement and converting row financial data into well written financial data.

**Subject: 203 Business Mathematics.**

**Course Objectives:**

1. To understand role and importance of Mathematics in various business situations and while developing software's.
2. To develop skills related with basic mathematical technique

### **Course Outcomes:**

1. Relate and apply techniques for constructing mathematical proofs and make use of appropriate set operations, propositional logic to solve problems.
2. Use function or relation models to interpret associated relationships.
3. Apply basic counting techniques and use principles of probability.
4. Given a data, compute various statistical measures of central tendency.
5. Use appropriate Sampling techniques.

### **Subject: 204 Relational Databases. Course**

#### **Objectives:**

1. Enables students to understand relational database concepts and transaction management concepts in database system.
2. Enables student to write PL/SQL programs that use: procedure, function, package, cursor and trigger.

#### **Course Outcomes:**

Understanding of various RDBMS products

1. Use of relational database
2. To get knowledge of Front End and Backend
3. Understanding of various programming aspects
4. Learning of different exceptions
5. Writing of triggers and packages

### **Subject: 205 Web Technology.**

#### **Course Objectives:**

1. To know & understand concepts of internet programming.
2. To understand how to develop web-based applications using JavaScript.

#### **Course Outcomes:**

1. Understand how to develop dynamic and interactive Web Page.

**Subject: 206 Computer Laboratory Based on Relational Databases and Web Technology.**

**Course Objectives:**

1. To solve real world computational problems.
2. To perform operations on relational database management systems.
3. To use HTML language concepts for creating web pages and its concepts.

**Course Outcomes:**

1. Develop dynamic and interactive Web Page.
2. Perform relational database operations.

### **Semester - III**

**Subject: 301 Digital Marketing.**

**Course Objectives:**

1. The aim of this syllabus is to give knowledge about using digital marketing in and as business.
2. To make SWOT analysis, SEO optimization and use of various digital marketing tools.

**Course Outcomes:**

1. Helps the students to get to Know about Ecommerce Concept
2. Understanding what is Internet Marketing
3. Students get the knowledge of What are Digital Marketing concepts which is the basic requirements of every organization when it targets a new Group.
4. Students Get a Knowledge for Doing Project and understanding the flow of System and to attract the audience.
5. Students get the knowledge of Various Keys supports of SWOT analysis: Strengths, Weaknesses, Opportunities, and
6. Threats and how to write various quires using Relational algebra concepts.

**Subject: 302 Data Structure.**

**Course Objectives:**

1. To understand the concepts of ADTs.

2. To learn linear data structures – lists, stacks, and queues.
3. To understand sorting, searching and hashing algorithms.
4. To apply Tree and Graph structures.

**Course Outcomes:**

1. To use well-organized data structures in solving various problems.
2. To differentiate the usage of various structures in problem solution.
3. Implementing algorithms to solve problems using appropriate data structures.

**Subject: 303 Software Engineering.**

**Course Objectives:**

1. To understand Software Engineering concepts.
2. To understand the applications of Software Engineering Subject.

**Course Outcomes:**

1. Compare and chose a process model for a software project development.
2. Identify requirements analyze and prepare models.
3. Prepare the SRS, Design document, Project plan of a given software system.

**Subject: 304 PHP.**

**Course Objectives:**

1. Understand how server-side programming works on the web.
2. Using PHP built-in functions and creating custom functions
3. Understanding POST and GET in form submission.
4. How to receive and process form submission data.
5. Read and process data in a MySQL database.

**Course Outcomes:**

1. Understand how to develop dynamic and interactive Web Page

## **Subject: 305 Block Chain.**

### **Course Objectives:**

1. Understand how blockchain systems (mainly Bitcoin and Ethereum) work,
2. To securely interact with them,
3. Design, build, and deploy smart contracts and distributed applications,
4. Integrate ideas from blockchain technology into their own projects.

### **Course Outcomes:**

1. Understand what and why of Blockchain.
2. Explore the major components of Blockchain.
3. Learn about Bitcoin, Cryptocurrency, Ethereum.
4. Deploy and exercise example smart contracts.
5. Identify a use case for a Blockchain application.
6. Create your own Blockchain network application.

## **Subject: 206 Computer Laboratory Based on Data Structure, PHP and Blockchain.**

### **Course Objectives:**

1. To provide the knowledge of basic data structures and their implementations.
2. To understand importance of data structures in context of writing efficient programs.
3. How to use PHP's built-in server to serve static resources.
4. How to use PHP to add some dynamic aspects to our pages.
5. The difference between GET and POST requests.
6. How to use cookies to store some data in the browser and pass it to the next request.

### **Course Outcomes:**

1. Develop skills to apply appropriate data structures in problem solving.
2. Use HTML forms.
3. Use cookies to store some data in the browser and pass it to the next request.

## Semester - IV

### Subject: 401 Networking.

#### Course Objectives:

1. To gain knowledge about Computer Networks concepts.
2. To know about working of networking models, addresses, transmission medias and
3. Connectivity devices.
4. To acquire information about network security and cryptography.

#### Course Outcomes:

1. Have a good understanding of the OSI and TCP/IP Reference Models and in particular have a good knowledge of Layers.
2. Understand the working of various protocols.
3. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies

### Subject: 402 Object Oriented Concepts through CPP. Course

#### Objectives:

1. Acquire an understanding of basic object-oriented concepts and the issues involved in Effective class design.
2. Enable students to write programs using C++ features like operator overloading, constructor and destructor, inheritance, polymorphism and exception handling.

#### Course Outcomes:

1. Compare and contrast procedural and object-oriented programming
2. Apply principles of OOP
3. Design and develop applications using object-oriented programming language C++

### Subject: 403 Operating System.

#### Course Objectives:

1. To know the services provided by Operating System

2. To know the scheduling concept
3. To understand design issues related to memory management and various related Algorithms.

### **Course Outcomes:**

1. Processes and Thread Scheduling by operating system
2. Synchronization in process and threads by operating system
3. Memory management by operating system using with the help of various schemes

### **Subject: 404 Advance PHP.**

#### **Course Objectives:**

1. To know & understand concepts of internet programming.
2. Understand how server-side programming works on the web.
3. Understanding How to use PHP Framework (Joomla / Druple).

#### **Course Outcomes:**

1. Build dynamic website.
2. Using MVC based framework easy to design and handling the errors in dynamic website.

### **Subject: 405 Project**

#### **Course Objectives**

1. To formulate projects with clearly identified scope and requirements.
2. To understand practical implementation of software development life cycle.

#### **Course Outcomes:**

1. Implement programming theories, concepts and principles and use latest computing tools for software development.
2. Develop team building capacity and work ethics for successful project development and management.



## **Subject: 406 Computer Laboratory Based on Object Oriented Concepts through CPP and Advanced PHP**

### **Course Objectives:**

1. How to Create C++ programs.
2. Tokens, expressions and control structures in C++
3. Classes and objects in C++.

### **Course Outcomes:**

1. Describe OOPs concepts.
2. Use functions and pointers in your C++ program.
3. Create programs using arrays and strings.
4. Building Advanced PHP applications.
5. Develop fast and scalable application.

## **Semester - V**

### **Subject: 501 Cyber Security.**

#### **Course Objectives:**

1. To understand the fundamentals of cyber security.
2. To understand various categories of Cybercrime, Cyber-attacks on mobile, tools and techniques used in Cybercrime and case studies.
3. To have an overview of the Cyber laws and concepts of Cyber forensics.

#### **Course Outcomes:**

1. Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure.
2. Design, develop, test and evaluate secure software.
3. Develop policies and procedures to manage enterprise security risks.
4. Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training.

## **Subject: 502 Object Oriented Software Engineering.**

### **Course Objectives:**

1. To understand the fundamentals of object modeling
2. To understand and differentiate Unified Process from other approaches.
3. To design with static UML diagrams.
4. To design with the UML dynamic and implementation diagrams.
5. To improve the software design with design patterns.
6. To test the software against its requirements specification.

### **Course Outcomes:**

1. Compare and chose a process model for a software project development.
2. Identify requirements analyze and prepare models.
3. Prepare the SRS, Design document, Project plan of a given software system.

## **Subject: 503 Core Java.**

### **Course Objectives:**

1. To introduce the object-oriented programming concepts.
2. To understand object-oriented programming concepts, and apply them in solving problems.
3. To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
4. To introduce the implementation of packages and interfaces
5. To introduce the concepts of exception handling and multithreading.
6. To introduce the design of Graphical User Interface using applets and swing controls.

### **Course Outcomes**

1. Understand the concept of classes, object, packages and Collections.
2. To develop GUI based application.

## **Subject: 504 Python.**

### **Course Objectives:**

1. To learn and understand Python programming basics and paradigm.
2. To learn and understand python looping, control statements and string manipulations.
3. Students should be made familiar with the concepts of GUI controls and designing GUI applications.
4. To learn and know the concepts of file handling, exception handling.

**Course Outcomes:**

1. Develop logic for problem solving
2. Determine the methods to create and develop Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
3. To be familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.
4. To write python programs and develop a small application project.

**Subject: 505 Project**

**Course Objectives:**

1. To formulate projects with clearly identified scope and requirements.
2. To understand practical implementation of software development life cycle.

**Course Outcomes:**

1. Implement programming theories, concepts and principles and use latest computing tools for software development.
2. Develop team building capacity and work ethics for successful project development and management.

**Subject: 506 Computer Laboratory Based on Core Java and Python.**

**Course Objectives:**

1. Work with common Python data types like integers, floats, strings, characters, lists, dictionaries.
2. Bringing uniformity in the way course is conducted across different colleges.

3. Continuous assessment of the students.

**Course Outcomes:**

1. Use an integrated development environment to write, compile, run simple programs.
2. Read and make elementary modifications to programs that solve real-world problems.
3. Validate input in a program.

## Semester - VI

**Subject: 601 Recent Trends in IT.**

**Course Objectives:**

1. To introduce upcoming trends in Information technology.
2. To study Eco friendly software development concepts.
3. To provide a strong foundation of fundamental concepts in Artificial Intelligence.
4. To evaluate the performance of various data mining task.
5. To understand Data analytics using Spark Programming.

**Course Outcomes:**

1. To study Eco friendly software development.
2. Main objective is to understand principles and foundations of distributed databases.
3. To learn architecture of Data Warehouse
4. To learn concept of cloud computing.

**Subject: 602 Software Testing.**

**Course Objectives:**

1. To provide learner with knowledge in Software Testing techniques.
2. To understand how testing methods can be used as an effective tool in providing quality assurance for software.
3. To provide skills to design test case plan for testing software.

**Course Outcomes:**

1. To understand various software testing methods and strategies.
2. To understand a variety of software metrics, and identify defects and managing those

defects for improvement in quality for given software.

3. To design test cases and test plans, review reports of testing for qualitative software.
4. To understand latest testing methods used in the software industries

### **Subject: 603 Advanced Java Course**

#### **Objectives:**

1. To know the concept of Java Programming.
2. To understand how to use programming in day-to-day applications.

#### **Course Outcomes:**

1. To access open database through Java programs using Java Data Base Connectivity (JDBC) and develop the application.
2. Understand and create dynamic web pages, using Servlets and JSP.
3. Work with basics of framework to develop secure web applications.

### **Subject: 604 Android Programming.**

#### **Course Objectives:**

1. To understand the Android Operating System and develop applications using Google's Android open-source platform.
2. To understand the issues relating to Wireless applications.

#### **Course Outcomes:**

1. Install and configure Android application development tools.
2. Design and develop user Interfaces for the Android platform.
3. Save state information across important operating system events.
4. Apply Java programming concepts to Android application development.

### **Subject: 605 Project**

#### **Course Objectives:**

1. To formulate projects with clearly identified scope and requirements.
2. To understand practical implementation of software development life cycle.

**Course Outcomes:**

1. Implement programming theories, concepts and principles and use latest computing tools for software development.
2. Develop team building capacity and work ethics for successful project development and management.

**Subject: 606 Computer Laboratory Based on Advanced Java and Android Programming.**

**Course Objectives:**

1. Develop error-free, well-documented Java programs.
2. Develop and test Java network, search engine, and web framework programs.
3. Learn how to write, test, and debug advanced-level Object-Oriented programs using Java.
4. Creating robust mobile applications and learn how to integrate them with other services.

**Course Outcomes:**

1. To learn database Programming using Java.
2. Understand and create dynamic web pages using Servlets and JSP.
3. Work with basics of framework to develop secure web applications.
4. Creating intuitive, reliable mobile apps using the android services and components.
5. Create a seamless user interface that works with different mobile screens



शिक्षण प्रसारक मंडळाचे  
**चांदमल ताराचंद बोर महाविद्यालय**  
कला-वाणिज्य-विज्ञान  
स्थापना १९६८

## 2.6.1: Programme Outcomes (POs) and Course Outcomes (COs)

**PO's, CO's B. Sc. 2019 CBCS Pattern Academic Year 2019-20**

**Shirur Shikshan Prasarak Mandal's,**  
**Chandmal Tarachand Bora College of Arts, Commerce and Science**  
**Shirur Dist. Pune**

**PO's PSO's and CO's**

**B. Sc. (Credit System) from the Academic Year 2019-20**

**Under the Faculty of Science**

Shirur Shikshan Prasarak Mandal's Chandmal Tarachand Bora College Arts, Commerce, Science Shirur, Dist. Pune (MS), India is affiliated to Savitribai Phule Pune University, Pune (formerly University of Pune) *ID. NO.=PU/PN/ASC/019 (1968)*

B. Sc. program in the college is recognized by Savitribai Phule Pune University, Pune, and follows the syllabus prescribed by the university. Chemistry is a compulsory subject for first- and second-year B.Sc. program. Apart from this, our students are allowed to choose any of the one subject from the cluster of Chemistry, Physics, Botany and Mathematics for special level. Choose any one language subject from Marathi, English, for S.Y.B.Sc. program. Geography is optional subject for Mathematics first and second year B.Sc. program.

**As per CBCS -2019 UG rules of Savitribai Phule Pune University, Pune student needs to complete 8 additional credits.** (See on Page No.2)

[http://collegedocuments.unipune.ac.in/sites/documents/Syllabus%202019/UG%20Rules%20and%20Regulations\\_24.02.2021.pdf](http://collegedocuments.unipune.ac.in/sites/documents/Syllabus%202019/UG%20Rules%20and%20Regulations_24.02.2021.pdf)

**Note :** University has started 2 Credit Mandatory Course on Democracy, Election and Governance (2 Credit) to all UG Courses. (See on Page No. 3)

**Title:** Circular No 344-2020 - Democracy, Election and Governance (2 Credit), U.G. Syllabus and Introduction to Constitution (2 Credits) P.G. Syllabus Compulsory Add-on Audit Course for All Faculty.

<http://sppudocs.unipune.ac.in/sites/circulars/Boards%20And%20Meetings%20Circulars/Circular%20No%20344-2020%20>

[http://sppudocs.unipune.ac.in/sites/circulars/Boards%20And%20Meetings%20Circulars/Circular%20No%20344-2020%20%20Democracy,%20Election%20and%20Governance\(2%20Credit\),%20%20and%20Introduction%20to%20Constitution\(2%20Credits\)\\_12\\_122020.pdf?Mobile=1&Source=%2Fsites%2Fcirculares%2F%5Flayouts%2Fmobile%2Fdispform%2Easpx%3FList%3D85ab0d02%252D7304%252D478b%252D04b%252D240d0a46dcae%26View%3D96b19d89%252Dba06%252D4885%252Dac3b%252D89fa3053952%26ID%3D627%26CurrentPage%3D1](http://sppudocs.unipune.ac.in/sites/circulars/Boards%20And%20Meetings%20Circulars/Circular%20No%20344-2020%20%20Democracy,%20Election%20and%20Governance(2%20Credit),%20%20and%20Introduction%20to%20Constitution(2%20Credits)_12_122020.pdf?Mobile=1&Source=%2Fsites%2Fcirculares%2F%5Flayouts%2Fmobile%2Fdispform%2Easpx%3FList%3D85ab0d02%252D7304%252D478b%252D04b%252D240d0a46dcae%26View%3D96b19d89%252Dba06%252D4885%252Dac3b%252D89fa3053952%26ID%3D627%26CurrentPage%3D1)



## 2.2 Mandatory Credit courses for award of B.Sc. Degree:

In addition to the compulsory credits of 132, the student has to earn additional 8 credits from following groups by taking/participating/conducting respective activities.

**Courses in Group I are compulsory.**

The student can earn **maximum 04 credits from an individual group from Group 2 to Group -9.**

**These extra credits will not be considered for GPA calculation,** however these are mandatory for the completion and award of B. Sc. Degree.

- Group 1:** Physical Education (at F. Y. B. Sc. Sem. I) -01 credit  
Physical Education (at F. Y. B. Sc. Sem. II) - 01 credit

(Note: Group I is compulsory for all the students as stated above.)

- Group 2:** Sport representation at College level - 01 credit  
Sport representation at University/Statelevel - 02 credits

- Group 3:** National Social Service Scheme (participation in Camp): 01 credits  
N.C.C.(with participation in annual camp) -01 credit  
N. C. C. (with B certificate/C certificate award)- 02 credits  
N.S.S./N.C.C. Republic day parade participation - 04 credits

- Group 4:** Avishkar participation; Extension activity participation, Cultural activity participation -01 credit  
Avishkar selection at University level - 02 credits  
Avishkar winner at state level - 04 credits

- Group 5:** Research paper presentation at State/National level - 01credits  
Research paper presentation at International level - 02 credits

- Group 6:** Participation in Summer school/programme; Short term course (not less than 1-week duration) - 03 credit.

- Group 7:** Scientific Survey, Societal survey, - 02 credits.

- Group 8:** Field Visits; Study Tours; Industrial Visits; Participation in curricular/ cocurricular competitions- 01 Credit.

- Group 9:** Online certificate Courses /MOOC Courses/ Career Advancement Course up to 04 credits (Minimum 10 Hrs. / credit)



सावित्रीबाई फुले पुणे विद्यापीठ  
(पूर्वीचे पुणे विद्यापीठ)

दूरध्वनी क्रमांक :  
०२०-२५६२११५६  
२५६०११५७  
२५६०११६०



शैक्षणिक विभाग  
गणेशखिंड, पुणे-४११ ००७  
वेबसाइट : [www.unipune.ac.in](http://www.unipune.ac.in)  
ई-मेल : [boards@pun.unipune.ac.in](mailto:boards@pun.unipune.ac.in)

संदर्भ क्र. : सीबीएच/ ७१३

दिनांक : १०/१२/२०२०

परिपत्रक क्र. ३४४/२०२०

विषय:- **Democracy, Election and Governance (2 Credits) U.G. Syllabus and Introduction to Constitution (2 Credits) P.G. Syllabus (Compulsory Add-on Audit Course for All Faculty)** या कोर्सच्या मार्गदर्शक तत्वांना मान्यता देणेबाबत.

विद्यापीठ अधिकार मंडळाने घेतलेल्या निर्णयानुसार कळविण्यात येते की, Democracy, Election and Governance (2 Credits) U.G. Syllabus and Introduction to Constitution (2 Credits) P.G. Syllabus (Compulsory Add-on Audit Course for All Faculty) या कोर्सच्या मार्गदर्शक तत्वांना मान्यता देण्यात येत आहे.

१. Introduction to Constitution हा दोन क्रेडिटचा कोर्स सर्व विद्याशाखेच्या Post Graduate कोर्सला शैक्षणिक वर्ष २०२०-२०२१ पासून तिसऱ्या सत्रात सुरू करण्यात यावा.
२. या कोर्ससाठीचे नियमन विद्यापीठातील विधी विभागाद्वारे करण्यात यावे.
३. सदरील कोर्सचे ऑनलाईन आशय तयार करण्याची जबाबदारी विधी विभागाने घेवून Online/Offline आशय वर विकसित करण्यात यावा.
४. सदरील कोर्स हा २ क्रेडिटचा असून २५ मार्क्स Internal व २५ मार्क्स External साठी असतील व त्याचे रूपांतर मार्कस् नुसार ग्रेड मध्ये करण्यात यावे.
५. Democracy, Election & Governance हा दोन क्रेडिटचा कोर्स सर्व विद्याशाखेच्या पदवी परीक्षेस प्रथम वर्षाच्या दुसऱ्या सत्रात शैक्षणिक वर्ष २०२०-२१ पासून सुरू करण्यात यावा.

## F. Y. B. Sc.

Subject	Semester	Theory / Practical	Subject Code	Subject Name	Total Credits
<b>Chemistry (Compulsory)</b>	I	Theory	CH-101	Physical Chemistry	2.0
		Theory	CH-102	Organic Chemistry	2.0
		Practical	CH-103	Practical Chemistry	1.5
	II	Theory	CH-201	Inorganic Chemistry	2.0
		Theory	CH-202	Analytical Chemistry	2.0
		Practical	CH-203	Practical Chemistry	1.5
<b>Physics (Compulsory)</b>	I	Theory	PHY-111	Mechanics and Properties of Matter	2.0
		Theory	PHY-112	Physics Principles and Applications	2.0
		Practical	PHY-113	Physics Laboratory-IA	1.5
	II	Theory	PHY-121	Heat and Thermodynamics	2.0
		Theory	PHY-122	Electricity and Magnetism	2.0
		Practical	PHY-123	Physics Laboratory-IB	1.5
<b>Botany (Compulsory)</b>	I	Theory	BO-111	Plant Life and Utilization-I	2.0
		Theory	BO-112	Plant Morphology and Anatomy	2.0
		Practical	BO-113	Practical Based On BO-111 and BO-112	1.5
	II	Theory	BO-121	Plant Life and Utilization II	2.0
		Theory	BO-122	Principles of Plant Science	2.0
		Practical	BO-123	Practical based on BO 121 & BO 122	1.5
<b>Mathematics (Optional)</b>	I	Theory	MT-111	Algebra	2.0
		Theory	MT-112	Calculus-I	2.0
		Practical	MT-113	Mathematics Practical	1.5
	II	Theory	MT-121	Analytical Geometry	2.0
		Theory	MT-122	Calculus - II	2.0
		Practical	MT-123	Mathematics Practical	1.5
<b>Geography (Optional)</b>	I	Theory	GG-111	Introduction to Physical Geography-I (Geomorphology)	2.0
		Theory	GG-112	Introduction to Physical Geography –II	2.0
		Practical	GG-113	Practical in Physical Geography	1.5
	II	Theory	GG-121	Introduction to Human Geography	2.0
		Theory	GG-122	Population and Settlement Geography	2.0
		Practical	GG-123	Practicals in Human Geography	1.5
<b>Mandatory Extra Credits *</b>	I	Physical Education			1.0
	II	Physical Education			1.0
<b>Total Credits</b>				<b>44 + 2</b>	<b>46</b>

*As per SPPU CBCS 2019 UG Rules, students need to get 50% credits in First Year B.Sc. will get admission to S.Y.B.Sc.*

## S. Y. B. Sc.

Subject	Semester	Theory / Practical	Subject Code	Subject Name	Total Credits
<b>English</b>	I	Theory	AECC-III	Text: Horizons: English in Multivalent Contexts	2.0
	II	Theory	AECC-IV	Text: Horizons: English in Multivalent Context	2.0
<b>Marathi</b>	I	Theory	AECC-III	उपयोजित मराठी	2.0
	II	Theory	AECC-IV	मराठी साहित्य	2.0
<b>Chemistry (Compulsory)</b>	I	Theory	CH-301	Physical and Analytical Chemistry	2.0
		Theory	CH-302	Organic and Inorganic Chemistry	2.0
		Practical	CH-303	Practical Chemistry	2.0
	II	Theory	CH-401	Physical and Analytical Chemistry	2.0
		Theory	CH-402	Organic and Inorganic Chemistry	2.0
		Practical	CH-403	Practical Chemistry	2.0
<b>Physics (Optional)</b>	I	Theory	PHY-231	Mathematical Methods in Physics-I	2.0
		Theory	PHY-232	Electronics	2.0
		Practical	PHY-233	Practical Course (Laboratory 2A)	2.0
	II	Theory	PHY-241	Oscillations, Waves, and Sound	2.0
		Theory	PHY-242	Optics	2.0
		Practical	PHY-243	Practical Course (Laboratory 2B)	2.0
<b>Botany (Optional)</b>	I	Theory	BO-231	Taxonomy of Angiosperms & Plant Ecology	2.0
		Theory	BO-232	Plant Physiology	2.0
		Practical	BO-233	Practicals	2.0
	II	Theory	BO-241	Plant Anatomy and Embryology	2.0
		Theory	BO-242	Plant Biotechnology	2.0
		Practical	BO-243	Practicals	2.0
<b>Mathematics (Optional)</b>	I	Theory	MT-231	Calculus of Several Variables	2.0
		Theory	MT-232(A) <b>OR</b> MT-232(B)	Numerical Methods and It's Applications <b>OR</b> Graph Theory	2.0
		Practical	MT 233	Mathematics Practical	2.0
	II	Theory	MT-241	Linear Algebra	2.0
		Theory	MT 242(A) <b>OR</b> MT-242(B)	Vector Calculus <b>OR</b> Dynamical Systems	2.0
		Practical	MT 243	Mathematics Practical	2.0
<b>Geography (Optional)</b>	I	Theory	GG 231	: Environmental Geography –I	2.0
		Theory	GG-232	Geography of Maharashtra	2.0
		Practical	GG-243	Practical Surveying –I	2.0
	II	Theory	GG-241	Environmental Geography- II	2.0
		Theory	GG-242	Geography of Maharashtra (Human)-II	2.0
		Practical	GG-243	Surveying – II	2.0

*As per SPPU CBCS 2019 UG Rules, students need to get 100 % credits from F. Y. B. Sc. and 50% credits in Second Year B.Sc. will get admission to T. Y. B. Sc.*

**B. Sc. Physics (Credit System)**  
**Under the Faculty of Science**  
**Programme Outcomes (PO's)**

**At the end of the Programme, students will be able to:**

1. Acquire a solid foundation in all aspects of Physics.
2. Familiarize a broad spectrum of modern trends in Physics.
3. Develop experimental, mathematical & computational skills.
4. Expand the existing knowledge in basic areas of Physics acquired from the Plus- Two classes and create a logical framework in assimilating the higher levels of Physics.
5. Transform themselves as graduates of the calibre sought by technologies, industries and public service as well as academic teachers and researchers of the future.
6. Get opportunities and platform to acquaint the skills for gathering information from various resources and to understand its effective uses.
7. Develop skills and enthusiasms to the best of their potential through an intellectually stimulating environment provided by the Programme.

**Programme Specific Outcome (PSO's)**

**By the end of the First Year Degree Programme, the students should have:**

1. Attained a common level in Basic Mechanics and Properties of Matter and laid a secure foundation in Physics Principles and Applications, Heat and Thermodynamics and Electricity and Magnetism for their future courses.
2. Developed their experimental and data analysis skills through a wide range of experiments in the practical laboratories.

**By the end of the Second Year Degree Programme, the students should have:**

1. Been introduced to powerful tools for tackling a wide range of topics in Electronics, Oscillations, Waves, and Sound and Optics.
2. Become familiar with additional relevant mathematical techniques in Physics.
3. Further develop their experimental skills through a series of experiments which are included in the syllabus.

**By the end of the Third Year Degree Programme, the students should have:**

1. Covered a range of topics in almost all areas of Physics including Quantum Physics, Solid State Physics, Computational Physics, Electronics, Nuclear Physics, Electrodynamics etc.
2. Had experience of independent work such as Projects, Seminars etc.
3. Developed their understanding of Core Physics

## Course Outcomes (CO's) Semester I

### PHY-111 Mechanics and Properties of Matter

Credits-2.0

On successful completion of this course students will be able to do the following:

Students who have completed this course should

1. Be familiar with basic concepts of kinematics.
2. Have deep understanding of Newton's laws of motion and their applications.
3. Understand the concepts of work and energy thoroughly.
4. Understand the phenomena of surface tension and its applications.
5. Be familiar with the fluid mechanics.
6. Be able to solve numerical problems involving topics covered.

### PHY-112 Physics Principles and Applications

Credits-2.0

On successful completion of this course students will be able to do the following:

1. To understand the general structure of atom, spectrum of hydrogen atom.
2. To understand the atomic excitation and LASER principles.
3. To understand the bonding mechanism and its different types.
4. To demonstrate an understanding of electromagnetic waves and its spectrum.
5. Understand the types and sources of electromagnetic waves and applications.
6. To demonstrate quantitative problem-solving skills in all the topics covered.

### PHY-113 Physics Laboratory 1A

(Credits-1.5)

After completing this practical course students will be able to

1. Handling of the various basic measuring instruments.
2. Experimentally analyzed the theory taught during lectures,
3. Hands on Experiments help students to learn various concepts of Physics.

4. Experimental tools help to develop ability to address real world problems.

## Semester II

### PHY-121 Heat and Thermodynamics

Credits-2.0

1. Be able to understand the equation of state and study deeply various experiments regarding it.
2. Be able to understand the laws of thermodynamics and thermodynamic processes.
3. Study the concept of entropy thoroughly.
4. Study heat engines and their efficiency.
5. Study various temperature scales, types of thermometers and working principles.
6. Be able to solve numerical problems involving topics covered.

### PHY-122 Electricity and Magnetism

Credits-2.0

On successful completion of this course students will be able to do the following:

1. To understand the concept of the electric force, electric field and electric potential for stationary charges.
2. Able to calculate electrostatic field and potential of charge distributions using Coulomb's law and Gauss's law.
3. To understand the dielectric phenomenon and effect of electric field on dielectric.
4. To study magnetic field for steady currents using Biot-Savart and Ampere's Circuital laws.
5. To study magnetic materials and its properties.
6. Demonstrate quantitative problem-solving skills in all the topics covered.

### PHY-123 Physics Laboratory 1B

(Credits-1.5)

After completing this practical course students will be able to

1. Hands on Experiments help students to learn various concepts of Physics.
2. Experimental tools help to develop ability to learn physics through experiments.
3. To motivate students for participation in scientific events, study visits, etc.
4. Understand scientific and technological aspects of experimental Physics.

## Semester III

### PHY-231: Mathematical Methods in Physics-I

Credits-02

**Learning Outcomes:** After the completion of this course students will be able to:

1. Understand the complex algebra useful in physics courses.
2. Understand the concept of partial differentiation.
3. Understand the role of partial differential equations in physics.
4. Understand vector algebra useful in mathematics and physics.
5. Understand the concept of singular points of differential equations

### PHY-232: Electronics

Credits-02

**Learning outcomes:**

On successful completion of this course the students will be able to

1. Apply different theorems and laws to electrical circuits.
2. Understand the relations in electricity.
3. Understand the parameters, characteristics and working of transistors.
4. Understand the functions of operational amplifiers.
5. Design circuits using transistors and applications of operational amplifiers.
6. Understand the Boolean algebra and logic circuits.

### PHY-233: Practical Course (Laboratory 2A)

(Credits-02)

**Learning Outcome:**

After completing this practical course students will be able to

1. Use various instruments and equipment.
2. Design experiments to test a hypothesis and/or determine the value of an unknown quantity.
3. Investigate the theoretical background of an experiment.
4. Setup experimental equipment to implement an experimental approach.
5. Analyze the data, plot appropriate graphs and reach conclusions from data analysis.
6. Work in a group to plan, implement and report on a project/experiment.
7. Keep a well-maintained and instructive laboratory logbook.



## Semester IV

### PHY-241: Oscillations, Waves, and Sound

(Credits-02)

**On completion of this course, the learner will be able:**

1. To study underlying principles of oscillations and its scope in development.
2. To understand and solve the equations / graphical representations of motion for simple harmonic, damped, forced oscillators and waves.
3. To explain oscillations in terms of energy exchange with various practical applications.
4. To solve numerical problems related to undamped, damped, forced oscillations and superposition of oscillations.
5. To study characteristics of sound, decibel scales and applications.

### PHY-242: Optics

(Credits-02)

**On successful completion of this course the students will be able to**

1. Acquire the basic concept of wave optics.
2. Describe how light can constructively and destructively interfere.
3. Explain why a light beam spread out after passing through an aperture.
4. Summarize the polarization characteristics of electromagnetic wave  
Understand the operation of many modern optical devices that utilize wave optics.
5. Understand optical phenomenon such polarization, diffraction and interference in terms of the wave model
6. Analyze simple example of interference and diffraction.

### PHY-243: Practical Course (Laboratory 2B)

(Credits-02)

**After completing this practical course students will be able to**

1. Use various instruments and equipment.
2. Design experiments to test a hypothesis and/or determine the value of an unknown quantity.
3. Investigate the theoretical background of an experiment.
4. Setup experimental equipment to implement an experimental approach.
5. Analyze the data, plot appropriate graphs and reach conclusions from data analysis.

6. Work in a group to plan, implement and report on a project/experiment.
7. Keep a well-maintained and instructive laboratory logbook.

## Semester V

### PHY-351: Mathematical Methods in Physics

(Credits-02)

**Student who has completed this course should**

1. Be familiar with partial differential equations.
2. Understand special functions used in mathematics thoroughly,
3. Be familiar with curvilinear with curvilinear co-ordinate systems.
4. Understand the concepts of special theory of relativity.
5. Be able to solve numerical problems involving topics covered.

### PHY-352: Electrodynamics

(Credits-02)

**After completing this practical course students will be able to**

1. Be familiar with basic concepts of electrostatics.
2. Be familiar with basic concepts of magnetostatics.
3. Be familiar with basic concepts of electrodynamics.
4. Understand the laws of electrodynamics deeply.
5. Be able to solve numerical problems involving topics covered.

### PHY-353: Classical Mechanics

(Credits-02)

**After completing this practical course students will be able to**

1. Understand mechanics of system of particles and motion in central force field.
2. Understand scattering of particles deeply.
3. Be able to construct Lagrangian and Hamiltonian of physical systems.
4. Be familiar with moving co-ordinate systems.
5. Be able to solve numerical problems involving topics covered.

### PHY-354: Atomic and Molecular Physics

(Credits-02)

**After completing this practical course students will be able to**

1. Be familiar with conceptual development of atomic model.

2. Understand one or two valence electron systems deeply.
3. Understand Zeeman effect.
4. Understand X ray / Molecular / Raman Spectroscopy.
5. Be able to solve numerical problems involving topics covered.

### **PHY-355: Computational Physics**

**(Credits-02)**

**After completing this practical course students will be able to**

1. Be familiar with basics of 'C' programming.
2. Understand the structure of 'C' program.
3. Be familiar with various operators / functions / control statements used in 'C' program.
4. Be familiar with various numerical / statistical methods to solve problems.
5. Be able to construct algorithm / flow chart / program in a scientific manner.

### **PHY-356 Elective-I (D): Renewable Energy Sources-I**

**(Credits-02)**

After completing this practical course students will be able to

1. Have introduction with various types of renewable energy sources.
2. Be familiar with various applications of solar energy.
3. Be familiar with various applications of biomass energy.
4. Be familiar with the wind mechanics.
5. Be aware of energy conservation and energy audit.
6. Be able to solve numerical problems involving topics covered.

### **PHY-3510 SEC (K): Smart Sensors and Transducer Technology**

**(Credits-02)**

**Course Outcomes:** At the end of the course, a student will be able to:

1. Use concepts in common methods for converting a physical parameter into an electrical quantity.
2. Classify and explain with examples of transducers, including those for measurement of temperature, strain, motion, position and light.
3. Choose proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc

4. Predict correctly the expected performance of various sensors.
5. Locate different type of sensors used in real life applications and paraphrase their importance.
6. Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.

### **PHY-3511 SEC (L): Physics Workshop Skill**

**(Credits-02)**

After completing this practical course students will be able to

1. This course is to get exposure with various aspects of instruments and their usage through hands-on mode.
2. After completion of this course students will able to handle and test various instruments.

### **PHY-357: Physics Laboratory-3A**

**(Credits-02)**

After completing this practical course students will be able to

1. Use various instruments and equipment.
2. Design experiments to test a hypothesis and/or determine the value of an unknown quantity.
3. Investigate the theoretical background of an experiment.
4. Setup experimental equipment to implement an experimental approach.

### **PHY-358: Physics Laboratory-3B**

**(Credits-02)**

After completing this practical course students will be able to

1. Develop skills to impart practical knowledge in real time solutions.
2. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
3. Design new experiments/instruments with practical knowledge.
4. Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.

5. Understand measurement technology, usage of new instruments and real time applications in engineering studies.

### **PHY-359: Physics Project-I**

**(Credits-02)**

After completing this practical course students will be able to

1. The student will gain experience in research. They will understand the research methodology and will help them in their future.
2. Demonstrate conceptual understanding of fundamental physics principles.
3. Communicate physics reasoning in oral and in written form.

## **Semester VI**

### **PHY-361: Solid State Physics**

**(Credits-02)**

After completing this practical course students will be able to

1. Be familiar with basic concepts of solid-state physics.
2. Be familiar with various types of characterization techniques.
3. Understand the band theory of metals deeply.
4. Understand the magnetism thoroughly.
5. Be able to solve numerical problems involving topics covered.

### **PHY-362: Quantum Mechanics**

**(Credits-02)**

After completing this practical course students will be able to

1. Be familiar with the historical background of Quantum Mechanics.
2. Understand the wave function and its physical interpretation clearly.
3. Be familiar with the time dependent and time independent Schrodinger's equations and their applications.
4. Be familiar with various operators used in Quantum Mechanics.
5. Be able to solve numerical problems involving topics covered.

### **PHY-363: Thermodynamics and Statistical Physics**

**(Credits-02)**

Student who has completed this course should

1. Understand the laws of thermodynamics.
2. Have deep understanding of kinetic theory of gases.
3. Be familiar with Maxwell's equations and their applications.
4. Be familiar with basic concepts of statistics.
5. Be able to apply the concept of statistical ensemble to various physical systems.
6. Be able to understand the concepts of Quantum Statistics.
7. Be able to solve numerical problems involving topics covered.

### **PHY-364: Nuclear Physics**

**(Credits-02)**

Student who has completed this course should

1. Be familiar with basic properties of nucleus.
2. Have deep understanding of radioactivity and its applications.
3. Be familiar with nuclear forces and elementary particles.
4. Have introduction to various nuclear models.
5. Understand construction and working of various particles accelerators and detectors.
6. Understand various types of nuclear reactions and their applications.
7. Be able to solve numerical problems involving topics covered.

### **PHY-365 (A): Electronics-II**

**(Credits-02)**

After completing this practical course students will be able to

1. Understand working of various components of circuit.
2. Be familiar with various applications of Op-Amp.
3. Have introduction with combinational circuits.
4. Have introduction with sequential logic circuits.
5. Be able to draw circuit diagram and explain its working.
6. Be able to solve numerical problems involving topics covered.

## Skill Enhancement Courses

### **PHY-3610(Z): Calibration Techniques**

**(Credits-02)**

After completing this practical course students will be able to

1. Illustrate the methods of range extension in A.C. & D.C. meters.
2. Compare calibrated meter readings with standard meters (digital meters).
3. Interpret the various methods to measure unknown resistance, inductance & capacitance.
4. Determine the physical & electrical quantities using transducers & sensors.

### **PHY-3611(AD): Photography**

**(Credits-02)**

After completing this practical course students will be able to

1. Students will be able to use a variety of brainstorming techniques to generate novel ideas of value to solve problems.
2. Students will have sufficient mastery of one or more media to complete the technical and formal challenges pertinent to a body of original work.
3. Students will be able to clearly communicate the content and context of their work visually, orally and in writing.
4. Students will develop behaviors such as curiosity, initiative, and persistence that will help them engage with the world in productive ways. Students will be able to work independently or collaboratively to achieve stated goals.

### **PHY-366(U) Renewable Energy Sources-II**

**(Credits-02)**

Student who has completed this course should

1. Able to understand the renewable energy sources available at present.
2. Able to understand the solar energy operation and its characteristics.
3. To educate the wind energy operation and its types.
4. To educate the tidal and geothermal energy principles and its operation.

### **PHY-367: Physics Laboratory-4A**

**(Credits-02)**

1. The students will be able to understand the working and use of various advanced instruments and equipment's.
2. The students will be able to design experiments to test a hypothesis and/or determine the value of an unknown quantity.
3. The students will be able to investigate the theoretical background to an experiment.
4. The students will be able to set up experimental equipment to implement an experimental approach.

### **PHY- 368: Physics Laboratory-4B**

**(Credits-02)**

1. The students will be able to set up experimental equipment to implement an experimental approach.
2. The students will be able to analyze data, plot appropriate graphs and reach conclusions from your data analysis.
3. The students will be able to work in a group to plan, implement and report on the experiments.
4. The students will develop a habit of keeping a well-maintained and instructive laboratory logbook.

### **PHY – 369: Project-II**

**(Credits-02)**

1. The students will be able to understand a general definition of research design.
2. The students will be able to design experiments to test a hypothesis
3. The students will be able to collect and analyze data to reach conclusions related to the hypothesis
4. The students will be able to work in a group to plan, implement and document on the systematic study to solve a research problem.
5. The students will become familiar with ethical issues and plagiarism related to research and documentation.



**B. Sc. Chemistry (Credit System)**  
**Under the Faculty of Science**  
**Programme Outcomes (PO's)**

**At the end of Program**

1. Students should be various concepts in physical, chemical, biological and mathematical sciences.
2. Students should be knowledged with the fundamental scientific theories.
3. Able to design and conduct experiments on the basis of learnt scientific theories.
4. Student empowered to prepare laboratory reports that provide a description of the experiment & reasoning clearly.
5. Student empowered with importance of Science in daily life, for sustainable development.

**Programme Specific Outcome (PSO's) Chemistry**

**At the end of Program**

1. Students should be familiar with various branches of Chemistry like Organic, Inorganic Physical, Industrial, Medicinal, Analytical, Forensic, Environmental, Biochemistry. Etc.
2. Students able to find procedure from literature to synthesize, separation, purification and identification components present in analyte in laboratory using various characterization techniques.
3. Understand the causes of environmental pollution and aware about steps to control Environmental Pollution.
4. To know various analytical techniques for qualitative and quantitative analysis.
5. Learnt Chemistry software's useful in future career such as Research, Industries & Academia.

## Course Outcomes (CO's)

### CH- 101 Physical Chemistry

(Credits-02)

#### At the end of course student,

1. Apply thermodynamic principles to physical and chemical process. Calculate enthalpy, Bond energy, Bond dissociation energy, resonance energy, variation of enthalpy with temperature – Kirchoff's equation
2. Explain third law of thermodynamic, Van't Haff equation and its application
3. Relation between Free energy and equilibrium and factors affecting on equilibrium constant, gas equilibrium, equilibrium constant and molecular interpretation of equilibrium constant
4. Know concepts such as Common ion effect hydrolysis constant, ionic product, solubility Product,
5. Understand ionization process occurred in acids, bases, degree of hydrolysis and pH for different salts, buffer solutions.

### CH- 102 Organic Chemistry

(Credits-02)

#### At the end of course student,

1. Aware and able to apply fundamentals of organic chemistry.
2. Awarred with importance of stereochemistry in activity of compound.
3. Aware and able to apply fundamentals of stereochemistry such as Conformations, Configurations of organic compounds
4. Learnt functional group approach for aliphatic hydrocarbons.
5. Able to nomenclature of simple organic compounds

### CH- 103 Chemistry Practical Course I

(Credits-1.5)

#### At the end of course student,

1. Aware of importance of chemical safety and strictly follow Lab safety practices while performing experiments in laboratory
2. Determine thermochemical parameters and related concepts
3. Calibration and use pH meter for analysis of commercial products and in experimental study
4. Do elemental analysis of organic compounds by non-instrumental method
5. Use Paper Chromatographic Techniques for separation of constituents of mixtures

## Semester II

### CH- 201 Inorganic Chemistry

(Credits-02)

At the end of course student,

1. Understand quantum mechanical approach to atomic structure.
2. Know periodicity of elements
3. Understand theories for chemical bonding.
4. To know role of hybridisation in determining structure of molecule.
5. Discuss assumption and need of VSEPR theory.

### CH- 202 Analytical Chemistry

(Credits-02)

At the end of course student,

1. Know about basics of analytical chemistry.
2. Know some analytical techniques of analysis.
3. Define term mole, millimole, molar concentration, molar equilibrium concentration and Percent Concentration
4. Know Qualitative Analysis of Organic Compounds
5. Understand theoretical background for Paper and Thin Layer Chromatography.

### CH- 203 Chemistry Practical –I

(Credits-1.5)

At the end of course student,

1. Aware with Inorganic Estimations using volumetric analysis
2. Able to synthesize some Inorganic compounds by following given procedure
3. Analyze commercial products available in the market.
4. Able to purify organic compounds.
5. Know variety of analytical procedures of commercial products.

## Semester III

### CH-301 Physical and Analytical Chemistry

(Credits-02)

At the end of course student,

1. Explain concept of kinetics, Rate of reaction, rate laws, and order.

2. Derive integrated rate laws, expression for half-life and examples of zero order, first order, and second order reactions, Graphical method, Energy of activation, Arrhenius equation
3. Define adsorption, classification of given processes into physical and chemical adsorption, Classification of adsorption isotherms, Langmuir adsorption isotherm, Freundlich's adsorption, BET Theory.
4. Discuss the types of volumetric analysis methods –Neutralisation titrations, complexometric titrations, Redox titrations, Precipitation titration
5. Define and explain the meaning of accuracy and precision, solved problems based on standard deviation

### CH-302 Inorganic and Organic Chemistry

(Credits-02)

At the end of course student,

1. Define different terms related to molecular orbital theory and coordination chemistry
2. Explain synthesis of aromatic hydrocarbons, mechanism of reactions involved.
3. Explain important reactions of aromatic hydrocarbon.
4. Write / discuss the mechanism of Nucleophilic Substitution ( $SN^1$ ,  $SN^2$  and  $SN_i$ ) reactions.
5. Identify and draw the structures alcohols / phenols from their names or from structure name can be assigned.

### CH-303 Practical Chemistry-III

(Credits-02)

At the end of course student,

1. Correlate theory to experiments.
2. Understand systematic methods of identification of substance by chemical methods.
3. Perform organic and inorganic synthesis and trace chemical reaction by suitable method i.e. (colour change, ppt. formation, TLC).
4. Perform the quantitative chemical analysis of substances explain principles behind it.
5. Systematic working skill in laboratory will be imparted in student.

### CH-401 Physical and Analytical Chemistry

(Credits-02)

At the end of course student,

1. Define the terms in phase equilibria such as- system, phase in system, components in system, degree of freedom, one / two component system, phase rule, etc.
2. Explain thermodynamic aspects of Ideal solutions-Gibbs free energy change, Volume change, Enthalpy change and entropy change of mixing of Ideal solution.
3. Explain solubility of partially miscible liquids- systems with upper critical. Solution temperature, lower critical solution temperature and having both UCST and LCST.
4. Define different terms in conductometry such as electrolytic conductance, resistance, conductance, Ohm's law, cell constant, specific and equivalent conductance, molar conductance, Kohlrausch's law, etc.
5. Explain terms in Colorimetry such as radiant power, transmittance, absorbance, molar, Lamberts Law, Beer's Law, molar absorptivity

#### **CH-402 Inorganic and Organic Chemistry**

**(Credits-02)**

**At the end of course student,**

1. Explain different types of isomerism in coordination complexes.
2. Apply principles of VBT & CFT to explain bonding in coordination compound of different geometries, limitation of VBT.
3. Explain spectrochemical series, tetragonal distortion / Jahn-Teller effect in Cu (II) Oh complexes.
4. Explain structure, synthesis, mechanism reactions aldehydes and ketones, carboxylic acids and their derivatives, amines and cyclohexane.
5. Give synthesis diazonium salt from amines and reactions of diazonium salt.

#### **CH-403 Practical Chemistry-IV**

**(Credits-02)**

**At the end of course student,**

1. Correlate the theory to the experiments. Understand / verify theoretical principles by experiment or explain practical output with the help of theory.
2. Understand systematic methods of identification of substance by chemical methods.
3. Write balanced equation for all the chemical reactions performed in the laboratory.
4. Perform organic and inorganic synthesis and able to follow the progress of the chemical reaction.
5. Perform the quantitative chemical analysis of substances and able to explain principles behind it.

## Semester V

### DSEC-I: CH-501 Physical Chemistry- I

(Credits-02)

At the end of course student,

1. Know historical of development of quantum mechanics in chemistry and understand terms involved in quantum chemistry.
2. Explain Raman spectra: Concept of polarizability, Pure rotational Raman spectra of diatomic molecules, Energy Expression, Selection rule, Rotational energy level diagram, Rotational Raman spectrum and Problems
3. Discuss difference between thermal and photochemical processes.
4. Know photochemical reactions: photosynthesis, photolysis, photocatalysis, photosensitization, Various photochemical phenomena like fluorescence and phosphorescence, Chemiluminescence,
5. Solve numerical Problems

### Analytical Chemistry- I DSEC-I: CH-502

(Credits-02)

At the end of course student,

1. Explain different principles involved in the gravimetry, spectrophotometry, parameters in instrumental analysis, qualitative analysis.
2. Perform quantitative calculations depending upon equations student has studied in the theory. Furthermore, student should be able to solve problems on the basis of theory.
3. Design analytical procedure for given sample, discuss procedure for different types analyses included in the syllabus.
4. Differentiate / distinguish / Compare among the different analytical terms, process and analytical methods.
5. Apply whatever theoretical principles he has studied in theory during practical session in laboratory.

### CH-503 Physical Chemistry Practical – I

(Credits-02)

At the end of course student,

1. Determine specific refractivity's of the given liquids

2. Calibrate and use pH meter for analysis and Prepare of buffer solutions and measure its pH.
3. Determine the indicator constant of methyl red indicator by colorimetry
4. Determine the titration of a mixture of weak acid and strong acid with strong alkali.
5. Do qualitative analysis of vitamin by Photoflurometry.

### **CH-504 Inorganic Chemistry – I**

**(Credits-02)**

**At the end of course student,**

1. Explain electro-neutrality principle and Nephelauxetic effect towards covalent bonding, explain Charge Transfer Spectra
2. Explain MOT of Octahedral complexes with sigma bonding and compare the different approaches to bonding in Coordination compounds.
3. Understand Tran's effect and applications of Trans effect, Stereochemistry of mechanism
4. Gain the knowledge of inorganic reaction mechanisms available in the literature to solve chemical problems.
5. Explain metal, non-metal, insulator & semiconductor with intrinsic and extrinsic properties.

### **Industrial Chemistry – I DSEC-II: CH-505**

**(Credits-02)**

**At the end of course student,**

1. Know various industries, aspects and importance of chemical industry.
2. Explain manufacture of sugar, fruit juice, dye, soap and pigment
3. Aware of Fermentation Industry and manufacturing of ethyl alcohol by using molasses and fruit juice.
4. Understand chemistry of soap and different types of soap products,
5. Explain : Dyes its classification, synthesis, Structures, properties and applications of dyes

### **CH-506 Inorganic Chemistry Practical – I**

**(Credits-02)**

**At the end of course student,**

1. Verify theoretical principles experimentally
2. Conceptual understanding of electrogravimetric principle, Numerical Problems
3. Principles of common ion effect and solubility product, Formation of complex ion

4. Factors affecting on solubility of precipitation
5. Prepare of inorganic complexes and spot tests for metal ions and ligands:
6. Qualitative and confirmatory tests of inorganic toxicants

### CH-507 Organic Chemistry – I

(Credits-02)

#### At the end of course student,

1. Define and classify, draw structure, synthesis polynuclear and hetroonuclear aromatic hydrocarbons & Understood their reactivity, active methylene group reactivity
1. To predict product with planning or supply the reagent/s for these reactions
2. Learnt different types of rearrangement and intermediate formed
3. Able to write the mechanism of rearrangement reactions and their applications
4. Understand stereochemistry by using models and learn reactivity of geometrical isomers
5. Orientation and reactivity in E1 and E2 elimination and factors affecting them

### CH-508 Chemistry of Biomolecules

(Credits-02)

#### At the end of course student,

1. Understood the Cell types its Biological composition
2. Awarred with types of carbohydrates with examples their chemical and structural properties, their biochemical significance
3. Know to the types of lipids with examples, structure of lipids, properties of lipids
4. Learnt structure and types, properties & structure of amino acids & protein
5. Known importance of enzymes and hormones in daily life.

### CH-509 Organic Chemistry Practical I

(Credits-02)

#### At the end of course student,

1. Separate, purify and analyse binary water-soluble and water insoluble mixture.
2. Understand the techniques involving drying and recrystallization by various method.
3. Learn the confirmatory test for various functional groups, special elements.
4. Learn the preparations of derivative various functional groups aspects of electrical experiments.
5. Use of Chromatographic techniques in chemical analysis.



### CH-510 A Medicinal Chemistry: Skills Enhancing Course-I

(Credits-02)

At the end of course student,

1. Aware with fundamentals of medicinal chemistry and its importance
2. Understood concept of Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics, metabolites, antimetabolites and therapeutic index
3. Understood overall process of drug discovery & drug mechanism of action
4. Importance of stereochemistry of drugs and receptors for biological effect.
5. Know mechanism of action of drugs belonging to the classes of infectious and non-infectious diseases.

### CH-511 (A) Environmental Chemistry: Skills Enhancing Course-II

(Credits-02)

At the end of course student,

1. Understand importance and conservation of environment, biogeochemical cycles, Hydrological Cycle.
2. Know water resources and water quality parameters
3. Aware of organic and inorganic pollutants, surfactants, toxic chemicals causing water pollution
4. Understand water parameters monitoring techniques and methodology
5. Know initiatives need to take in order to reduce pollution.

## Semester VI

### CH-601 Physical Chemistry-II

(Credits-02)

At the end of course student,

1. Understand concepts in electrochemistry, electrochemical series, electrodes, Primary Batteries, Secondary Batteries, etc.
2. Explain diagram, Construction, representation, working and limitation of primary reference electrode, calomel electrode, glass electrode, silver-silver chloride electrode.
3. Know types of Reversible electrodes with respect to examples, diagram, representation, construction, working (electrode reactions) and electrode potential.
4. Explain the term crystallography and laws of crystallography.

5. Understand Radioactivity, types of radioactive decay types and properties of radiations, detectors and application of radioisotopes

#### **DSEC-IV: CH-602 Physical Chemistry-III**

**(Credits-02)**

**At the end of course student,**

1. Understand meaning of the terms-Solution, electrolytes, nonelectrolytes and colligative properties,
2. Know application of colligative properties to determine molecular weight of nonelectrolyte, abnormal molecular weight,
3. Factors affecting on solid state reactions,
4. Explain phenomena of photoconductivity, conductors and insulators, semiconductors
5. Numerical based on cohesive energy

#### **CH-603 Physical Chemistry Practical –II**

**(Credits-02)**

**At the end of course student,**

1. Understand method of analysis by potentiometric titration, pH-metric titration, turbidometry
2. Explain colligative properties of material like polymer.
3. Determine the molecular weight of solute by depression in freezing point method
4. Prepare buffer solutions and measure its pH by pH-metry.
5. Analyze of crystal structure from X-ray diffraction spectra.

#### **CH-604 Inorganic Chemistry –II**

**(Credits-02)**

**At the end of course student,**

1. Understand organometallic chemistry, method of synthesis of compounds
2. Know the phenomenon of catalysis, its basic principles and terminologies.
3. Understand the role of metals in non-enzymatic processes.
4. Explain the functions of hemoglobin and myoglobin in O<sub>2</sub> transport and storage.
5. Know thy types of Inorganic polymers, comparison with organic polymers, synthesis, structural aspects of Inorganic polymers

#### **DSEC-V: CH-605 Inorganic Chemistry –III**

**(Credits-02)**

At the end of course student,

1. Learn the concept of acid, base and their theories.
2. Know the crystal structures of solids, simple cubic, BCC and FCC structures
3. Know the defects in Ionic solids, differentiate between the defects.
4. Synthesize Zeolite and their structure, Know application of zeolites
5. Know toxic chemical in the environment, explain biological methylation.

### **DSEC-V: CH-606 Inorganic Chemistry Practical –II**

**(Credits-02)**

At the end of course student,

1. Volumetric Estimations of Calcium, Cu, Phosphate, Iodine from products
2. Estimation of Na, K by flame photometry by calibration curve method and regression method.
3. Purification of water using cation/anion exchange resin and analysis by qualitative analysis
4. Synthesize nanoparticles of silver, ZnO.
5. Explain UV spectra of nanomaterial.

### **CH-607 Organic Chemistry –II**

**(Credits-02)**

At the end of course student,

1. Award with principle & instrumentation in UV, Mass, IR & NMR Spectroscopy.
2. Determine the structure of simple organic compounds on the basis of spectral data such as  $\lambda$  max values, IR frequencies, chemical shift ( $\delta$  values).
3. Determine  $\lambda$  max value from structure of compound.
4. Read UV, Mass, IR & NMR Spectrum interpret them to determine structure of organic compound
5. Explain stereochemistry of cyclohexane and decalin

### **CH-608 Organic Chemistry –III**

**(Credits-02)**

At the end of course student,

1. Use retrosynthesis for synthesis of target molecule from commercially available synthetic equivalents
2. Aware with the Terms - Disconnection, Synthons, Synthetic equivalence, FGI, TM.
3. Apply knowledge of Organic Reaction Mechanism in Synthetic of organic compounds

4. Know oxidizing reagents and reducing reagents for synthesis of organic compound.
5. Explain natural products like terpenoids, Alkaloids and their importance

### **CH-609 Organic Chemistry Practical –II**

**(Credits-02)**

**At the end of course student,**

1. Handle chemicals & glassware with safety
2. Able to read infrared spectrum identify the functional group or groups present in a compound.  
Interpret IR and NMR spectra
3. Apply learnt Chemistry principles in practical
4. Trained with hands-on experience of modern extraction methods.
5. Able to determine and use chromatography techniques for purification, separation of organic compounds

### **CH-610: Introduction to Forensic Chemistry**

**(Credits-02)**

**At the end of course student,**

1. The fundamental principles and functions of forensic science and significance of forensic science to human society
2. The work nature in a forensic science laboratory.
3. Encourage academic students towards the noble career.
4. The forensic identification of illicit liquors.
5. The classification and characteristics of the narcotics, drugs and psychotropic substances.

### **CH-611 (A) : Analytical Chemistry-II**

**(Credits-02)**

**At the end of course student,**

1. Define terms in solvent extraction, basics of chromatography, HPLC, GC, and AAS and AES.
2. Identify important parameters in analytical processes or estimations.
3. Explain different principles involved in the analyses using solvent extraction, basics of instrumental chromatography, HPLC, GC, and atomic spectroscopic techniques.
4. Perform quantitative calculations depending upon equations students have studied in the theory.
5. Differentiate / distinguish / compare among the different analytical terms, process and analytical methods.

**B. Sc. Botany (Credit System)**  
**Under the Faculty of Science**  
**Programme Outcome (PO)**

1. Knowledge and understanding of the range of plant diversity in terms of structure, function and environmental relationships. The role of plants in the functioning of the ecosystem. A selection of more specialized, optional topics. Statistics as applied to biological data.
2. **Intellectual skills** – able to think logically and organize tasks into a structured form. Assimilate knowledge and ideas based on wide reading and through the internet.
3. **Practical skills:** Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying each of the following skills and gain greater proficiency in a selection of them. Depending on their choice of optional modules. a. Interpreting plant morphology and anatomy. b. Plant identification. c. Vegetation analysis techniques. d. A range of physiochemical analyses of plant materials in the context of plant physiology and biochemistry. e. Analyze data using appropriate statistical methods and computer packages. f. Plant pathology to be added for sharing of field and lab data abstained.
4. **Scientific Knowledge:** Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form.
5. **Problem analysis:** Identify the taxonomic position of plants, formulate the research literature, and analyze non reported plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.
6. **Design/development of solutions:** Design solutions from medicinal plants for health problems, disorders and disease of human beings and estimate the phytochemical content of plants which meet the specified needs to appropriate consideration for the public health.
7. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern instruments and equipment for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.

8. **Environment and sustainability:** Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
9. **Ethics:** Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

### **Programme Specific Outcome (PSO)**

- PSO1** Student gets expertise in Taxonomic work of plants.
- PSO2** Students gets expertise in identification of plant diseases and control measures which will be helpful for farmers.
- PSO3** Students get knowledge of production and use of bio fertilizers, bio pesticides, bio insecticides, bio fungicides and its applications in sustainable agriculture.
- PSO4** Students get acquainted with the different methods of plant propagation [natural, artificial] and its applications in agriculture.
- PSO5** Students get aware about conservation of biodiversity which is a need of time.
- PSO6** Students able to understand the sophisticated techniques based on biotechnological approaches.
- PSO7** Students use biological science software based on Bioinformatics

### **Course Outcomes (COs)**

#### **Semester - I**

#### **BO-111: PLANT LIFE AND UTILIZATION-I**

**(Credits-02)**

1. This paper deals with plant diversity of Algae, Fungi, Bryophytes and Lichens in the nature
2. Students deals with different plant forms in nature and its economic importance.
3. Students aware role in plant groups for nature conservation.
4. Study of plants and how they survive and interact with other living and non-living things in the environment. How it is commercially importance for society.

**BO-112: PLANT MORPHOLOGY AND ANATOMY** (Credits-02)

1. This paper deals with scientific morphological and anatomical study angiosperm plant-groups (dicot and monocot).
2. Students will aware the plant part types for plant identification process.
3. Understand various flower and fruits types.
4. Students will gain the basic information regarding section work and anatomy.

**BO 113: PRACTICAL BASED ON BO 111 & BO 112** (Credits-1.5)

1. Students learn to carry out practical work, in the field and in the laboratory.
2. This practical beneficial for systematic study of plants and their commercial applications for society
3. Economic botany helps to know the procedure for cultivation of important forms
4. They gain introductory experience in applying techniques and skills to study the structural details and the role.
5. Students will gain the basic information regarding plant part section work and anatomy.

**Semester – II**

**BO-121: Plant Life and Utilization-II** (Credits-02)

1. This paper deals with plant diversity of Pteridophytes, Gymnosperms, Angiosperms.
2. Students will aware and able to understand role of plant forms for food, feed and medicines.
3. Student would be able to cultivate commercially important plant forms for society.

**BO-122: PRINCIPLES OF PLANT SCIENCES** (Credits-02)

1. Aware of advanced knowledge of various disciplines in life science.
2. Knowing the concept - in basic plant sciences mainly plant physiology, molecular biology and its importance
3. Understand the agronomic mechanism and economic potential of various plants forms.

**BO 123: Practical BASED ON BO 121 & BO 122****(Credits-1.5)**

1. Students learn to carry out practical work,
2. In the laboratory, They gain introductory experience in applying advanced technology and skills to study the structural details and their applications and limitation by selecting proper techniques for sustainable development.
3. Students aware and get more exposure about sophisticated instruments and hands on experience.

**SEM III****BO 231 Taxonomy of Angiosperms and Plant Ecology****(Credits-02)**

1. This paper deals basics of plant classification
2. Understand theoretical background based on plant classification mainly dicot and monocot
3. Current global scenario for plant conservation strategies with role of angiosperm plants with the working of ecosystem and environmental relationships for stable ecosystem and its impact on society.

**BO 232 - PLANT PHYSIOLOGY:****(Credits-02)**

1. This paper deals with theoretical basis for increasing the total productivity of plants,
2. Aware with improving the nutritional value and raising the quality of their tissues and organs for use in industry.
3. Able to understanding the basic physiological mechanism based in flowering plants.

**BO 233 PRACTICALS****(Credits-02)**

1. Students learn to carry out practical work, in the field and in the laboratory, with minimal risk.
2. They get knowledge in applying techniques and skills to study the structural details and the role of plants in sustainable development.
3. Students will gain practical experience with hands-on technique.



## SEM IV

### BO 241 PLANT ANATOMY AND EMBRYOLOGY

(Credits-02)

1. This paper deals with familiar with history of microscopy and to learn different techniques of anatomy and their role in development of healthy plant body.
2. Mechanism of flowering plant development from embryo to flowering stage.
3. Know the physiological role of various plant species.

### BO 242 PLANT BIOTECHNOLOGY

(Credits-02)

1. This paper deals with applications in improvement in food quality, processing and quantity 2. Know about basics of manufacturing in which simple cells and proteins can be manipulated to produce chemicals of plant origin for its commercial utilization to prepare food and nutritional products.

### BO 243 PRACTICALS:

(Credits-02)

1. Students learn to carry out practical work, in the field and in the laboratory, with minimal risk.
2. They get knowledge in applying techniques and skills to study the structural details and the role of plants in sustainable development with commercial applications.

## SEM V

### BO. 331 Cryptogamic Botany:

(Credits-02)

1. Curricula include the life cycles of cryptogrammic plant species and it correlate with experimental techniques.
2. This syllabus is practical based and deals with basic information of non-flowering primitive plants.
3. Students learn and understand the vegetative and developmental stages of non flowering plants.

### BO. 332: Cell and Molecular Biology:

(Credits-02)

1. The basic terminology in these fundamental streams like cell and molecular biology.
2. The student's participation with laboratory experiments for understanding the basic principles of life sciences.
3. Understanding the mechanism of genetic make of all life forms.
4. Students gain the information based on cellular and molecular mechanism during life processes.

**BO. 333 Genetics and Evolution: (Credits-02)**

1. Students understand different terms related to basic genetics and its principle.
2. This streams mainly deals with basic terms and subject application in evolution.
3. Students determine and analysis of laws of the inheritance.

**BO. 334 Spermatophyta and Paleobotany: (Credits-02)**

1. Students aware about the classification of plants.
2. Students gain the importance of plant classification and its types.
3. Students understand the basic terminology based on various morphological aspects.
4. Chapters are deals with important terminology in the angiosperm and taxonomy.
5. Syllabus mainly focuses the geological time scale and origin of modern plants on earth.

**BO. 335 Horticulture and Floriculture: (Credits-02)**

1. Syllabus deals with information on economically important plant species which are commercialized for the local and international market.
2. Some aspects like habitat, growth condition, production of healthy plantlets and cultivation techniques.
3. Students understand the marketing strategies of economical importance flowering plants.
4. Students aware the physiological aspects based on the mode of flowering and management of by-products in floriculture.

**BO. 336 Computational Botany: (Credits-02)**

1. This syllabus mainly deals with basic concept of computer technology.

2. This includes the some application and computer programme helpful for analyzing the data in life science experiments.
3. Students understanding the basic programming methodology in statistical analysis in life sciences data.

## SEM VI

### **BO. 341 Plant Physiology:**

**(Credits-02)**

1. This subject syllabus based on the basic life science process in relation to the plant metabolism and catabolism process.
2. It linked with interrelation between plant adaptations to external environment.
3. The included chapters deal with plant metabolic cycles with Photosynthesis and Respiration process.
4. Students get familiarized with all basic terminology and mechanism in plant physiology.

### **BO. 342 Plant Ecology and Biodiversity**

**(Credits-02)**

1. Syllabus framed for this subject is concern with all environmental burning aspects of global scenario, also deals with all basic ecological information.
2. Advanced ecological concepts give the idea regarding the impact of pollution on human health and on ecological cycles.
3. Students understand advanced areas of local ecosystem maintenance through various conservation strategies and laws.
4. Students gain the importance of ethnobotanical information for ecosystem conservation.

### **BO. 343 Plant Pathology**

**(Credits-02)**

1. This curriculum beneficial for agriculture, Horticulture and crops streams.
2. The types of various diseases and its effect on crop production.
3. Syllabus also concern with preventive measure should be taken to avoid the harm full diseases.

4. Students understand advanced areas of pathological techniques for crop protection through biological control.

**BO. 344 Medicinal and Economic Botany: (Credits-02)**

1. This subject deal with system of medicines and its application for day to day life.
2. Students aware the medicinal value of plants, which give specific effect on body parts.
3. Understand the preparation steps for various Ayurvedic formulations.

**BO. 345 Plant Biotechnology: (Credits-02)**

1. Innovative and recently findings in plant sciences included in this chapters.
2. Students understand the various techniques applied in life sciences.
3. Syllabus giving basic information regarding the plant biotechnology and its application in agriculture, Horticulture, medicinal and industrial crops.

**BO. 346 Plant Breeding and Seed Technology: (Credits-02)**

1. To expose students plant propagation technique this will be beneficial for the students to understand to create a new variety of medicinal and agronomic crops.
2. Syllabus giving basic information of plant improvement through advanced techniques.
3. Know about basics of Factors affecting the production of high yielding variety in important crop species.

**Semester VI**

**BO. 247 PRACTICALS (Credits-02)**

1. This syllabus is practical based and deals with basic information of reproductive plant parts of non-flowering primitive plants.
2. Students aware about the classification of plants
2. They get knowledge in applying techniques and skills to study the structural details and the role of plants in sustainable development with commercial applications.

**BO 248 PRACTICALS (Credits-02)**

1. This subject deals with system of medicines and its application for day to day life.
2. Students aware the medicinal value of plants, which give specific effect on body parts.
3. Understand the preparation steps for various Ayurvedic formulations.
4. They get knowledge in applying techniques and skills to study the structural details and the role of plants in sustainable development with commercial applications.

### **BO 249 PRACTICALS**

**(Credits-02)**

1. To expose students plant propagation technique this will be beneficial for the students to understand to create a new variety of medicinal and agronomic crops.
2. Discuss the types for plant improvement through advanced techniques.
3. Know about basics of Factors affecting the production of high yielding variety in important crop species.



## **B. Sc. Mathematics (Credit System)**

### **Under the Faculty of Science**

#### **Programme Outcome (POs)**

1. Gain sound knowledge on fundamental principles and concepts of Mathematics and computing with their applications related to Industrial, Engineering, Biological and Ecological problems.
2. Exhibit in depth the analytical and critical thinking to identify, formulate and solve real world problems of science and engineering.
3. Get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
4. A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.
5. Apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
6. Be capable of undertaking suitable experiments/research methods while solving the real-life problem and would arrive at valid conclusions based on appropriate interpretations of data and experimental results.
7. Develop written and oral communications skills in order to effectively communicate design, analysis and research results.
8. Demonstrate appropriate inter-personal skills to function effectively as an individual, as a member or as a leader of a team and in a multi-disciplinary setting.
9. Acquire competent positions in industry and academia as well.

#### **Programme Specific Outcome (PSOs)**

1. Give the students a sufficient knowledge of fundamental principles, methods and a clear perception of in numerous powers of mathematical ideas and tools and know how to use them by modelling, solving and interpreting.
  2. To equip the students sufficiently in both analytical and computational skills in Mathematical Sciences.

3. To develop a competitive attitude for building a strong academic - industrial collaboration, with focus on continuous learning skills.
4. Enhancing students' overall development and to equip them with mathematical modelling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
5. Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.
6. Enabling students to Gauge the hypothesis, theories, techniques and proofs provisionally.

## Course Outcomes

### Semester – I

#### MT 111- Algebra

(Credits-02)

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

#### MT 112: Calculus – I

(Credits-02)

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

#### MT 113 Mathematics Practical

(Credits-1.5)

**Course Outcomes:** The course will enable the students to:

1. Getting knowledge of basic of maxima software.
2. Calculate GCD of 2 numbers using Euclidean algorithm.
3. Solve examples of polynomial.
4. Plot function in 2D and 3D.

## Semester - II

### MT 121-Analytical Geometry

(Credits-02)

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### MT 122: Calculus-II

(Credits-02)

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### MT 123 Mathematics Practical

(Credits-1.5)

**Course Outcomes:** The course will enable the students to:

1. Solve the problems of Geometry and Calculus using Maxima.
2. Draw 3D dimension figures.
3. Learn the command of Maxima Software.
4. Use various Maxima software command.

## Semester – III

### MT-231: Calculus of Several Variables

(Credits-02)

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### MT-232(A): Numerical Methods and It's Applications

(Credits-02)

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.



2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### **MT-232(B) : Graph Theory**

**(Credits-02)**

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### **MT 233 Mathematics Practical**

**(Credits-02)**

**Course Outcomes:** The course will enable the students to:

1. List the software's.
2. Learn and install Software in Desktop Mobile Devices.
3. Troubleshoot the problems using Maxima software.
4. Solve the problems.
5. Plot the graphs and charts.

## **Semester - IV**

### **MT-241: Linear Algebra**

**(Credits-02)**

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### **MT 242(A): Vector Calculus**

**(Credits-02)**

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### **MT-242(B): Dynamical Systems**

**(Credits-02)**

**Course Learning Outcomes:** The course will enable the students to:

1. The mathematical maturity of students in their current and future courses shall develop.
2. The student develops theoretical, applied and computational skills.
3. The student gains confidence in proving theorems and solving problems

### **MT 243 Mathematics Practical**

**(Credits-02)**

**Course Outcomes:** The course will enable the students to:

1. List the software's.
2. Learn and install Software in Desktop Mobile Devices.
3. Troubleshoot the problems using Maxima software.
4. Solve the problems.
5. Plot the graphs and charts.

## **Semester-V**

### **DSE-1A: MT 351: Metric Spaces**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Understand the introductory concepts of metric spaces;
2. Correlate these concepts to their counter parts in modern analysis by
3. studying examples;
4. Learn to analyse mappings between spaces.
5. Attain background for advanced courses in real analysis, functional
6. analysis, and topology.
7. Appreciate the abstractness of the concepts such as open balls, closed
8. balls, compactness, connectedness etc. beyond their geometrical imaginations.

### **MT: 352 Real Analysis-I**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Learn the basic facts in logic and set theory

2. Learn to define sequence in terms of functions from  $\mathbb{N}$  to a subset of  $\mathbb{R}$  and to understand several properties of the real line.
3. Recognize bounded, convergent, divergent, Cauchy and monotonic
4. sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
5. Use the ratio, root, alternating series and limit comparison tests for
6. convergence and absolute convergence of an infinite series of real numbers

### **MT-353: Group Theory**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc;
2. Analyze consequences of Lagrange's theorem
3. Learn about structure preserving maps between groups and their consequences.
4. Explain the significance of the notion of cosets, normal subgroups, and factor groups.

### **DSE-2B: MT-354- Ordinary Differential Equations**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Understand the genesis of ordinary differential equations.
2. Learn various techniques of getting exact solutions of solvable first order differential equations and linear differential equations of higher order.
3. Grasp the concept of a general solution of a linear differential equation of an arbitrary order and also learn a few methods to obtain the general solution of such equations

### **DSE-3A: MT 355(A): Operations Research**

**(2 credit)**

**Course Learning Outcomes:** The course will enable the students to:

1. Analyze and solve linear programming models of real-life situations.
2. The graphical solution of LPP with only two variables, and illustrate the concept of convex set and extreme points. The theory of the simplex method is developed.

3. The relationships between the primal and dual problems and their solutions with applications to transportation, assignment and two-person zero-sum game problem

### **MT-355(B): Differential Geometry**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Gain an understanding to solve problems with the use of differential geometry to diverse situations in mathematical contexts.
2. Develop different properties associated with curves and surfaces.
3. Demonstrate a depth of understanding in advanced mathematical topics in relation to geometry of curves and surfaces Learn to analyze mappings between spaces.
4. Apply the theory of differential geometry to specific research problems in mathematics or other fields.

### **MT 355(C): C-Programming**

**(2 credits)**

**Course Learning Outcomes:** After the completion of this course, the students will be able to develop applications.

### **DSE-3B: MT-356(A): Machine Learning-I**

**(2 credits)**

**Course Learning Outcomes:** Upon successful completion of this course the student will be able to:

1. Gain knowledge about basic concepts of Machine Learning.
2. Identify machine learning techniques suitable for a given problem.
3. Solve the problems using various machine learning techniques.

### **DSE-3B: MT-356(B): Number Theory**

**(2 credits)**

**Course Learning Outcomes:** This course will enable the students to learn:

1. Some of the open problems related to prime numbers.
2. About number theoretic functions and modular arithmetic.

3. The Law of Quadratic Reciprocity and other methods to classify numbers as primitive roots, quadratic residues, and quadratic non-residues.

### **MT-356 (C): Laplace Transform and Fourier Series**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Students will be able to know the use of Laplace transform in system modelling, digital signal processing, process control.
2. Solve an initial value problem for an nth order ordinary differential equation using the Laplace transform.
3. Find the Fourier series representation of a function of one variable

### **MT -3510: Programming in Python–I**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. The student will be able to explain basic principles of Python programming language.
2. The student will implement object-oriented concepts.

### **MT-3511: LaTeX for Scientific Writing**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Write a simple LaTeX input document based on the article class.
2. Turn the input document into pdf with the pdf program.
3. Format Words, Lines, and Paragraphs.
4. Understand how to present data using tables. Latex

## **Semester-VI**

### **MT - 361: Complex Analysis**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Understand the significance of differentiability of complex functions leading to the understanding of Cauchy-Riemann equations.

2. Evaluate the contour integrals and understand the role of Cauchy-Goursat theorem and the Cauchy integral formula.
3. Expand some simple functions as their Taylor and Laurent series, classify the nature of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.
4. Represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem.

### **MT: 362 Real Analysis-II**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Some of the families and properties of Riemann integrable functions, and the applications of the fundamental theorems of integration.
2. Beta and gamma functions and their properties.
3. Recognize the difference between pointwise and uniform convergence of a sequence of functions.
4. Illustrate the effect of uniform convergence on the limit function with respect to continuity, differentiability, and integrability.

### **MT: 363 Ring Theory**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. The fundamental concept of Rings, Fields, subrings, integral domains and the corresponding morphisms.
2. Learn in detail about polynomial rings, fundamental properties of finite field extensions, and classification of finite fields.
3. Appreciate the significance of unique factorization in rings and integral domains.

### **MT 364: Partial Differential Equations**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Formulate, classify and transform partial differential equations into canonical form.

2. Solve linear partial differential equations using various methods and apply these methods in solving some physical problems.
3. Solve Laplace equations using various analytical methods demonstrate uniqueness of solutions of certain kinds of these equations.

### **MT-3610: Programming in Python –II**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

- Demonstrate the use of Python in Mathematics such as operations research and computational Geometry etc.
- Study graphics and design and implement a program to solve a real-world problem.

The students will implement the concepts of data with python and database connectivity

### **MT365 (A): Optimization Techniques**

**(2 credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Understand fundamentals of Network Analysis using CPM and PERT.
2. Solve a sequencing Problem for various jobs and machines.

### **MT 365(B): Calculus of Variation and Classical Mechanics**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. Understand problems, methods and techniques of calculus of variations.
2. Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body.
3. Deal with the kinematics and kinetics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles.
4. Determine the centre of gravity of some materialistic systems and discuss the equilibrium of a uniform cable hanging freely under its own weight.

**MT 365 (C): Financial Mathematics****(2 credits)****Course Learning Outcomes:** The course will enable the students to:

1. Describe and explain the fundamental features of a financial instruments.
2. Demonstrate a clear understanding of financial research planning, methodology and implementation.
3. Demonstrate understanding of basic concepts in linear algebra, relating to linear equations, matrices, and optimization.
4. Demonstrate understanding of concepts relating to functions and annuities.

**MT-366(A): Machine Learning-II****(2 Credits)****Course Learning Outcomes:**

1. The students learning outcomes are designed to specify what the students will be able to perform after completion of the course: Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.

**MT- 366(B): Computational Geometry****(2 Credits)****Course Learning Outcomes:** The course will enable the students to:

1. Construct algorithms for simple geometrical problems.
2. Characterize invariance properties of Euclidean geometry by groups of transformations.
3. Describe and construct basic geometric shapes and concepts by computational means.

**MT-366(C): Lebesgue Integration****(2 Credits)****Course Learning Outcomes:** The course will enable the students:

1. To understand the concept of measure and properties of Lebesgue measure.
2. To study the properties of Lebesgue integral and compare it with Riemann integral.



## MT-3611: Mathematics into LaTeX

(2 Credits)

**Course Learning Outcomes:** The course will enable the students to:

1. Typeset mathematical formulas, use nested list, tabular and array environments.
2. Import figures and pictures that are stored in external files.



## Department of Geography

### Course Outcome for B. Sc

## Semester I

### GG 111 Introduction to Physical Geography–I (Geomorphology)

#### Course Outcome:

1. Students will understand the basic concepts of Physical Geography.
2. Students will understand the applications of Geomorphology.
3. Students will understand the theories regarding Origin of Continents and oceans.
4. Students will be sensitizing with urgent need of protection and conservation of different aspects of Earth and its environment.
5. Students will be able to understand various geographical phenomenon, their origin, distribution and effect on life.

### GG 112: Introduction to Physical Geography II (Geography of Atmosphere and Hydrosphere)

#### Course Outcome:

1. Students will gain knowledge of the fundamentals of the Atmosphere so that they will be able to understand its uniqueness in among the planets in the galaxy.
2. Students will understand insolation and heat budget of the Earth. This is essential to understand causes and effects of global warming.
3. Students will be acquainted with atmospheric pressure and wind system. With this scientific knowledge they would understand intricacies of monsoon system that effects on Indian economy and polity.
4. Students will gain knowledge of hydrosphere to appreciate how water resource is precious.

### GG113 Practicals in Physical Geography

#### Course Outcome:

1. Students will get acquainted with basics of maps.
2. Students will understand map scales and its types.
3. Students will acquire skills of drawing various map projections with their advantages and limitations.
4. The students would develop the skills of representing geographical, meaning thereby spatial and temporal, data.
5. Exposure will be given to students about the field-based studies and data collection.

## Semester II

### GG121: Introduction to Human Geography

#### Course Outcome:

1. The students' understanding of basic concepts of Human Geography would help them for application of the same to local issues.
2. Students will acquire knowledge of the history and evolution of humans and their races.
3. Students will learn and respect cultural diversity through various theories.
4. Students will explore man-environment relationship or man within environment in different geographical regions.
5. Students will acquire knowledge of various economic activities.

### GG122 Population and Settlement Geography

#### Course Outcome:

1. With a knowledge base of Population Geography students would be able to understand issues related to population growth and related issues.
2. Students would understand the applications and sources of Population data.
3. Students would familiarize with the different types of Man-Environment relationship in different periods and areas.

4. Students would be able to understand the issues and solutions related to settlements using concepts in Settlement Geography.
5. Students would understand the concept and process of urbanisation in view of problems related to urban sprawl, rural urban divide and conflicts between human beings and environment.

### **GG123 Practicals in Human Geography.**

#### **Course Outcome:**

1. Students would understand the Population Indices and Projection with appropriate examples.
2. Students would be able to understand and apply notions of Population Geography in various field.
3. Students would develop their skills for using techniques used in Agriculture Geography.
4. Students would acquire the skills of computer aided presentation techniques.
5. They would get the idea of conducting social survey project which could surface the issues of particular social and

### **Semester III**

### **GG 231: Environmental Geography –I (Paper-I)**

**(2 Credits)**

#### **Course Learning Outcomes:**

The course will enable the students to:

1. To create environmental awareness amongst the students.
2. To familiarize the students with fundamentals concepts of Environmental Geography.
3. To acquaint the students to past, present, and future utility and potentials of resources at regional, national and global levels.
4. To enable the students to understand dynamics of man–environment relationship in various region of the world.

## **GG 232 : Geography of Maharashtra (Physical)-I (Paper II)**

**(2**

### **Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. To appraise the students with salient features of the Maharashtra State.
2. To familiarize the students with the climatic characteristics of the State.
3. To make the students aware of the geographic problems of Maharashtra in the view of sustainable development.

## **GG-243 Practical Surveying –I (Paper III)**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. To acquaint the students with the principles of surveying, its importance, and its utility in the Geographical study.
2. To familiarize the students with the basic aspects of linear, vertical and angular measurements of surveying.
3. To understand the importance, basic principles and uses of GPS in surveying.
4. To identify sources and types of errors occurs during surveys.

### **Semester IV**

## **GG-241 : Environmental Geography- II (Paper-I)**

**(2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. To introduce the methods and assessments of the impact on the environment amongst the students.
2. To acquaint the students with environmental protection laws, acts, planning, and management.
3. To appraise the students with various indigenous environmental conservation measures.

4. To make aware the students about various programs and policies carried out in the regional and global scale.

**GG-242: Geography of Maharashtra (Human)-II (Paper-II) (2**

**Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. To acquaint the students with the relationship between man and environment in Maharashtra State.
2. To familiarize the students with the agricultural pattern, problems and prospects in the state.
3. To study and understand the industrial sector, spatial distribution, development and problems faced within the state.
4. To know the status of transport and communication in Maharashtra state.

**GG-243: Surveying – II (2 Credits)**

**Course Learning Outcomes:** The course will enable the students to:

1. To acquaint the students with the principles of surveying, its importance and utility in the Geographical study.
2. To familiarize the students with the basic aspects of linear, vertical, and angular measurements of surveying.
3. To introduce the importance, basic principles, and uses of GPS in surveying.
4. To identify sources and types of errors occurs during surveys.

## Department of English

### Course Outcome for B. Sc

(Ability Enhancement Compulsory Course-AECC) (02-Credit Course)

#### Semester-III

**Text:** *Horizons: English in Multivalent Contexts*

(2 Credits)

(Board of Editors- Orient BlackSwan)

**Course Learning Outcomes:** The course will enable the students to:

1. To introduce the use of English in multimedia
2. To acquaint the students with the language skills in multivalent contexts
3. To acquaint and enlighten students regarding the speaking skill in various contexts
4. To acquaint and familiarize the students with advanced writing skills in different contexts
5. To acquaint and familiarize the students with soft skills
6. To minimize the gap between the existing communicative skills of the students and the skills they require at professional level
7. To develop competence among the students to appreciate and analyze short stories and poetry

#### Semester-IV

**Text:** *Horizons: English in Multivalent Context*

(2 Credits)

(Board of Editors- Orient BlackSwan)

**Course Learning Outcomes:** The course will enable the students to:

1. To introduce the use of English in multimedia
2. To acquaint the students with the language skills in multivalent contexts
3. To acquaint and enlighten students regarding the speaking skill in various contexts
4. To acquaint and familiarize the students with advanced writing skills in different contexts

5. To acquaint and familiarize the students with soft skills
6. To minimize the gap between the existing communicative skills of the students and the skills they require at professional level
7. To develop competence among the students to appreciate and analyze short stories and poetry





**Department of Marathi**  
**Course Outcome for B. Sc**

(Ability Enhancement Compulsory Course-AECC) (02-Credit Course)

**Semester-III**

**AECC -2A : विषयाचे नाव-उपयोजित मराठी** (02-Credit Course)

अभ्यासक्रमाची उद्दिष्टे :

१. मराठी भाषा, साहित्य आणि यांच्या परस्परसंबंधाची जाणीव करून देणे.
२. मराठी भाषेचा परिभाषासापेक्ष आणि शैलीसापेक्ष विकास विद्यार्थ्यांच्या लक्षात आणून देणे.
३. मराठी भाषेची उपयोजनात्मक कौशल्ये विकसित करणे.

**Semester-IV**

**AECC – 2B: मराठी साहित्य** (02-Credit Course)

अभ्यासक्रमाची उद्दिष्टे :

१. साहित्यविषयक अभिरूची विकसित करणे.
२. मराठी भाषा, साहित्य आणि यांच्या परस्परसंबंधाची जाणीव करून देणे.
३. साहित्यविषयक अभ्यासातून जीवनविषयक समज विकसित करणे.
४. विज्ञानसाहित्यविषयक आकलनक्षमता वाढविणे.

**Shirur Shikshan Prasarak Mandal's,**  
**Chandmal Tarachand Bora College**  
**of Arts, Commerce and Science Shirur Dist. Pune**  
**B. Sc. (Computer Science) CBCS-2019 Pattern**  
**Under the Faculty of Science**

**Program Outcome (PO)**

1. An ability to identify, formulate, and develop solutions to computational challenges.
2. An understanding of professional, ethical, legal, security, and social issues and responsibilities for the computing profession.
3. An ability to apply design and development principles in the construction of software systems of varying complexity.
4. An ability to analyse impacts of computing on individuals, organizations, and society.
5. An ability to function effectively on teams to accomplish shared computing design, evaluation, or implementation goals.

**Program Specific Outcome (PSO)**

1. Develop problem solving abilities using a computer
2. Build the necessary skill set and analytical abilities for developing computer-based solutions for real life problems.
3. Imbibe quality software development practices.
4. Create awareness about process and product standards
5. Train students in professional skills related to Software Industry.
6. Prepare necessary knowledge base for research and development in Computer Science
7. Help student's build-up a successful career in Computer Science

## Course Outcome (CO)

### Semester-I

**Course Code: CS101**

**Title : Problem Solving Using Computer and 'C' Programming – I**

#### Course Objectives:

1. To introduce foundations of computing, programming and problem- solving using computers.
2. To develop the ability to analyze a problem and devise an algorithm to solve it.
3. To formulate algorithms, pseudocodes flowcharts for arithmetic and logical problems
4. To understand structured programming approach.
5. To develop the basic concepts and terminology of programming in general.
6. To implement algorithms in the 'C' language.
7. To test, debug and execute programs.

**Course Outcomes:-** On completion of this course, students will be able to :

- Explore algorithmic approaches to problem solving.
- Develop modular programs using control structures and arrays in 'C'.

**Course Code: CS102**

**Course Title : Database Management Systems**

#### Course Objectives:

1. To understand the fundamental concepts of database.
2. To understand user requirements and frame it in data model.
3. To understand creations, manipulation and querying of data in databases.

**Course Outcomes:** On completion of the course, student will be able to–

1. Solve real world problems using appropriate set, function, and relational models.
2. Design E-R Model for given requirements and convert the same into database tables.

3. Use SQL

**Course Code:CS103**

**Title : Practical course on Problem Solving using Computer and ‘C’ programming and Database Management Systems**

**Course Objectives:**

1. To understand the program development life cycle.
2. Solve simple computational problems using modular design and basic features of the ‘C’ language.
3. Understand basic database management operations.
4. Design E-R Model for given requirements and convert the same into database tables

**Course Outcomes:** On completion of this course, students will be able to:

1. Devise pseudocodes and flowchart for computational problems.
2. Write, debug and execute simple programs in ‘C’.
3. Create database tables in postgre SQL.
4. Write and execute simple, nested queries.

**Subject : Matrix Algebra (MTC 111)**

**Course Outcomes:** The course will enable the students to:

1. Define the terms.
2. Understand the concepts ,tell fundamental principles .
3. Interrelate various concepts with other fields.
4. Solve the system of linear equations. Able to write cohesive and compressive solution to exercises.
5. Able to defend the arguments.

**Subject : Discrete Mathematics (MTC 112)**

**Course Outcomes:** The course will enable the students to:

1. Learn the logical connectives, their representation and meaning.
2. Understand partially ordered sets, lattices, Boolean lattices, logic gates, switching circuits and their applications.
3. Solve the real life problems.

### **Subject: Mathematics practical (MTC 113)**

**Course Outcomes:** The course will enable the students to:

1. Getting knowledge of basic of maxima software.
2. Solve the examples related to matrices. Limit and continuity.
3. Solving integration and derivative by using maxima.

### **ELC-111**

#### **Title : Semiconductor Devices and Basic Electronic Systems**

**Course Objectives:**

1. To study various types of semiconductor devices
2. To study elementary electronic circuits and systems

**Course Outcome:**

1. Students learn the characteristics and working of electronic devices
2. Understands the various device models
3. Develop skills in analysis and design of analog circuits

### **ELC 112:**

#### **Principles of Digital Electronics**

**Course Objectives:**

1. To get familiar with concepts of digital electronics

2. To learn number systems and their representation
3. To understand basic logic gates, Boolean algebra and K-maps
4. To study arithmetic circuits, combinational circuits and sequential circuits

**Course Outcome:**

1. Students understand sequential and combinational logic design

**ELC-113: ELECTRONICS LAB IA**

**Course Objectives:**

1. To study various types of semiconductor devices.
2. To study elementary electronic circuits and systems.
3. To get familiar with concepts of digital electronics.
4. To learn number systems and their representation.

**Course Outcomes:**

1. Students learn the characteristics and working of electronic devices.
2. Understands the various device models.
3. Develop skills in analysis and design of analog circuits.
4. Students understand sequential and combinational logic design.

**CSST 111 Descriptive Statistics I**

**Course Outcomes:** The course will enable the students to:

1. Basic concepts of statistics.
2. Know about graphical representation and diagrams.
3. Understand the meaning of central tendency, dispersion, skewness, symmetric of statistical data.
4. Solve the numerical problems based on mean, median and mode.
5. Get to know how statistics applied in day to day life.

## CSST 112 Methods of Applied Statistics

**Course Outcomes:** The course will enable the students to:

1. Understand the meaning of probability, using classical definition of probability, axiomatic approach and modern approach of probability.
2. Understand meaning of permutation (arrangement) and combination (selection) using set theory, probability, factorial notation.
3. Apply the law of independence, conditional probability of events and use of Baye's Theorem, using prior and posterior probability.
4. Calculation of average dispersion of discrete random variable using expectation.

## CSST 113 Statistics Practical I

**Course Outcomes:** The course will enable the students to:

1. Understand the relation between two variables scatter variable.
2. Compute coefficient of correlation, coefficient or regression.
3. Find normal distribution.
4. Understand the trend in time series and how to remove it.
5. Generate model sample from given distribution

### Semester-II

## CS201 Advanced 'C' Programming

**Course Objectives :-**

1. To study advanced concepts of programming using the 'C' language.
2. To understand code organization with complex data types and structures.
3. To work with files.

**Course Outcomes:-** Student will be able to :-

1. Develop modular programs using control structures, pointers, arrays, strings and structures

2. Design and develop solutions to real world problems using C

## **CS202 Relational Database Management Systems**

### **Course Objectives:**

1. To teach fundamental concepts of RDBMS (PL/PgSQL)
2. To teach database management operations
3. Be familiar with the basic issues of transaction processing and concurrency control
4. To teach data security and its importance

**Course Outcomes:** On completion of the course, student will be able to–

1. Design E-R Model for given requirements and convert the same into database tables.
2. Use database techniques such as SQL & PL/SQL.
3. Explain transaction Management in relational database System.
4. Use advanced database Programming concepts

## **CS203 Practical Course on Advanced ‘C’ Programming and Relational Database Management Systems**

### **Course Objectives:**

1. To solve real world computational problems.
2. To perform operations on relational database management systems.

**Course Outcomes:-**On completion of this course, students will be able to :

1. Write, debug and execute programs using advanced features in ‘C’.
2. Use SQL & PL/SQL.
3. Perform advanced database operations.

## **MTC 121 Linear Algebra**

**Course Outcomes:** The course will enable the students to:



1. Define term rank, nullity.
2. Learn about properties of linear transformation
3. Understand the matrix, its properties and its affect on finding eigen value, eigen vector.
4. Solve the problems. Solve linear equations independently

**Course Code: MTC 122**

**Title: Graph Theory**

**Course Outcomes:** The course will enable the students to:

6. Appreciate the definition and basics of graph along with its types and their examples.
7. Understand the definition of trees and learn its application to fundamental circuits.
8. Know the application of graph theory to network flows.
9. Understand the notion of planarity and colouring of graphs.
10. Relate the graph theory to the real-world problems.

**Course Code: MTC 123**

**Title: Mathematics Practical**

**Course Outcomes:** The course will enable the students to:

1. Getting knowledge of basic of maxima software.
2. Solve the examples related to matrices. Limit and continuity.
3. Solving integration and derivative by using maxima.

**Course Code: CSST 121**

**Title: Mathematical Statistics**

**Course Outcomes:** The course will enable the students to:

1. Know about relation between two variables using scatter diagram, Karl Pearson's coefficient of correlation and Spearman's rank correlation.
2. Understand the concept of Forecasting using regression analysis.
3. Calculation of finding relation for up to three variables and its forecasting.

4. Gain basic knowledge of time series analysis, its model component and analysis.

**Course Code: CSST 122**

**Title: Continuous Probability Distributions and Testing of Hypothesis**

**Course Outcomes:** The course will enable the students to:

1. Understand basic concept of continuous probability distribution (uniform, pareto, exponential and normal).
2. Learn concept of testing of hypothesis including types of hypothesis, error and test statistic.
3. Calculation of large sample and small sample test using t-test, F-test,  $\chi^2$
4. Learn knowledge of simulation techniques using random number table, calculator and computer.

**Course Code: CSST 123**

**Title: Statistics Practical II**

**Course Outcomes:** The course will enable the students

1. Know about relation between two variables using scatter diagram, Karl Pearson's coefficient of correlation and Spearman's rank correlation.
2. Understand the concept of Forecasting using regression analysis.
3. Calculation of large sample and small sample test using t-test, F-test,  $\chi^2$ .
4. Learn knowledge of simulation techniques using random number table, calculator and computer.

**F.Y.B.Sc.(Comp. Sci.) (Electronics)**

**Course Code: ELC 121:**

**Title: Instrumentation Systems**

**Course Objectives:**

1. To study Instrumentation System
2. To study various blocks of Instrumentation System

3. To study Smart Instrumentation System

**Course Outcome:**

1. Understand the configurations and functional descriptions of measuring instruments
2. Understand the basic performance characteristics of instruments
3. Understand the working principles of various types of sensors and transducers and their use in measuring systems
4. Study the techniques involved in various types of instruments
5. Understand the relevance of electronics with other discipline

**Course Code: ELC 122 :**

**Title: Basics of Computer Organisation**

**Course Objectives:**

1. To get familiar digital sequential circuits
2. To study Basic computer Organization
3. To study Memory architecture

**Course Outcome:**

1. Understand the architecture of Memory
2. Learn software techniques to embed codes in to the systems

**Course Code: ELC-123**

**Title: Electronics Lab IB**

**Course Objectives**

1. To study Instrumentation System.
2. To study various blocks of Instrumentation System.
3. To study Smart Instrumentation System.
4. To get familiar digital sequential circuits.

5. To study Basic computer Organization.
6. To study Memory architecture.

**Course Outcomes:**

1. Understand the configurations and functional descriptions of measuring instruments.
2. Understand the basic performance characteristics of instruments.
3. Understand the working principles of various types of sensors and transducers and their use in measuring systems.
4. Study the techniques involved in various types of instruments.
5. Understand the relevance of electronics with other discipline.
6. Understand the architecture of Memory.
7. Learn software techniques to embed codes in to the systems.

**Semester-III**

**Course Code: CS 231**

**Title : Data Structures and Algorithms – I**

**Course Objectives:**

1. To learn the systematic way of solving problem
2. To understand the different methods of organizing large amount of data
3. To efficiently implement the different data structures
4. To efficiently implement solutions for specific problems
5. To apply linear data structures.

**Course Outcomes:** On completion of the course, student will be able to

1. To use well-organized data structures in solving various problems.
2. To differentiate the usage of various structures in problem solution.
3. Implementing algorithms to solve problems using appropriate data structures.

**Course Code: CS 232**

**Title : Software Engineering**

**Course Objectives:**

1. To get knowledge and understanding of software engineering discipline.
2. To learn analysis and design principles for software project development.

**Course Outcomes:** On completion of the course, student will be able to

1. Compare and chose a process model for a software project development.
2. Identify requirements analyze and prepare models.
3. Prepare the SRS, Design document, Project plan of a given software system.

**Course Code: CS -233**

**Title: Data Structures and Algorithms I & Software Engineering Mini Project.**

**Course Objectives:**

1. To recall and understand the concepts of problem solving, algorithms and data structures.
2. To understand data representation, implementation and applications of linear data structures.
3. To learn, apply and analyze various data searching and sorting techniques.
4. To analyze algorithms using time and space complexity.
5. To implement various computers algorithm to solve real world problems

**Course Outcomes:**

1. Apply appropriate linear data structure to construct efficient algorithms to approach the given problem.
2. Apply the concept of Linked list to solve given problem.
3. Distinguish between various linear data structures based on their representations and applications.
4. Solve examples using data searching and sorting techniques.
5. Analyse algorithms using time and space complexity.

**Semester-III (Comp. Sci.), Electronics**

**ELC 231**

**Paper-I: Microcontroller Architecture & Programming**

### **Course Objectives:**

1. To study the basics of 8051 microcontroller
2. To study the Programming of 8051 microcontroller
3. To study the interfacing techniques of 8051 microcontroller
4. To design different application circuits using 8051 microcontroller

**Course Outcomes:** On completion of the course, student will be able

1. To write programs for 8051 microcontrollers
2. To interface I/O peripherals to 8051 microcontrollers
3. To design small microcontroller-based projects

### **ELC- 232 Digital Communication and Networking**

#### **Course Objectives:**

1. To introduce to all aspects of data communication system
2. To introduce various digital modulation schemes
3. To identify the need of data coding and error detection/correction mechanism.
4. To study bandwidth utilization techniques: multiplexing and Spectrum spreading
5. To know data link layer protocol: Media Access Control
6. To study OSI and TCP/IP models of Networking.

**Course Outcomes:** On completion of the course, student will be able

1. Define and explain terminologies of data communication
2. Understand the impact and limitations of various digital modulation techniques
3. To acknowledge the need of spread spectrum schemes.
4. Identify functions of data link layer and network layer while accessing communication link
5. To choose appropriate and advanced techniques to build the computer network

### **ELC-233**

#### **Practical Course**

### Course Objectives:

1. To get hands on training of Embedded C
2. To study experimentally interfacing of microcontroller
3. To design, build and test modulator and demodulators of digital communication
4. To build and test experimentally various techniques of wired communication
5. To develop practical skills of network setup

**Course Outcomes:** On completion of the course, student will be able

1. To design and build his/her own microcontroller-based projects.
2. To acquire skills of Embedded C programming
3. To know multiplexing and modulation techniques useful in developing wireless application
4. Do build and test own network and do settings.

### Subject: Groups and Coding theory (MTC 231)

**Course Outcomes:** The course will enable the students to:

1. Learn about groups, sub-groups, normal subgroups, isomorphism theorem, cyclic graphs.
2. Understand the development of codes for transmission.
3. Learn input and output of signal via transmission channel. Represent a linear code by matrices. Able to do encoding and decoding.
4. Study detection and correction of errors during transmission.

### Subject : Numerical Techniques (MTC 232)

**Course Outcomes:** The course will enable the students to:

1. Obtain numerical solution of algebraic and transcendental equations
2. Find numerical solution of system of linear equations and to check accuracy of solution.
3. Learn about various interpolation and extrapolation methods to find numerical solutions.
4. Solve initial and boundary value problems in different equation using numerical methods.
5. Apply various numerical method in real life problems.

## **Mathematics Practical: Python Programming Language-I (MTC 233)**

**Course Outcomes:** The course will enable the students to:

1. Explain the basic principles.
2. List the programming languages.
3. Learn the python.
4. Write programmes.
5. Apply iterations and conditional statements.

## **Semester IV**

**Course Code: CS 241**

**Title: DATA STRUCTURES AND ALGORITHMS-II**

**Course Objectives:**

1. To learn the systematic way of solving problems
2. To design algorithms
3. To understand the different methods of organizing large amount of data
4. To efficiently implement the non-linear data structures

**Course Outcomes:** On completion of this course students will be able to

1. Implementation of different data structures efficiently
2. Usage of well-organized data structures to handle large amount of data
3. Usage of appropriate data structures for problem solving

**Course Code: CS 242**

**Title: Computer Networks-I**

**Course Objectives:**

1. To prepare students with basic networking concepts: data communication, protocols and standards, various topologies and applications of network.

**Course Outcomes**



1. Have a good understanding of the OSI and TCP/IP Reference Models and in particular have a good knowledge of Layers.
2. Understand the working of various protocols.
3. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies

**Course Code: CS-243**

**Title: Practical course on CS 241(Data Structures and Algorithms II) and CS 242 (Computer Networks I)**

**Course Objective:**

1. To understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
2. To understand basic data structures such as arrays, linked lists, stacks and queues.
3. To describe the hash function and concepts of collision and its resolution methods
4. To understand computer network basics, network architecture, TCP/IP and OSI reference models.
5. To Identify and understand various techniques and modes of transmission

**Course Outcomes:**

1. Solve problem involving graphs, trees and heaps
2. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data
3. Discuss the elements and protocols of transport layer
4. Understand network security and define various protocols such as FTP, HTTP, Telnet, DNS
5. To Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN

**ELC-241**

**Embedded System Design**

**Course Objectives:**

1. To understand the concept of Embedded systems.
2. To study the design flow and available tools for an Embedded system.
3. To understand the implementation of embedded system using firmware and hardware components.
4. To acquire programming skills for the development of Embedded system design.
5. To develop practical skills for designing embedded system Applications.

**Course Outcomes:** On completion of the course, student will be able

1. To understand the difference between general computing and the Embedded systems.
2. To know the fundamentals of embedded systems.
3. Understand the use of Single board Computer (Such as Raspberry Pi) for an embedded system application.
4. Familiar with the programming environment to develop embedded systems and their interfaces with peripheral devices.
5. To develop familiarity with tools used to develop in an embedded environment.

**ELC242**

### **Wireless Communication and Internet of Things**

**Course Objectives:**

1. To learn and understand applications of wireless communication system
2. To learn and understand cellular system
3. To learn and understand architecture of short-range Wireless Technologies
4. To learn and understand basics of Internet of Things
5. To study applications of IoT

**Course Outcomes:** Students will be able to

1. Know working of wireless technologies such as Mobile communication, GSM, GPRS
2. Become familiar with 3G and 4G Cellular Network Technologies for Data Connections.
3. Understand working principles of short-range communication application
4. Get introduce to upcoming technology of Internet of Things
5. Explore themselves and develop new IoT based applications

## ELC-243

### Practical Course

#### Course Objectives:

1. To use basic concepts for building various applications of embedded electronics.
2. To build experimental setup and test the circuits.
3. To develop skills of analyzing test results of given experiments.
4. Developing Trained Personals for educating and training for upcoming graduates in wireless communication.
5. Implement basic IoT applications on embedded platform

#### Course Outcomes: On completion of the course, students will be able

1. To design and develop own smart applications using Raspberry-Pi
2. To write Python program for simple applications
3. To build own IoT based system

### Subject : Computational Geometry (MTC 241)

#### Course Outcomes: The course will enable the students to:

1. Understand the effects like rotation, reflection, shearing, scaling and translation. Describe the various effect with the help of matrices. Visualize the effects.
2. Solve the problems.
3. Apply the knowledge in real life problems.

### Subject : Operations Research (MTC 242)

#### Course Outcomes: The course will enable the students to:

1. Apply and solve linear programming models of real-life situations.
2. Provide graphical solutions of linear programming problems with two variables and illustrate the concept of convex and extreme points.
3. Understand the theory of the simplex method.

4. Know about the relationship between the primal and dual problems and to understand sensitivity analysis.
5. Learn about the application to transportation, assignment and two person zero- sum game.

### **Mathematics Practical : Python Programming Language-II ( (MTC 243)**

**Course Outcomes:** The course will enable the students to:

1. Explain the basic principles.
2. List the programming languages.
3. Learn the python.
4. Write programmes.
5. Apply iterations and conditional statements.

### **Semester V**

**Course Code: CS - 351**

**Course Title: Operating Systems – I**

**Course Objectives:**

1. To understand the concept of operation system and its principle
2. To study the various functions and services provided by operating system
3. To understand the notion of process and threads

**Course Outcomes:** After completion of this course students will be able to understand the concept of

1. Processes and Thread Scheduling by operating system
2. Synchronization in process and threads by operating system
3. Memory management by operating system using with the help of various schemes

**Course Code: CS - 352**

**Course Title: Computer Networks – II**

**Course Objectives**

1. To understand different protocols of application layer.
2. To understand concepts of multimedia.
3. Explore the different methods used for Network/INTERNET security.

**Course Outcomes:** On completion of the course, student will be able to–

1. Student will understand the different protocols of Application layer.
2. Develop understanding of technical aspect of Multimedia Systems
3. Develop various Multimedia Systems applicable in real time.
4. Identify information security goals.
5. Understand, compare and apply cryptographic techniques for data security.

**Course Code: CS - 353**

**Course Title: Web Technologies – I**

**Course Objectives:**

1. To Design dynamic and interactive Web pages.
2. To Learn Core-PHP, Server-Side Scripting Language
3. To Learn PHP-Database handling

**Course Outcomes:** On completion of the course, student will be able to–

1. Understand how to develop dynamic and interactive Web Page

**Course Code: CS - 354**

**Paper Title: Foundations of Data Science**

**Course Objectives:**

1. Provide students with knowledge and skills for data-intensive problem solving and scientific discovery
2. Be prepared with a varied range of expertise in different aspects of data science such as data collection, visualization, processing and modelling of large data sets.

3. Acquire good understanding of both the theory and application of applied statistics and computer science based existing data science models to analyze huge data sets originating from diversified application areas.
4. Be better trained professionals to cater the growing demand for data scientists in industry.

**Course Outcomes:** On completion of the course, student will be able to–

1. Perform Exploratory Data Analysis
2. Obtain, clean/process, and transform data.
3. Detect and diagnose common data issues, such as missing values, special values, outliers, inconsistencies, and localization.
4. Demonstrate proficiency with statistical analysis of data.
5. Present results using data visualization techniques.
6. Prepare data for use with a variety of statistical methods and models and recognize how the quality of the data and the means of data collection may affect conclusions.

**Course Code: CS - 355**

**Course Title: Object Oriented Programming using Java – I**

**Course Objectives:**

1. To learn Object Oriented Programming language
2. To study various java programming concept like Interface, File and Exception Handling etc.
3. To design User Interface using Swing and AWT

**Course Outcomes:** On completion of the course, student will be able to–

1. Understand the concept of classes, object, packages and Collections.
2. To develop GUI based application.

**Course Code: CS - 356**

**Paper Title: Theoretical Computer Science**

**Course Objectives:**

1. To understand the Finite Automata, Pushdown Automata and Turing Machine.

2. To understand the Regular Language, Context Free Language, Context Sensitive Language and Unrestricted Language.
3. To understand the relation between Automaton and Language

**Course Outcomes:** On completion of the course, student will be able to–

1. Understand the use of automata during language design.
2. Relate various automata and Languages.

**Course Code: CS - 357**

**Course Title: Practical Course based on CS – 351**

**Course Objectives:**

1. To understand the concept of process scheduling with the help of simulation.
2. To study the concept demand paging concepts in operating system.
3. To understand the working of operating system shell.

**Course Outcomes:** After completion of this course students will be able to understand the concept of

1. Process synchronization
2. Processes and Thread Scheduling by operating system
3. Memory management by operating system using with the help of various schemes

**Course Code: CS - 358**

**Course Title: Practical Course based on CS - 353 and CS – 354**

**Course Objectives:**

1. To Design dynamic and interactive Web pages.
2. To Learn Core-PHP, Server-Side Scripting Language
3. To Learn PHP- Database handling
4. To apply statistical, data pre-processing and visualization techniques on data sets

**Course Outcomes:**

1. Understand how to develop dynamic and interactive Web Page
2. Prepare data for use with a variety of statistical methods and recognize how the quality of the data may affect conclusions.
3. Perform exploratory data analysis

**Course Code: CS - 359**

**Course Title: Practical Course based on CS – 355**

**Course Objectives:** Covers the complete scope of the syllabus.

1. Bringing uniformity in the way course is conducted across different colleges.
2. Continuous assessment of the students.

**Course Outcomes:**

1. Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.
2. Read and make elementary modifications to Java programs that solve real-world problems.
3. Validate input in a Java program.

**Course Code: CS-3510**

**Course Title: Python Programming**

**Course Objectives:**

1. To introduce programming concepts using python
2. Student should be able to develop Programming logic using python
3. To develop basic concepts and terminology of python programming
4. To test and execute python programs

**Course Outcomes:** On completion of the course, student will be able to–

1. Develop logic for problem solving.
2. Determine the methods to create and develop Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.



3. To be familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.
4. To write python programs and develop a small application project

**Course Code: CS-3511**

**Course Title: Blockchain Technology**

**Course Objectives:**

1. Understand what and why of blockchain technology.
2. Explore major components of blockchain.
3. Learn about Bitcoin, Cryptocurrency and Ethereum.
4. To learn blockchain programming using Python, Flask Web Framework, and HTTP client Postman.

**Course Outcomes:** On completion of the course, student will be able to–

1. Learn the fundamentals of Blockchain Technology.
2. Learn Blockchain programming
3. Basic knowledge of Smart Contracts and how they function.

**Semester VI**

**Course Code: CS - 361**

**Course Title: Operating Systems-II**

**Course Objectives:**

1. To understand the issue of Deadlocks in Process management.
2. To understand the concept of File system management & disk scheduling
3. To study the concept of distributed and mobile operating systems

**Course Outcomes:** After completion of this course students will be able to understand the concept of

1. Management of deadlocks and File System by operating system
2. Scheduling storage or disk for processes
3. Distributed Operating System and its architecture and the extended features in mobile OS.

**Course Code: CS - 362**

**Course Title: Software Testing**

**Course Objectives:**

1. To provide the knowledge of software testing techniques
2. To understand how testing methods can be used as an effective tool in quality assurance of software.
3. To provide skills to design test case plan for testing software.
4. To provide knowledge of latest testing methods

**Course Outcomes:**

1. To understand various software testing methods and strategies.
2. To understand a variety of software metrics, and identify defects and managing those defects for improvement in quality for given software.
3. To design test cases and test plans, review reports of testing for qualitative software.
4. To understand latest testing methods used in the software industries.

**Course Code: CS - 363**

**Course Title: Web Technologies – II**

**Course Objectives:**

1. To Learn different technologies used at client-Side Scripting Language
2. To Learn XML and XML parsers.
3. To One PHP framework for effective design of web application.
4. To Learn Java Script to program the behaviour of web pages.
5. To Learn AJAX to make our application more dynamic.

**Course Outcomes:** On completion of the course, student will be able to–

1. Build dynamic website.
2. Using MVC based framework easy to design and handling the errors in dynamic website.

**Course Code: CS - 364**

**Course Title: Data Analytics**

**Course Objectives:**

1. Deploy the Data Analytics Lifecycle to address data analytics projects.
2. Develop in depth understanding of the key technologies in data analytics.
3. Apply appropriate analytic techniques and tools to analyze data, create models, and identify insights that can lead to actionable results.

**Course Outcomes:** On completion of the course, student will be able to–

1. Use appropriate models of analysis, assess the quality of input, and derive insight from results.
2. Analyze data, choose relevant models and algorithms for respective applications
3. Understand different data mining techniques like classification, prediction, clustering and association rule mining
4. Apply modeling and data analysis techniques to the solution of real-world business problems

**Course Code: CS - 365**

**Course Title: Object Oriented Programming using Java – II**

**Course Objectives:**

1. To learn database programming using Java
2. To study web development concept using Servlet and JSP
3. To develop a game application using multithreading
4. To learn socket programming concept

**Course Outcomes:** On completion of the course, student will be able to–

1. To access open database through Java programs using Java Data Base Connectivity (JDBC) and develop the application.
2. Understand and create dynamic web pages, using Servlets and JSP.
3. Work with basics of framework to develop secure web applications.

**Course Code: CS - 366**

**Course Title: Compiler Construction**

**Course Objectives:**

1. To understand design issues of a lexical analyzer and use of LEX tool.
2. To understand design issues of a parser and use of YACC tool.
3. To understand and design code generation and optimization techniques.

**Course Outcomes:** On completion of the course, student will be able to–

1. Understand the process of scanning and parsing of source code.
2. Learn the conversion code written in source language to machine language.
3. Understand tools like LEX and YACC.

**Course Code: CS - 367**

**Course Title: Practical Course based on CS - 361**

**Course Objectives:**

1. To implement Banker's algorithm for Deadlocks in Process management.
2. To simulate File system management
3. To study and implement various algorithms of disk scheduling

**Course Outcomes:** After completion of this course students will be able to understand the concept of

1. Management of deadlocks by operating system
2. File System management
3. Disk space management and scheduling for processes

**Course Code: CS - 368**

## **Course Title: Practical Course based on CS - 363 and CS – 364**

### **Course Objectives:**

1. To Learn different technologies used at client-Side Scripting Language
2. To Learn XML and XML parsers.
3. To One PHP framework for effective design of web application.
4. To Learn Java Script to program the behaviour of web pages.
5. To Learn AJAX to make our application more dynamic. Framework has some utility features that make easy to write API in more efficient way Than Core PHP

### **Course Outcomes:**

1. Build dynamic website.
2. Using MVC based framework easy to design and handling the errors in dynamic website.

## **Course Code: CS - 369**

## **Course Title: Practical Course based on CS – 365**

### **Course Objectives:**

1. Covers the complete scope of the syllabus.
2. Bringing uniformity in the way course is conducted across different colleges.
3. Continuous assessment of the students.
4. Advanced Java is designed to develop web based, network centric, Enterprise level Applications

### **Course Outcomes:**

1. To Learn database Programming using Java
2. Understand and create dynamic web pages using Servlets and JSP.
3. Work with basics of framework to develop secure web applications

## **Course Code: CS - 3610**

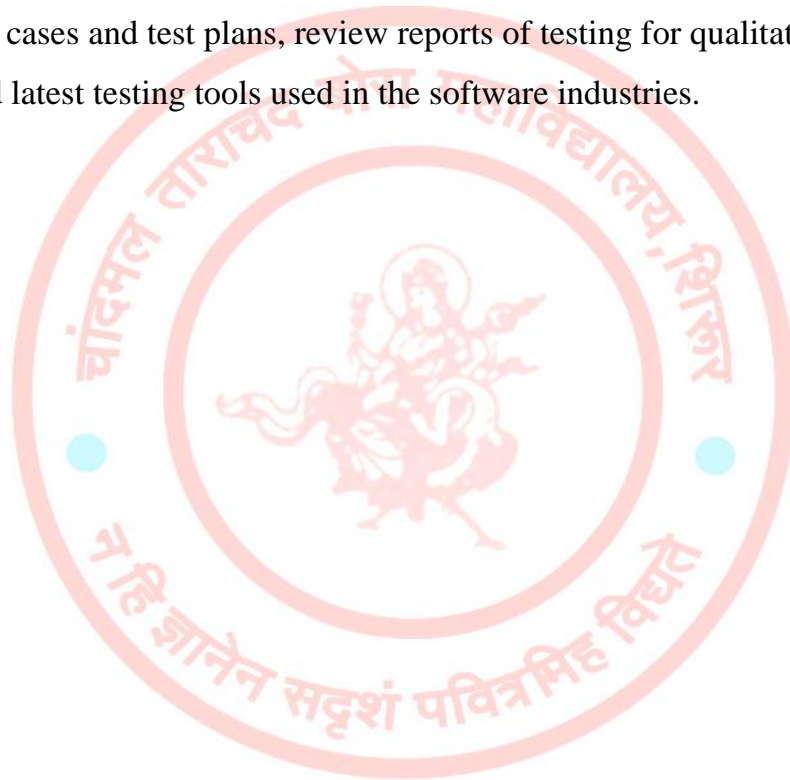
## **Course Title: Software Testing Tools**

### **Course Objectives:**

1. To provide the knowledge of software testing methods and strategies.
2. To understand how testing methods can be used as an effective tool in quality assurance of software.
3. To provide skills to design test case plan for testing software.
4. To provide knowledge of latest testing tools

**Course Outcomes:**

1. To understand various software testing methods and strategies.
2. To understand a variety of software metrics and identify defects and managing those defects for improvement in quality for given software.
3. To design test cases and test plans, review reports of testing for qualitative software.
4. To understand latest testing tools used in the software industries.



## **B. Voc. (Retail Management) (Credit System)**

### **Program Outcome (PO)**

- PO1** To provide adequate basic understanding about Retail Management and specific skill sets among the candidates.
- PO2** To train the candidates in communication skills effectively.
- PO3** To prepare candidates with special labs in specific courses and with suitable training from Industry
- PO4** To give candidates hands on training with projects to make them Industry ready.
- PO5** To develop appropriate Vocational employability skills in the candidates so as to make them competent and get or provide themselves self-employment.

### **Program Specific Outcome (PSO)**

- PSO-01** This course enables to know about prevailing, past and future scenario of retailing in India.
- PSO-02** This course gets the student acquainted with the knowledge of retail operations performed in a retail organization
- PSO-03** This course will help to organize the display at the store and to plan visual merchandising
- PSO-04** This course provides practical experience and exposure to students.
- PSO-05** This course will provide students conceptual understanding of different operating processes and their significance in running retail operations by undergoing research.

## Course Outcome (COs)

### Semester- I

#### Subject: 101 Business Communications.

##### Course Objectives:

1. This course is useful to make the students conversant and fluent in English.
2. This course will create a positive image of self and organization in the Customer Mind.
3. This course will resolve customer concerns and improve customer relationship.

#### Subject: 102 Basics of Marketing.

##### Course Objectives:

1. This course will improve the understand and concept of marketing.
2. This course will expose the students to the latest trends in marketing.
3. This course will monitor and solve service problems.
4. This course will promote continuous improvement in service.

#### Subject: 103 Fundamental of Customer Services.

##### Course Outcomes:

1. This course will help students to understand the critical need for service orientation in the current business scenario.
2. This course will help customers choose right products.
3. This course will create a positive image of self and organization.
4. This course will resolve customer concerns and improve customer relationship.

#### Subject: 104 Basic of Retailing.



**Course Outcomes:**

1. This course enables to know about prevailing, past and future scenario of retailing in India.
2. This course will improve customer relationship.
3. This course will help to organize the display at the store and to plan visual merchandising

**Subject: 105 Project Work.****Course Outcomes:**

1. This course will help to learn the practical tactics of retail business.
2. This course will provide on the job experience to students.

**Subject: 106 Computer Practical-MS Office-I.****Course Outcomes:**

1. This course is useful to enhance the knowledge about the usage of the Computer and IT in retail business.
2. This course will improve the computer skills of students.

**Skill Enhancement Course****Credit: 15****Subject 107: Business Correspondent/Business Facilitator (BSC/Q8401) OR MOOC****(NPETL/Swayam)**

The student who successfully completes this course students will be able to:

1. To provide interactive courses, prepared by best teachers in country at free of cost.
2. Students will get certificate on successful completion of the course.
3. Students will be assessed through proctored examination and the marks/grades secured in this exam could be transferred to the academic record of students.

## Semester-II

### Subject: 201 Business Organization and Management

#### Course Outcomes:

1. This course will provide conceptual knowledge of different forms of Business Organizations
2. This course will enable students' understanding various concepts in Management.
3. Students will be enabled to work effectively in organization with proper understanding of various aspects of Business Organization and Management.

### Subject: 202 Business Mathematics and Statistics

#### Course Outcomes:

1. This course will enable students to develop understanding of various mathematical and statistical tools and techniques and its application in practical problems.
2. This course will enable students to perform mathematical, logical calculations required for decision making in day today retail operations.
3. Students will be enabled to monitor and manage store performance

### Subject: 203 Retail Management

#### Course Outcomes:

1. This paper will be useful in providing students with a comprehensive understanding of the theoretical and applied aspects of retail management.
2. This course will help students to identify various retail management functions and activities and enable them to understand their importance in satisfying customer need.
3. Students will be enabled to effectively monitor and manage retail store.

### Subject: 204 Environmental Studies

**Course Outcomes:**

1. This course will provide a comprehensive knowledge of mechanism of Ecological System.
2. Students will be enabled to understand the various environmental issues.
3. This course will help students to understand the various elements of ecological system and its impact.

**Subject: 205 COMPUTER PRACTICALS-II (MS- Power point & Internet)****Course Outcomes:**

1. This course will enhance the knowledge of students regarding basic elements and use of Power Point and Internet in performing various business activities.
2. This course will help students to acquire proficiency in application such as power point.

**Subject: 206 Lab in Retail Store Operations-I****Course Outcomes:**

1. This course will help students to learn tactics of retail store operations practically.
2. This help students in gaining insights into retail store planning, organizing and managing.

**Skill Enhancement Course****Credit: 15****Subject: 207: On Job Training – Retail Sector**

The student who successfully completes this course students will be able to:

1. Student will get practical Knowledge about retail sector.
2. Student will experience actual platform of work in retail industry.
3. Student will get clear idea about various functions of retail sector

**Pedagogy:** Lectures / Critical Analysis / Assignments / Test/ e-learning/ Visual Presentation

## Semester-III

### Subject: 301: Business Economics

#### Course Outcomes:

1. This course is to make the student understand how the business organizations work by applying economic principles in their Business Management.
2. This course will provide practical knowledge about business economics to students.

### Subject: 302: Human Resources Management

#### Course Outcomes:

1. This course is aimed at providing comprehensive knowledge of Human Resources Management.
2. This course will provide knowledge of all the functions of Human Resources Management.

### Subject: 303: Supply Chain Management

#### Course Outcomes:

1. This course will create awareness about the supply chain activities taken in order to deliver the goods.
2. This will help to understand tools and techniques of supply chain management in the retail sector.

### Subject: 304: Consumer Behavior

#### Course Outcomes:

1. This course will impart conceptual knowledge about consumer behavior and other related issues.

2. This course will be useful to understand the retail customer and its origin of various retail strategies.

### **Subject: 305: Research Paper Writing and Presentation on Retailing Sector I**

#### **Course Outcomes:**

1. This course will provide students conceptual understanding of different operating processes and their significance in running retail operations by undergoing research into the same.
2. It also helps develop understanding about necessary skills for undertaking research paper writing task and presentation.

### **Subject: 306: Practical Training - retail store Operations- II**

#### **Course Outcomes:**

1. This course provides practical experience and exposure to students.
2. This course will make students understand various aspects of retail store operation

#### **Skill Enhancement Course**

**Credit: 15**

### **Subject: 307: Desk Research in Retailing Sector**

The student who successfully completes this course will be able to:

1. Student will get idea about how to do practical work in retail sector
2. Student will be able to prepare project report on the practical work done by them.
3. Student will be got familiar with project contents

**Pedagogy:** Lectures / Critical Analysis / Assignments / Test/ e-learning/ Visual Presentation

#### **Semester IV**

## **Subject: 401: Personality and soft skill Development**

### **Course Outcomes:**

1. This course will enable students to understand different aspects of personality development and soft Skills.
2. This course will help students to understand need and importance of personality and soft skill development in workplace and will enable them to work on personality and soft skill development of themselves.
3. This course will enable students to shape themselves appropriately while behaving in social and professional circles

## **Subject: 402: Store Layout and Design**

### **Course Outcomes:**

1. This course will help students in gaining comprehensive knowledge of Store Location, layout and operations.
2. This course will help students to understand crucial elements of store layout and design to maximize sales of goods & services promote continuous improvement.
3. This course will help students to develop the sense of understanding about the importance of effective store layout and design in facilitation consumer purchases and maximizing sales of the store.

## **Subject: 403: Organizational Behavior**

### **Course Outcomes:**

1. This course will provide a foundation for understanding individual, group and organizational behavior, which is essential for better management of an organization
2. This course will help students to understand various behavioral aspects affecting the operations of an organization.

### **Subject: 404: Elements of Salesmanship**

#### **Course Outcomes:**

1. This course will impart conceptual knowledge of salesmanship and understanding consumer behavior.
2. To make the students aware about various activities of business, business practice to positive image.

### **Subject: 405: Research Paper Writing and Presentation (II) on Retail Store Operations**

#### **Course Outcomes:**

1. This course will provide students conceptual understanding of different operating processes and their significance in running retail operations by undergoing research into the same.
2. This course will help students to develop necessary skills for undertaking research paper writing task and presentation.

### **Subject: 406: Project Work on Retail Consumer Buying Behavior and Satisfaction**

#### **Course Outcomes:**

1. This course will provide practical experience and exposure to students.
2. This course will help students to understand various aspects of consumer buying behavior and customer satisfaction and factors affecting the same.
3. This course will help students develop necessary skills for planning and managing for better customer services in a retail store.

**Pedagogy:** Lectures / Critical Analysis / Assignments / Test/ e-learning/ Visual Presentation

### **Subject 407: MOOC(NPTEL/Swayam)**

The student who successfully completes this course students will be able to:

1. To provide interactive courses, prepared by best teachers in the country at free of cost.
2. Students will get certificate on successful completion of the course.
3. Students will be assessed through proctored examination and the marks/grades secured in this exam could be transferred to the academic record of students.

## Semester-V

### **Subject: 501 Merchandise buying and planning**

#### **Course Objectives**

- 1 This course will make student understand about Merchandise buying and planning.
- 2 This course enables students develop strategies about Merchandise buying and planning.

### **Subject: 502 Retail Operations**

#### **Course Objectives**

1. This course get the student acquainted with the knowledge of retail operations performed in a retail organization.
2. This course will make students understand retail operation

### **Subject: 503 Entrepreneurship Developments**

#### **Course Objectives**

1. This course will provide a foundation for Entrepreneurship Development
2. This course will make the students to prepare business plans

### **Subject: 504 Advertising and Brand Management**



### **Course Objectives**

1. This course will make the students understand the importance of advertising and media role in advertising and Brand management.
2. This course enables to develop the various strategies of Advertising and Brand Management.

### **Subject: 505 Fundamentals of Visual Merchandising (VM)**

#### **Course Objectives**

1. This course aims at learning basic visual merchandising concepts and theories essential in the store image, its merchandise, and displays.
- 2 This course will helpful to formulate Strategies of Visual Merchandising (VM).

### **Subject: 506-SummerProject**

#### **Course Objectives**

1. This course will provide practical experience and exposure to students.
2. This course will make student understand various aspects of retail sector.
3. It also helps develop necessary skills for planning and managing for better customer services in a retail store.

### **Subject: 507 Skill Enhancement Course**

**Credit: 15**

#### **MOOC / Swayam / NPTEL course on Marketing Management**

1. Describe retailing, the entities involved, and the impact of decisions on a retail business.
2. Identify the various models of buying processes.
3. Identify the important aspects of merchandise planning and management

4. Describe the process of conceiving, producing, and selling fashion products for instore and on-line retailing.

**Pedagogy:** Lectures / Critical Analysis / Assignments / Test/ e-learning/ Visual Presentation

## Semester-VI

### Subject: 601 Strategic Management

#### Course Objectives

1. This course will enable students to understand various perspectives and concept sin Strategic Management.
2. This course will enable students to develop skills for applying these concepts to different Business situations.
3. This course will help students to understand the analysis.

### Subject 602: Business Ethics

#### Course Objectives

1. This course will provide conceptual and comprehensive knowledge of Business Ethics to students.
2. This course will impart knowledge to students of dilemmas of ethical decision making in business.
3. This course will provide basic understanding of ethics management and overview of ethics in different functional areas.
- 4 This course will develop understanding of the relationship between corporate social responsibility and business ethics among students.

### Subject: 603: Research Methodology

#### Course Objectives

1. This course will provide a foundation for conceptual understanding of essential elements in Research.

2. This course will develop understanding of need & importance of research, conduct of research and application of various essential elements.
3. This course will enable students to understand the basic frame work of Research Methodology

### **Subject: 604 Customer Relationship Management in Retail**

#### **Course Objectives**

1. This course will enable students to learn the basics of Customer Relationship Management.
2. This course will enable students to understand the role and changing face of CRM as IT enabled functions, and application of CRM activities in retail business
3. Student will be enabling to manage Customer Relationships.

### **Subject: 605 Lab in Retail Selling skill**

#### **Course Objectives**

1. This course will provide conceptual understanding of various essential elements for maximizing retail sales and their significance in successful retail business operations with effective sales performance.
2. This course will help to develop understanding about necessary skills for undertaking various selling activities and better customer service to the retail store

### **Subject: 606 Desk Research**

#### **Course Objectives**

1. This course will provide the foundation for understanding retail strategies and CRM activities of retail store
2. This course will enable students to understand various aspects of retail store strategies and its implementation.

**Subject: 607 Skill Enhancement Course**

**(Credit: 15)**

**MOOC / Swayam / NPTEL course on Marketing Management**

1. Describe retailing, the entities involved, and the impact of decisions on a retail business.
2. Identify the various models of buying processes.
3. Identify the important aspects of merchandise planning and management
4. Describe the process of conceiving, producing, and selling fashion products for instore and on-line retailing.



## Department of B. Voc. (Renewable Energy)

### Programme Outcomes (PO's)

- 1) Be familiar with the methods used in Renewable Energy.
- 2) Be able to understand the theoretical / mathematical / conceptual development of the subject.
- 3) Be able to understand the theoretical foundations / basic phenomena / concepts of Renewable Energy thoroughly.
- 4) Be able to understand the Renewable Energy sources and its applications deeply with the help of practicals.
- 5) Have a basic understanding of laboratory instruments used by faculty in the department.

### Programme Specific Outcome (PSO's)

- 1) Be able to improve technological aspect.
- 2) Be familiar with main theoretical concepts and experimental techniques.
- 3) Be able to develop experimental skills, data analysis, calculations and writing results scientific manner.
- 4) Be able to tackle the problems with the help of equations / formulae / graphs / mathematical tools.
- 5) Be able to improve the Energy Conservation and its awareness.
- 6) Be able to apply the subject knowledge of Renewable Energy in project / research.
- 7) Be able to continue to work in the field of Energy in general and in particular.
- 8) Be able to develop Awareness of the use of Solar Energy appliances among students.
- 9) Be able to develop the enhancing research skills among students.
- 10) Be familiar with the PV system designing and installation and maintenance of PV system

### Course Outcomes (COs) Semester I

#### Introduction to Renewable Energy Sources

(RET-1-1)

Students who have completed this course should

1. Have deep introduction with basic concepts of Renewable Energy Sources.
2. Understand various aspects of Renewable Energy.
3. Understand various aspects of various forms of energy.
4. Have deep understanding of Conventional and Non-conventional energy sources.
5. Have deep Knowledge of Energy consumption in various sectors and its changing pattern, projected energy demands.

### **Basic Electronics**

**(RET-1-2)**

Students who have completed this course should

1. Be familiar with basic properties of electronics. Have deep understanding of Decimal, Binary, Octal and Hexadecimal number systems and their inter conversions, and fractional binary number representations.
2. Have deep understanding of logic gates.
3. Have introduction with arithmetic circuits, combinational circuits, and sequential circuits
4. Be able to solve Rules of binary addition, subtraction, subtraction using 1's and 2's Complements, half adder, full adder, and parallel adder.
5. Have deep understanding of logic families, Multivibrator, data converters.

### **Basic Mechanical Engineering:**

**(RET-1-3)**

Students who have completed this course should

1. Have introduction with Forces in structures.
2. Have deep introduction with Engineering Drawing.
3. Have deep understanding of Fluid mechanics.
4. Have introduction with various types of Fluid, fluid statics, Bernoulli's equation, Conservation of mass, Definition of viscosity.
5. Have deep understanding of. Part drawing, method of Dimensioning; limit fit tolerances, symbols of welded joint, pipe joints, machine parts symbols.

## Semester II

### Sustainable Development and Energy

(RET-2-1)

Students who have completed this course should

1. Have introduction with sustainable development.
2. Understand various Opportunities in Energy Sustainability, Introduction of Green Buildings, Challenges and opportunities in sustainable practices.
3. Know about Global Energy Scenario, Indian Energy Scenario, Maharashtra Energy Scenario, Energy and Environment.
4. Know various applications of Solar Energy and Its Conversion.
5. Have knowledge of Spectral distribution of extra-terrestrial radiation, Estimation of extra-terrestrial solar radiation.

### Applications of Solar Energy

(RET-2-2)

Students who have completed this course should

1. Be familiar with general properties and concepts of Photovoltaic applications of solar energy.
2. Understand Basic working principle, solar cell parameters and characteristics, Efficiency, Efficiency losses, Classifications models.
3. Understand mechanism of various Photovoltaic systems: Stand-alone systems, Grid connected systems, Solar power satellite systems.
4. Have deep introduction with Photovoltaic applications: Industrial applications, Social applications, Consumer applications.
5. Have deep introduction with Solar Photovoltaic (SPV) Systems Designing: Load estimation, selection of inverters, battery sizing, and array sizing.

### Bio-Energy

(RET-2-3)

Students who have completed this course should

1. Be familiar with general properties of Biogas / Biomethanation System, Generation of biogas.
2. Have deep introduction with Conversion Principals-Aerobic and Anaerobic bioconversion process.
3. Have deep understanding of Types of Biofuels, Basic Biology, Production Processes, Biofuel applications.
4. Have deep introduction with Origin of Biomass (Photosynthesis process).
5. Be able to determine various types biomass/biomass resources (Energy Crops, Agricultural residues, herbaceous biomass, Woody biomass, Waste materials).

### Semester III

#### Soft Skill and Communications

(RET-3-1)

Students who have completed this course should

1. Be familiar with basic knowledge of Presentation Skills, Interview Technique, and Time management.
2. Be aware of Hazard identification, Risk management/risk control, Risk to health from work activities.
3. Have deep introduction with various aspects of Inter-personal relation, Job limitations, Work ethics, and Professional behavior.
4. Have introduction with various aspects of Problem solving skills, Job role play & Developing Efficient Work Habits, Time work ethics.
5. Make awareness about the overall health and safety management system.

#### Wind Energy

(RET-3-2)

Students who have completed this course should

1. Have introduction with origin of wind, fundamentals of fluid flow.
2. Understand various classifications of wind machines: vertical & horizontal axis, upwind and downwind.



3. Know about the performance parameter of wind machines-tip speed ratio, solidity and power coefficient.
4. Know about the various hybrids, environmental impact of wind power, global and Indian scenario.
5. Be able to measure the power coefficient and plotting of  $C_p-\lambda$  characteristics of horizontal axis wind machines.

### **Solar Cell Technology & its applications**

**(RET-3-3)**

Students who have completed this course should

1. Have introduction with Production of Silicon.
2. Understand various growths of solar PV industry and Si requirement.
3. Know about Si wafers, Production of metallurgical Grade Si (MGS), Production of electronics Grade Si (EGS).
4. Know about Thin film solar cell Technology.
5. Know about Si wafer-based solar cell Technology.

### **Semester IV**

### **Components of Photovoltaic Systems**

**(RET-4-1)**

Students who have completed this course should

1. Have introduction with Components of Grid – connected Solar PV Systems.
2. Understand various Solar Modules, Charge Controllers, Inverters Batteries, Racking, Solar PV array.
3. Know about the PV module, Side- of Pole Mount for solar panel.
4. Know about the Components of Solar Panel.
5. Be familiar with solectrica inverter on a prewired Power panel.

### **Solar Photovoltaic Systems: Design & Integration**

**(RET-4-2)**

Students who have completed this course should

1. Have introduction with Solar PV systems Design And integration
2. Understand various Types of Solar PV Systems, Standalone SPV system, Grid connected SPV systems.
3. Know about the Design methodology for SPV systems.
4. Know about the PV systems design and its applications
5. Be familiar with Design methodology of PV systems, Wire Sizing in PV systems.

### **Solar Photovoltaic Systems: Installation & Maintenance**

**(RET-4-3)**

Students who have completed this course should

1. Have introduction with Installation, Troubleshooting and safety.
2. Understand various Types of solar PV systems.
3. Know about the Maintenance of PV systems.
4. Know about the installation of Solar PV systems, Installation and trouble shooting of solar PV Power Plants.
5. Be familiar with the PV system components.

### **Semester V**

### **Roof Top & Grid Connected PV System**

**(RET-5-1)**

Students who have completed this course should

1. Have introduction with Roof Top Solar PV Systems.
2. Understand various components and design of solar rooftop business models.
3. Know about the Grid Connectivity – Configuration.
4. Know about the Components of Grid Connected PV Systems.
5. Be familiar with Off-Grid and On-Grid connectivity, Grid connected photovoltaic system.

### **Net Metering Concept & Government Policies**

**(RET-5-2)**

Students who have completed this course should

1. Have introduction with Concept of net metering.

2. Understand various State and National level net metering policies.
3. Know about the net energy metering, virtual net metering.
4. Know about the General Guidelines of Net Metering, Various Approvals, and Application procedure for net metering.
5. Be familiar with the concept of solar rooftop net metering.

### **Introduction to PV Software's**

**(RET-5-3)**

Students who have completed this course should

1. Have introduction with Solar PV Software's.
2. Understand various software's which are useful to design solar photovoltaic plants.
3. Know about the detail study of PVSYST and PVSOL software.
4. Know about the HELIOSCOPE, PV F CHART, INSEL, POLYSUN, SOLARIUS PV, SKELION,
5. Be familiar with PV-Design-PRO (GE), PV Designer Sol metric, HELIOS 3D.

## **Semester VI**

### **Operation and Maintenance**

**(RET-6-1)**

Students who have completed this course should

1. Have introduction with Operation and Maintenance (O&M) of the plants.
2. Understand various types of maintenance.
3. Know about the O&M focus areas.
4. Know about the Preventive Maintenance (PM), Corrective Maintenance (CM) or breakdown Maintenance (BM).
5. Be familiar with Module, Electrical sub-systems, Civil and Structural sub-systems.

### **Site Feasibility Report**

**(RET-6-2)**

Students who have completed this course should

1. Have introduction with solar PV power plant.

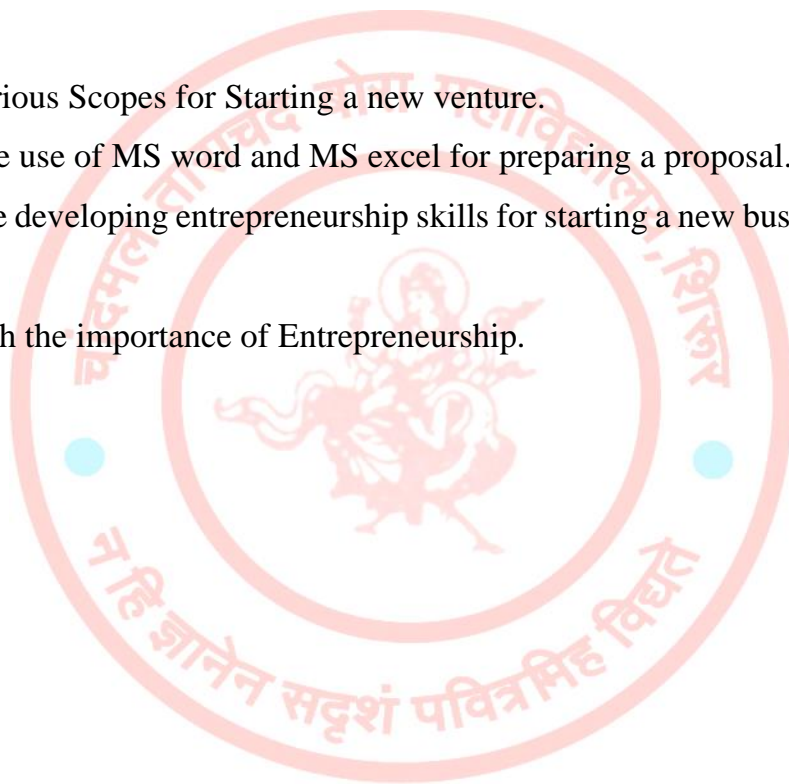
2. Understand various parameters of solar resource data like GHI, DNI, Temperature and Wind , Perform shading analysis.
3. Know about the Site Visit.
4. Know about the client requirement.
5. Know about the how to prepare Site Feasibility Study Report.

### **Entrepreneurship Skills**

**(RET-6-3)**

Students who have completed this course should

1. Have introduction with Government/corporate policies and guidelines on solar PV & solar rooftop.
2. Understand various Scopes for Starting a new venture.
3. Know about the use of MS word and MS excel for preparing a proposal.
4. Know about the developing entrepreneurship skills for starting a new business and managing it.
5. Be familiar with the importance of Entrepreneurship.



**Shirur Shikshan Prasarak Mandal's,**  
**Chandmal Tarachand Bora College**  
**of Arts, Commerce and Science, Shirur Dist. Pune**

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## **M. A. Marathi (Credit System) Academic Year 2019-20**

### **Under the Faculty of Humanities**

#### **Programme Outcomes (POs)**

1. Enriching students' literary and life skills.
2. To enhance the attitude of medical study of literature
3. To develop linguistic awareness and apply skills
4. To develop various language skills and employment potential in field of life
5. To cultivate literary values and values of life
6. Increase interest in reading literature and other arts
7. To introduce Students Eocene social, political, religious literary and economic conditions perspective Watchtower.

#### **Program Specific Outcome (PSO) of Master of Arts (M.A.)**

1. Able to understand language fully and use it appropriately.
2. Speak and write grammatically correct Marathi.
3. Cultivate universal human values.
4. Let the students know the definitions of language and various variations of language.
5. Understand the basis of the classification of Marathi literature.
6. To introduce Students Eocene social, political, religious literary, and economic conditions perspective Watchtower.
7. The study of Literature and language can enhance geographical and social mobility

## Semester- I

### Course Title- CC 1 – BHASHA VYAVHAR VA BHASHK KUOSHLY Code- 10401

- 1) There was accuracy in the speech of the students
- 2) The standard language began to appear accurately in the writing of students
- 3) Students were able to write critical language, especially when writing reviews
- 4) Students noticed the contradiction between spoken language, literary language, standard language and review language.

### Course Title- CC 2 -ARVACHIN MARATHI VAGAMAYACHA EITIHASCode- 10402 ( 1818 TO 1920 )

- 1) Understood the concept of literary history.
- 2) Understood the social, religious, cultural background of this period
- 3) Understood the type, form and movement of literature during this period
- 4) Understood the literary inspiration and subject matter of this period

### Course Title- CC 3- EYATYASHIK BAHASHA VIDYAN, Code- 10403

- 1) Understood language format and function.
- 2) Understood language study methods.
- 3) Understood linguistic concepts.
- 4) Understood sociolinguistics concepts.
- 5) Understood the interrelationships between language and culture.

### Course Title- CC 4 – GRAMIN SAHITYA, Code- 10404

- 1) Understood the inspiration of Gramin literature after independence.
- 2) Understood the nature and movement of Marathi Gramin literature.
- 3) Understood the nature and inspiration of Marathi Gramin literature.
- 4) Understood the contribution of Marathi Gramin and literature.

## Semester II

### Course Title- CC 5 – BHASHA VYAVHAR VA BHASHK KUOSHLI Code- 20401

- 1) Translation and translation writing skills can be done.
- 2) Understanding how to make a statement of statement in various programs.
- 3) What is public relations? The search processes,
- 4) understanding, language and components.

### Course Title- CC 6 – ARVACHIN MARATHI VAGAMAYACHA EITIHAS ( 1920TO 2010 ) Code- 20402

- 1) Understood the inspiration and nature of Marathi literature from 1920 to 1945.
- 2) Understood various thought processes in this period e.g.
- 3) Gadhiism, Socialism, Marxism ... New literature and new reviews of this period were introduced.
- 4) Literary genres of this period were introduced

### Course Title- CC 7- SAMAJ BHASHA VIDYAN, Code- 20403

- 1) Understood the nature of sociolinguistics.
- 2) Sociolinguistics special and scope understood.
- 3) Understood the relationship between language and social status.
- 4) Language and language contact noticed.

### Course Title- CC 8 – DALIT SAHITYA, Code- 20404

- 1) Understood the nature of Marathi Dalit literature.
- 2) Marathi Dalit literature understood inspiration and uniqueness.
- 3) Various types of Marathi Dalit literature were introduced.
- 4) Dalit literature and social commitment were introduced.

## Semester III

### Course Title- CC 1 – Writing Skills for Media Part-1, Code- 30401



- 1) The media understood the concept.
- 2) Understood the nature and specialty of media.
- 3) Gained writing skills for radio.
- 4) Understood how to write for television. Gained the ability to write for media.

**Course Title- CC 1 – Critisim in Literature, Code- 30402**

- 1) Literature and review is the concept.
- 2) Various components of review were introduced.
- 3) The importance of review writing was realized.
- 4) A variety of reviews were introduced.

**Course Title- CC 1 – Study of Designated Literary Works Part-1, Code- 30404**

- 1) Tarabai Shinde's thoughts were understood from the appointed literary work.
- 2) Equality is seen in the book Spurush Purlana.
- 3) Contemporary social system meditation came from the book Shetji Pratap.  
Understood the nature and specialty of Khankava.
- 4) Social consciousness developed from the play Shobhayatra.
- 5) This type of drama was introduced.

**Course Title- CC 1 – Fundamentals of Folklore and Marathi Folklore Part -01Code- 30405**

- 1) Understood the nature of the folklore.
- 2) The people's guidance and the curriculum found in the public.
- 3) Folklore decorated the Indian tradition.
- 4) Lokityalism and other study branches (history, language, psychology, learnedthat  
folklore is a global standing area.

**Semester IV**

**Course Title- CC 1 – Writing Skills for Media Part-2,**

**Code- 40401**

- 1) Students understood how to write for a documentary.

- 2) Understood how to write a screenplay for a film.
- 3) Various new social media were introduced.
- 4) The effect of writing on social media on the society was noticed.

**Course Title- CC 1 – Research in Literature,**

**Code- 40402**

- 1) Understood the concept of literary research.
- 2) Understood what qualities should be in the hands of critics.
- 3) Various stages in the research process came to mind.
- 4) Understood research methodology and how to plan research.

**Course Title- CC 1 – Study of Designated Literary Works Part-2, Code- 40404**

- 1) This type of Marathi travelogue was introduced.
- 2) America was introduced to this country. The nature and subject matter of the political novel came to mind.
- 3) This type of literature became known as autobiography.
- 4) While walking, this autobiography gave a glimpse of Dalit life.
- 5) This literary work introduced modern literature and its social consciousness,

**Course Title- CC-1 Fundamentals of Folklore and Marathi Folklore Part -02,Code- 40405**

- 1) Understanding the nature of the Marathi folklore.
- 2) The nature and specialty of the Marathi folk songs. Understanding the nature and type of Marathi folk.
- 3) It was understood what artistic beauty of Marathi people.
- 4) Introduced to the Marathi cylinders. The work of Marathi folklore researchers

# **Savitribai Phule Pune University, Pune**

## **M. A. Hindi (Credit System) from the Academic Year 2019-20**

### **Under the Faculty of Humanities**

#### **Program Outcome (PO)**

1. Students know relation between Society and Literature.
2. Introducing the evolution of epics and discord in the modern era.
3. Information o elemental nature of modern-day management and liberating poetry.
4. Explain the interrelationship between different aspects of language skills and means of communication and develop their application.
5. Speak and write grammatically correct Hindi.
6. Study the different types of Hindi literature and develop literary taste.
7. To introduce Students Eocene social, political, religious literary and economic conditions perspective Watchtower.

#### **Program Specific Outcome (PSO)**

1. Able to understand language fully and use it appropriately.
2. Speak and write grammatically correct Hindi.
3. Cultivate universal human values.
4. Let the students know the definitions of language and various variations of language.
5. Understand the basis of the classification of Hindi literature.
6. To introduce Students Eocene social, political, religious literary, and economic conditions perspective Watchtower.
7. The study of Literature and language can enhance geographical and social mobility.

## Course Outcomes (COs) of Master of Arts (M.A.)

### Semester I

#### Course Title- Madhyayugin Kavya,

Code- 10501

1. Understand and interpret the concept, structure and meaning of Madhyayugin poetry.
2. Introducing the evolution of epics and discord in the modern era.
3. Information about elemental nature of modern-day management and liberating poetry.
4. To teach students the elements of poetry, the difference of poetry and wordpower.

#### Course Title- Katha Sahitya,

Code- 10502

1. Understand and interpret concept, structure and meaning of Madhyayugin poetry.
2. Developing student's ability to taste Hindi novels.
3. Understand the basic elements of short stories.
4. Students Know to Hindi Novel, story writers.

#### Course Title- Bharatiy Kavyashastra,

Code- 10503

1. Undertake the formal study of literature by engaging in critical reading, appreciation and analysis of texts in an interactive and participatory classroom setting.
2. Learn the basic elements of Bharatiy Kavyashastra.
3. Understand and interpret the concept, structure and meaning of poetry.

#### Course Title- Hindi Patrakarita,

Code- 10504

1. Students Know to Hindi Patrakarita.
2. Understand and interpret the concept, structure and meaning of Patrakarita.

3. Understand the basic elements of Patrakarita.
4. Students Know the Media and these responsibilities.

## **Semester II**

### **Course Title- Kathetar Gadya Sahitya,**

**Code- 20501**

1. Students Know to Hindi Rekhachitra (Sketches), Essays, Autobiography and Irony (Vyangya) writers.
2. Students Able to Creative writing.
3. Students learn method of Various types of Sahitya writing.

### **Course Title- Shodh Pravidhi,**

**Code- 20502**

1. Students become aware of research methodology.
2. Research vision is developed in the students.
3. Become familiar with new research flows.
4. The research process and dissertation writing skills are developed in the students.

### **Course Title- Pashchyatya Kavyashastra,**

**Code- 20503**

1. Undertake the formal study of literature by engaging in critical reading, appreciation and analysis of texts in an interactive and participatory classroom setting.
2. Learn the basic elements of western poetry.
3. Knowledge of the development of the sequence of western poetry.
4. Creativity, taste and criticism are developed in the students.

### **Course Title- Shailivigyan evam Saundrashashtra,**

**Code- 20504**

1. Students Know the Shailivigyan (Stylistics) evam Saundrashashtra (Aesthetic).
2. Enable students to deal with highly intellectual and radical content and thereby develop their logical thinking and analytical ability.

3. Aesthetic vision is developed in the students.
4. The ideology of Indian and western thinkers gets introduced.

### **Semester III**

#### **Course Title- Adhunik Kavya,**

**Code- 30501**

1. Introducing the trends of modern Hindi poetry to students.
2. To give information for student about modern poetry.
3. Introducing the types of poetry and development of poetry to the Students.
4. To familiarize students with various types of modern poetry.
5. To give information about 'new poem'.

#### **Course Title- Bhashavigyan,**

**Code- 30502**

1. Linguistics parts and various branches introduction to give.
2. To aware the theoretical side of linguistics.
3. Information about the historical development of Indian Arya language.
4. Introducing the word store and grammatical form of Hindi.
5. Explain the usefulness of linguistics in the study of literature.

#### **Course Title- Hindi Sahitya ka Itihas,**

**Code- 30503**

1. Understand the origin of Hindi language and its literature.
2. To introduce Students Eocene social, political, religious literary, and economic conditions perspective Watchtower.
3. Understand the basis of the classification of Hindi literature.
4. To aware Aadikalin, Bhaktikalin and Ritikalin major literary trends, representatives of poets and his compositions.

#### **Course Title- Sanhar Madhyam,**

**Code- 30505**

1. Understand the basic elements of Sanchar Madhyam (Media) .

2. Learn the history, effect, ethics and creative writing in Media.
3. Gather acquaintance with the basic workings in radio, T.V., Cinema etc,Media.
4. Understand the basic workings of television and film industry.
5. Developing critical views in students.

### **Semester IV**

**Course Title- Adhunik Kavita,**

**Code- 40501**

1. Introducing the trends of modern Hindi poetry to students.
2. To give information for student about modern poetry.
3. Introducing the types of poetry and development of poetry to the Students.
4. To familiarize students with various types of modern poetry.

**Course Title- Hindi Bhasha ka Vikas,**

**Code- 40502**

1. Enhance knowledge about Hindi language and historical background.
2. To make students aware of modern Indian Aryans languages and their classification.
3. Classification of Hindi dialects and acquaintance with the region.
4. Give information about movement of Hindi publicity and dissemination.

**Course Title- Hindi Sahitya ka Itihas,**

**Code- 40503**

1. Enhance the knowledge of origin of Hindi language and its literature.
2. To introduce Students Eocene social, political, religious literary, and economic conditions perspective Watchtower.
3. Understand the basis of the classification of Hindi literature.
4. To aware Modern literary trends, representatives of poets and his compositions.
5. Enable to Historical perspective develops.

**Course Title- Bharatiy Loksahitya,**

**Code- 40504**

1. To introduce students to Indian folk literature

## **Savitribai Phule Pune University, Pune**

### **M. A. English (Credit System) Academic Year 2019-20**

#### **Under the Faculty of Humanities**

#### **Program Outcome (PO)**

1. Broadens students' awareness of the general culture of different places where English is used and enhances their appreciation and understanding of culturally diverse societies.
2. Provides ample opportunities for learners to develop their creativity, sharpen their critical and analytical skills, and enhance their language proficiency.
3. The study of Literature has many practical advantages—it provides ample opportunities for learners to develop their creativity, sharpen their critical and analytical skills, and enhance their language proficiency.
4. The rationale for studying Literature in English is that it primarily reinforces the guiding principles for education reform outlined in the UGC guidelines.
5. Cultivate universal human values

#### **Program Specific Outcome (PSO)**

1. The intellectual, aesthetic and emotional qualities which learners develop by studying literature in English prepare them for further study or work, particularly in areas such as publishing and the media, where creativity, critical thinking and intercultural understanding are highly appreciated.
2. The Literature component in English Curriculum provides learners with learning experiences to appreciate and enjoy literature, encourage self-expression and creativity, enhance their critical and analytical skills, improve their competence in the use of English, develop their cultural understanding as well as positive values



and attitudes conducive to lifelong learning, and prepare them for further study or work.

3. Studying/teaching the Literature component in English curriculum are to enable learners to appreciate and enjoy a wide range of literary or creative texts and to appreciate other related cultural forms.
4. The curriculum helps learners to develop a humanistic outlook on life. Through a close interaction with literary/creative works, which portray a range of human thoughts, emotions and experiences, learners gain knowledge and an understanding of the nature of human existence and of the world.
5. The study of Literature and language can enhance geographical and social mobility.

## **Course Outcome (CO) Part I**

### **Paper 1.1: English Literature from 1550 to 1798**

- 1) Introduce students to the major movements and figures of English Literature through a study of selected literary texts/pieces published during the period prescribed for study.
- 2) Enhance learners' literary sensibility and their emotional response to literary texts and to help them understand the thematic and stylistic preoccupations of the writers prescribed for study.
- 3) Enable them to critically examine the writers' thematic concerns and to point out the (in) significance of such concerns in the postcolonial context.
- 4) Help students recognize the distinctive ways in which the writers differed, in their ideological positions, from their counterparts belonging to different ages
- 5) Provide learners some basic information about England's political, social and cultural developments during the period prescribed for study.

### **Paper 1.2: English Literature from 1798 to the Present**

- 1) Introduce students to the major movements and figures of English Literature through a study of selected literary texts/pieces published during the period prescribed for study.

- 2) Enhance learners' literary sensibility and their emotional response to literary texts and to help them understand the thematic and stylistic preoccupations of the writer prescribed for study.
- 3) Enable students to critically examine the writers' thematic concerns and to point out the (in) significance of such concerns in the postcolonial context.
- 4) Help learners recognize the distinctive ways in which the writers differed, in their ideological positions, from their counterparts belonging to different ages.
- 5) Enable learners to critically assess the 'universal' values that writers tend to project in their writings.

### **Paper 1.3: Contemporary Studies in English Language**

1. Introduce students to the basic tools essential for a systematic study of language
2. Acquaint students with the basic concepts and issues in linguistics
3. Introduce them to various sub-disciplines of linguistics
4. Initiate them into some of the theoretical assumptions underlying language and to enable them to apply the acquired linguistic skills in real life situations
5. Acquire linguistic skills.

### **Paper – 1.4: Literary Criticism and Theory**

- 1) Introduce students to the nature, function and relevance of literary criticism and theory
- 2) Introduce learners to various important critical approaches and their tenets
- 3) Enable students to deal with highly intellectual and radical content and thereby develop their logical thinking and analytical ability
- 4) Develop sensibility and competence in them for practical application of critical approach to literary texts

## M. A. English Part II

### Paper 3.1: Indian Writing in English (Core Paper)

- 1) Introduce students to the various phases of the evolution in Indian Writing in English.  
(i. e. the major movements and figures of IWE)
- 2) Make students aware of Indian cultural ethos and indigenous belief systems through the study of major literary works in the domain of Indian English literature.
- 3) Acquaint learners with the writings of different Indian writers and help them appreciate the variety and diversity of Indian Writing in English.
- 4) Expose students to the corpus of Indian Writing in English, and explain the socio-political and cultural contexts in which the works were written and received.
- 5) Develop the ability of students to critically examine and restate their understanding of literary texts

### Paper-3.3: Cultural Studies

- 1) Introduce students to the newly established field of cultural studies, its concerns and approaches
- 2) Orient students towards interdisciplinary approach and analysis of cultural issues including literature and language
- 3) Steer students towards new possibilities of analysis that can relate them to their surroundings
- 4) Create awareness about the recent developments in humanities and social sciences that cover several issues from philosophical to everyday matter
- 5) Instill tolerance, sense of equality and love for humanity in students.

### Paper-3.4: Indian Literatures in English Translation

- 1) Introduce students to some of the significant Indian regional language writers of various periods and to their works.

- 2) Acquaint students with the major ancient, medieval and modern literary movements in India and their influence on literature.
- 3) Enable students to compare the features and peculiarities of Indian societies, cultures and languages.
- 4) Encourage students to undertake translations from Indian languages
- 5) Familiarize students with translation theories

### **Paper-3.6: American Literature**

- 1) Provide students a general introduction to the major texts that led to the evolution of American literature as an independent branch of literature in English.
- 2) Familiarize students with the issues and problems America has gone through and how they find expression in her literature.
- 3) Help students gain a broad historical view of the entire period from the time of the early settlers, through the westward movement to the contemporary period.
- 4) Provide students a general idea about the religious, socio-political, literary and cultural movements in America.
- 5) Acquaint students with some of the major conflicts, struggles and movements that are closely connected with the experiences of a group of people struggling establish their space within the nation.

## **Savitribai Phule Pune University, Pune**

### **M. A. History (Credit System) from the Academic Year 2019-20**

#### **Under the Faculty of Humanities**

#### **Semester I**

##### **Course Title: HS: CC - 1: History: Theory and Method**

###### **Objectives**

The paper is designed to provide adequate conceptual base, bring better understanding of history and its forces, help interrogate existing paradigms and challenge the outdated, help in developing critique, help research in terms of formulating hypotheses and develop broad frames of interaction with other social sciences and attain certain level of Interdisciplinary approach.

##### **Course Title: HS: CC - 2: Evolution of Ideas and Institutions in Early India**

###### **Objectives**

The course intends to provide an understanding of the social, economic and institutional bases of early India. It is based on the premise that an understanding of early Indian history is crucial to understand Indian history as a whole.

##### **Course Title: HS: CC 3: Maratha Polity**

###### **Objectives**

The purpose of the course is to study the administrative system of the Marathas in an analytical way, to acquaint the student with the nature of Maratha Polity, to understand basic components of the Maratha administrative structure, to enable the student to understand the basic concepts of the Maratha polity.

## **Semester 1: HS: EC: 1: History of Deccan – Pre History to Chalukyas**

### **Objectives:**

The paper is designed to make the student aware of the background of the history of the region. A broad survey of the pre-history which connects with the early history is aimed at emphasizing the continuities and changes in terms of geographical and cultural conditions created by the rulers.

## **Semester II**

### **Course Title: HS: CC - 4: Approaches to History**

Credits: 4

### **Objectives**

The paper is designed to make the student aware about the various approaches to the discipline of History. With its roots in Indian history, the paper provides a historical review of the salient approaches that have developed over the last few centuries. It is hoped that the student will become aware of the idea that the same set of historical source materials can be interpreted in different ways depending upon the approach one takes in studying them.

### **Course Title: HS: CC - 5: Ideas and Institutions in Medieval India**

### **Objectives**

The course examines the nature of medieval Indian society, economy, state formations, and the main religious currents of the time. It is seen as a continuation of the course on ancient India. It is also seen to be crucial to an understanding of the nature of society, and the problems of the challenge to that society, through colonialism, at a later stage.

Course content

### **Course Title: HS: CC - 6: Socio-Economic History of the Marathas Objectives**

The purpose of the course is to study socio-economic history of the Marathas in an analytical way, to acquaint the student with the components of social structure and their functions, to understand the relationship between religion, caste, customs, traditions, class in 17<sup>th</sup> and 18<sup>th</sup> century Maratha Society, to enable the student to understand aspects of economic life, to trace the determinants of changes in social and economic life.

### **Course Title: HS: EC - 09: Marathas in 17th and 18th Century: Power Politics**

#### **Objectives**

The course intends to study the role played by the Marathas in the context of India, the changing nature of Maratha State, to understand and analyse the Maratha expansionism and its significance in various spheres.

## **Semester III**

### **Course Title: Cultural History of Maharashtra Objectives**

**Credits :4**

This paper is designed to help the student situate and interpret the cultural manifestations across historical memory which have contributed to the creation of the geopolitical region of Maharashtra.

### **Course Title: Intellectual History of Modern World**

#### **Objectives:**

The paper is seen as a prerequisite for understanding the concepts that are used in history, to acquaint the student with the intellectual activity that played an important role in shaping events; the transition from medieval to modern times.

**Course Title: Economic History of Modern India**

To acquaint the student with structural and conceptual changes in Indian economy after coming of the British, to make them aware of the exploitative nature of the British rule, to help them understand the process of internalization by Indians of new economic ideas, principles and practices.

**Course Title: East Asia: Japan (1853-2000)**

**Objectives:** The course is designed to help the students to know Japanese history especially after the opening up of Japan; Japan's modernization and its impact; post World War II developments and Japan's role in world politics.





# Savitribai Phule Pune University, Pune

## M.A. Economics (Credit System) from the Academic Year 2019-20

### Under the Faculty of Humanities

### Program Outcomes (PO)

- PO-1** Prepare students to develop critical thinking to carry out investigation about various socio-economic issues objectively while bridging the gap between theory and practice.
- PO-2** Equip the student with skills to analyses problems, formulate a hypothesis, evaluate and validate results and draw reasonable conclusions thereof.
- PO-3** Prepare students for pursuing research or careers that provide employment through entrepreneurship and innovative methods.
- PO-4** Prepare students to develop own thinking /opinion regarding current national or international policies and issues

### Program Specific Outcome (PSO)

- PSO -01** Ability to apply the concepts of micro economics such as demand, supply, revenue, cost, elasticity, etc.
- PSO -02** Ability to recognize apply and analyze concept, theories in public economics
- PSO -03** Ability to understand the concept of international economics
- PSO -04** Ability to analyze evaluate the subject with reference to various aspect of agrarian economies
- PSO -05** Ability to analyze & use knowledge of basic theories in macro economics
- PSO-06** Ability to apply the concept of economic growth and development
- PSO-07** Ability to evaluate and examine subject areas in economics explores possibilities of research
- PSO-08** Ability to develop examine various topic under demography
- PSO-09** Ability to develop an understanding of the economics of environment
- PSO-10** Ability to develop an understanding of the Labour

## Semester I

### I. (EC-1001) Micro Economics Analysis-I

- 1) It will familiar students on creating an understanding among students on the basic reasoning of Micro Economics.
- 2) It will make students aware about how various economic agents behave optimally given the scarce Micro economic resource and other constraints.
- 3) Students are better able to understand various economic issues and applied part of the Micro economics.

### II. (EC-1002) Public Economics-I

- 1) The students would learn of the feature the federal structure and financial relationship among them.
- 2) The course would develop the analytical ability of students to distinguish between beneficial and detrimental effects of a government policy and their effect on macroeconomics framework of an economy.

### III. (EC-1003) International Trade

1. Students would know the country's position regarding international trade, payments and foreign exchange.
2. The students would learn the methods regarding improvement in terms of trade, international debt and balance of payments positions.
3. Students would know about the policies regarding increase in exports, to deal with international institutions and to maintain relation with other countries. Since globalization and international relations can increase the rate of growth and solve domestic problems like inflation, unemployment and value of currency etc.

#### **IV. (EC-1004) Agricultural Economics**

1. Course provides knowledge agricultural background, farm and agro business activities, agriculture finance and management.
2. It introduces learner applied part of economics instead theoretical, which deals with allocation of land under various crops, specialization, diversification and other policy amplifications.
3. Course offer relevant production and various techniques to understand agro production, cost benefit analysis and enhance learner to make frontier-production function at least cost.

### **Semester - II**

#### **I. (EC-2001) Micro Economics Analysis- II**

1. A comprehensive knowledge of Micro Economics will empower students to explain the social reality with better arguments and optimum solutions.
2. It will familiarize the students with different types of economic models.
3. Students will get to know the different market structure.
4. It will provide information to the students about the distribution of income and wealth.

#### **II. (EC-2002) Public Economics- II**

1. It will help students to critically analyses the fiscal reforms and policy choices of the government in developed and developing countries.
2. To know about the preparation of budgeting and its utilization for Indian economy.

#### **III. (EC-2003) International Finance**

1. Appreciate the functioning of the international financial markets and its management and the determination of different exchange rates
2. Understand the way the foreign exchange market and the derivatives markets and the capital markets function using futures, options and swaps

#### **IV (EC -2004) Labour Economics**

1. The paper makes students aware of different theories on labour and employment from the point of view of economic research.
2. It provides a detail analysis on the latest development of labour market in developing countries with reference to India.

#### **Semester III**

##### **(EC-3001) Macro Economics Analysis -I**

1. It will demonstrate knowledge of laws of supply and demand and equilibrium.
2. Students will be familiar about a clear picture of circular flow model.
3. Students will be able to explain the concept of opportunity costs, trade –off and benefits of Macroeconomics.

##### **(EC-3002) Growth & Development - I**

1. Students would be acquainted with the various perspectives of economic growth and its relevance.
2. Students would become familiar with factors affecting economic growth and development.
3. Students would understand the conceptual bases of income measurement, physical quality of life index, poverty, inequality and development gap and role of various institutions in economic growth and development.

##### **(EC-3003) Research Methodology**

1. Develop a conceptual understanding and foundation related to Research Methodology and its various approaches.
2. Identify and provide a logical reasoning in the formulation of research problem, and the problems involved in systematic explanation of phenomenon.

3. Develop Research Design based on multifarious approaches with quantitative techniques for economic data analysis.

#### **(EC-3004) Demography**

- 1) To make the students aware of the importance of population in economic development and the various theories that explains the growth of population in a country. The paper also enlightens the students on the quantitative and the qualitative aspects and characteristics of the population through various demographic techniques.
- 2) Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.

#### **Semester IV**

#### **(EC-4001) Macro Economics Analysis II**

- 1) Students will learn the concept of fiscal and monetary policies and their effect on Economy.
- 2) It will help the students to apply supply and demand models to analyze responses of market to external events.
- 3) It will help students to describe ISLM model.

#### **(EC-4002) Growth and Development –II**

- 1) Students would have knowledge about the nature and classical theories of development. Students would be able to apply economic theories and concepts to contemporary social issues, as well as formulation and analysis of policy and recognize the role of ethical values in economic decisions.
- 2) Students would learn the key tools to analyze agricultural economies, with an eye towards understanding a wide array of impacts, from agricultural policies to trade and climate change and what the role agriculture and industry have in economic development.

### **(EC-4003) Research Project**

The purpose of the dissertation is to encourage students to undertake independent economic research and to foster research-related skills, which should benefit future study and employment.

- 1) Demonstrate specialist knowledge in the area of their research.
- 2) Demonstrate the ability to initiate research and to formulate viable research questions.
- 3) Demonstrate the capacity to design, conduct and report sustained and original research.
- 4) Demonstrate the ability to evaluate and synthesize research-based and scholarly literature.
- 5) Present research findings and argument in a suitably structured and sequenced thesis that conforms to protocols of academic presentation and research practice.
- 6) Demonstrate the ability to critique literature and conduct analyses at a Masters level.

### **(EC-4004) Economics of Environment**

- 1) Apply economic principles for applied environmental issues.
- 2) Select and apply appropriate economic techniques to solve environmental problems and measure value of environmental goods.

# Savitribai Phule Pune University, Pune

## M. A. Geography (Credit System) Academic Year 2019-20

### Under the Faculty of Humanities

#### Program Outcome M. A. Geography

**PO. 1.** To acquaint the utility and application of geography in different region and environment.

**PO. 2.** To understand the history of tourism.

**PO. 3.** Study Tour, field visits, project work, city survey, oral examination.

#### Program Specific Outcome (PSO)- PG

**PSO.1.** To learn Geography based on the Observation.

**PSO.2.** To Develop theoretical, Applied and Computational Skills.

#### Course Outcome (CO)-PG

##### Semester- I

##### **GGUT-111.Principles of Geomorphology**

Upon successful completion of this course, the student will be able to

- i) The geographical maturity of students in their current and future courses shall develop.
- ii) The student develops theoretical, applied and computational skills.

##### **GGUT-112.Principles of Climatology**

Upon successful completion of this course, the student will be able to:

- i) The geographical maturity of students in their current and future courses shall develop.
- ii) The student develops theoretical, applied and computational skills.

##### **GGUT-113.Principles of Economic Geography**

Upon successful completion of this course, the student will be able to:

- i) The geographical maturity of students in their current and future courses shall

develop.

ii) The student develops theoretical, applied and computational skills.

### **GGUT – 114 Principles of Population and Settlement Geography**

Upon successful completion of this course, the student will be able to:

i) The geographical maturity of students in their current and future courses shall develop.

ii) The student develops theoretical, applied and computational skills.

### **GGUP-115. Practical in Physical and Human Geography.**

Upon successful completion of this course, the student will be able to:

i) The geographical maturity of students in their current and future courses shall develop.

### **Semester II**

#### **GGUT-121. Geoinformatics –I**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the basic concepts in GIS, Definition, Potential of GIS, data base, Data Models, Structuring of spatial data, data analysis etc.

II. To introduced in GIS Application, Digitizers Processes.

#### **GGUT-122. Coastal Geomorphology**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the basic concepts in Introduction of coaste and coastal systems and Shore zones, Coastal Processes, sea Level, Coastal Sediment, Coastal Environment, Applied coastal Geomorphology.

II. To introduce concept of Applied Coastal Geomorphology.

#### **GGUT-126. Fluvial Geomorphology**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the basic concepts in Introduction to Fluvial

Geomorphology, definition, drainage network , stream number, Drainage basin



hydrology, open channel morphology, hydraulic geometry, etc.

- II. To introduce the process about sediment transport, fluvial erosion, erosional depositional, Fluvial Depositional.

### **GGDT -130. Geography of Tourism**

Upon successful completion of this course, the student will be able to

- I. To introduce the students to the basic concepts in Introduction to geography of Geography of Tourism Definition, tourist , tourism, classification, factors of tourism, Role of accommodation in tourism.
- II. To explain the major Indian tourism such as Hill Stations, Beaches, Historical Centres, National Parks, Waterfall.

### **GGDP -133 Practical in Map Projections**

Upon successful completion of this course, the student will be able to

- I. To introduce the students to the basic concepts in Map Projection,
- II. Construction of Projection Zenithal polar Gnomonic Projection, Zenithal Polar Stereographic Projection and its Properties and use of Projection.

### **GGUP -134 Practical of statistical Techniques for Geography.**

Upon successful completion of this course, the student will be able to

- I. To introduce the students to the basic concepts Introduction to statistical Techniques in Geography, Descriptive statistics, etc.
- II. Fieldwork and data Collection, collection of primary and secondary data by fieldwork or field visit.

## **Semester-III**

### **GGUT-235 Geoinformatics –II**

Upon successful completion of this course, the student will be able to

- I. To introduce the students to the basic concepts Introduction to Remote Sensing, EMR and EMS, Platforms and satellites, Sensors, Resolution , Image Interpretation , Aerial Photography.

### **Semester-III .GGUT-236 Geographical Thoughts**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the basic concepts historical Development of Geographical Thought. A brief account of Greek, Roman, Indian, Arab, German, French, British, American. Etc.

II. To Introduced the concept about Applied Geography,

### **GGUT-237 Tropical Geomorphology**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the basic Introduction to Tropics, Tropical Weathering, Duricrusts and Laterites, Denudation in Tropics etc.

II. To introduce the Processes about Tropical Planation such as formation and types of planation surface and landform development in tropics.

### **Semester-III .GGDP-241 Practical in Geoinformatics**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the basic of Aerial Photography, Visual Interpretation of LISS, PAN, Wifs Image.

II. GIS Operation using Open Source GIS Software.

### **Semester-III .GGUT-243 Watershed Management**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the concept of watershed management , Characteristics of Watershed , Hydrological Process in Watershed,

II. To introduce Application of Remote Sensing and GIS IN Watershed Management.

### **GGUP-245 Practical in Geomorphology**

Upon successful completion of this course, the student will be able to

I. To introduce the students to the concept of Geomorphological Mapping, USE of Symbols, Interpretation of the map in terms of forms and Processes, hill slope analysis.

II. Field Survey, Laboratory work, GPS Survey.

### **GGUT-249 Geography of India.**

Upon successful completion of this course, the student will be able to

- I. To introduce the student's basic concept of India, Such as location, Extent, Physiography, Drainage System, climate, soil, Agriculture, Industries, Population etc.

### **Semester-IV**

### **GGUT-250- Oceanography**

Upon successful completion of this course, the student will be able to

- I. To introduce the student's basic concept of Research Methodology, Research Design, Sampling Design, Method of Data Collection, Data Analysis, Research ethics, plagiarism and funding Agencies.

### **GGUT-252- Geography of Soil**

Upon successful completion of this course, the student will be able to

- I. To introduce the students basic concept Soil, Soil Formation, Soil Profile, Components , Classification of Soil, Problems related to soil and soil conservation.

### **GGDP -257- Interpretation of Topographical Maps and GPS Survey**

Upon successful completion of this course, the student will be able to

- I. To introduce the students basic concept of the earth, Regional geography, world contemporary issues, 21<sup>st</sup> century challenges and opportunities in the World .

# Savitribai Phule Pune University, Pune

## Master of Commerce

### Under the Faculty of Commerce

## M. Com. CBCS-2019 Pattern Course Outcomes

### Semester I

#### 101 Management Accounting

##### Course objective:

1. To enhance the abilities of learners to develop the concept of management accounting and its significance in the business.
2. To enhance the abilities of learners to analyze the financial statements.
3. To enable the learners to understand, develop and apply the techniques of management accounting in the financial decision making in the business corporates.
4. To make the students develop competence with their usage in managerial decision making and control.

##### Course outcome:

1. To understand the concept of Financial Accounting and its limitations, emergence of Management Accounting and Cost Accounting, its advantages and distinction between Management Accounting and Cost Accounting.
2. To understand the concept of Marginal Costing, its applications, different techniques of managerial cost accounting and fixed and Variable Cost Analysis in decision making process.

3. To understand the concept of budget and budgetary control, types of budgets and preparation of functional budgets in an organization.
4. To understand the concept of Working capital Management, determination of working capital, components of working capital and accounts receivable and inventory management

### **102 Strategic Management**

#### **Course objective:**

1. To enhance the abilities of learners to develop the concept of management accounting and its significance in the business.
2. To enhance the abilities of learners to analyze the financial statements.
3. To enable the learners to understand, develop and apply the techniques of management accounting in the financial decision making in the business corporates.
4. To make the students develop competence with their usage in managerial decision making and control.

#### **Course outcome:**

1. Conceptual Clarity on Strategic management.
2. Development effective Strategy formulation and analytical ability and Skills to design Strategic Plan.
3. Development of Applicability skills and technical skills. Development of Technical and analytical abilities.

### **115 Legal Framework of Banking**

1. To acquaint the students with legal framework in which the Indian banking is working today.
2. To make the students aware about the latest developments in the field of

banking law.

3. To enable the students to understand modern banking practices.
4. To enable the students to establish a link between the legal provisions and the practical aspects of banking

### **116 Central Banking**

#### **Objectives –**

1. To acquaint the students with RBI's various functions.
2. To make the students aware about the latest developments in the field of Para banking and NBFCs in India.
3. To enable the students to understand the role of central banking especially in India.
4. To enable the students to acquire sound knowledge of working and techniques of central bank.

## **Semester II**

### **201 Financial Analysis & Control**

#### **Course objective:**

1. To enable students to acquire knowledge of financial analysis and control tools
2. To Make appropriate application and uses of financial analysis and control

#### **Course outcome:**

1. Application of IT for financial analysis
2. Generate interest among students to apply Excel as a tool for financial analysis.
3. Learn to analyze and identify financially strong and weak companies
4. Develop needed understanding and use of various ratios for financial analysis.

### **202 Industrial Economics**

#### **Objectives –**

1. To provide the knowledge to the students about the basic issues of industrial economics.
2. To make aware the students about the industrial profile of India and the industrial policy of government of India. Depth of the Program – Fundamental Knowledge

### **215 Banking Law and Practices**

1. To enable students to acquire sound Knowledge of banking laws and practices in India.
2. To make students aware about latest developments in the field of banking law.
3. To enable the students to understand modern banking practices.
4. To enable the students to establish a link between the legal provisions and practical aspects of banking.

### **216 Monetary Policy**

#### **Objectives –**

1. To create awareness regarding objectives and importance of monetary policy.
2. To make students aware about the latest developments in the field of monetary policy committee in India.
3. To enable students to understand the role of RBI in financial inclusion.
4. To acquaint students with the recent policy changes announced by RBI.

## **Semester III**

### **301 Business Finance**

1. To acquaint the students with corporate finance required for Indian Industries.

2. To make students aware about the latest developments in field of corporate finance.
3. To enable students to understand the traditional theories of capitalization and dividend distribution practices.
4. To give detail exposure of working capital management practice of finance to students Skills to be developed

### **302 Research Methodology for Business**

#### **Course objective:**

1. To acquaint the students with the areas of Business Research Activities
2. To enhance capabilities of students to conduct the research in the field of business and social sciences
3. To enable students in developing the most appropriate methodology for their research studies
4. To make them familiar with the art of using different research methods and techniques

#### **Course outcome:**

1. Understanding of basic knowledge of business Research, Research Process, ethical issues and modern practices in research.
2. Learning the formulation of Research problem, Hypotheses, research Design and sampling.
3. Gaining knowledge of Sources of Data collection measurement & Scaling, processing of Data.

### **315 Foreign Exchange**

#### **Objectives –**

1. To provide an understanding of various aspects of foreign exchange market.



2. To acquaint the students with financing of foreign trade.
3. To give an understanding about exchange rate mechanism and factors affecting exchange rates.
4. To make students aware of recent development in foreign exchange market.

### **316 International Finance**

#### **Objectives –**

1. To offer exposure of international banking.
2. To Provide understanding of International Financial market.
3. To acquaint the students with International monetary system.
4. To give understanding of operations of international Financial Institutions.

## **Semester IV**

### **401 Capital Market and Financial Services**

1. To acquaint the students with working of capital market.
2. To make the students aware about the latest developments in the field of capital market in India.
3. To enable the students to understand various transactions in stock exchanges and agencies involved in it.
4. To give exposure of financial services offered by various agencies and financial adviser to students.

### **402 Industrial Economic**

#### **Environment Objectives –**

1. To provide knowledge about basic issues in Industrial Economic Environment to students.
2. To make students aware about Industrial pattern and growth in India and

Industrial policies of India since independence.

3. To study the progress and current problems of major industries in India.

### **415 Recent Advances in Banking and Finance**

#### **Objectives –**

1. To enable students, understand new developments in banking industry.
2. To keep the students abreast with the innovative practices introduced by RBI in day to day banking in India.
3. To enable the students to understand the various modern services offered by banks.
4. To give exposure of financial services offered by various agencies and financial adviser to students

### **416 Project Work**

#### **Objectives –**

1. The Analysis of Research in Banking Sectors.
2. A study of New Banking Technique
3. Data Analysis of Research
4. The Analysis of Industrial Profile & Imbalance.

## Savitribai Phule Pune University, Pune

### M. Sc Physics (Credit System) from the Academic Year 2019-20

#### Under the Faculty of Science

#### Programme Outcomes (PO's)

At the end of Master of Science (Physics) programme students should:

- 1) Have general competence in different branches of Science such as Physics, Chemistry, Mathematics, Life Sciences with emphasis on the evolution of physics, its possibilities and limitations.
- 2) Attain the systemic knowledge with technical proficiency in the field of Physics both theoretically as well as experimentally.
- 3) Be able to apply fundamental principles of physics together with analytic tools to evaluate and describe complex physical situations.
- 4) Have acquired substantial knowledge of different areas in physics, basic knowledge in mathematics with advanced knowledge in some specialized areas of physics.
- 5) Have some research experience within a specific field of physics, through a supervised project (Master's dissertation).
- 6) Enhance their skills for continuous professional development in response to technological and social challenges.
- 7) Be able to apply scientific and technical knowledge to other disciplines and areas of study.

#### Programme Specific Outcomes (PO's)

At the end of the programme, the student will be able to:

- 1) Understand and apply basic principles of physics, and basic interaction laws that govern our universe.
- 2) Understand and apply mathematical tools required for describing and understanding the physical systems.
- 3) Understand the basic differences in classical and quantum mechanical approach, their real world applicability in a certain domain
- 4) Understand and apply statistical methods in solving real physical problems, and its application and connections with thermodynamical laws.
- 5) Understand the nature of a nucleus, nuclear reaction mechanism, nuclear models and its usefulness in power generation and for medical sciences.
- 6) Understand and acquire basic knowledge in various techniques in optical spectroscopy and interpretation of spectra.

7) Understand and apply computational techniques and apply to real physical problems.

### Course Outcomes (CO's) of Semester-I

- **Mathematical Methods in Physics (PHCT-111)**

Students who have completed this course should

- 1) Be familiar with vector spaces and special type of matrices that are relevant in physics.
- 2) Understand special functions and their differential equations.
- 3) Understand the details of Fourier series, integral transforms and their properties.
- 4) Acquire skills to apply different mathematical techniques to solve problems
- 5) Be able to solve different numerical problems involving topics covered.

- **Classical Mechanics (PHCT-112)**

This Course enables the students to understand

- 1) The Lagrangian and Hamiltonian approaches in classical mechanics.
- 2) The basics of generating function, canonical transformation & Poisson brackets and Hamilton-Jacobi equation.
- 3) To illustrate the dynamics of a rigid body and non-inertial frames of reference.
- 4) To formulate the concepts of rigid body dynamics and small oscillations.
- 5) Be able to solve numerical problems involving topics covered.

- **Electronics (PHCT-113)**

Students who have completed this course should

- 1) Be familiar with special function ICs and their applications.
- 2) Have deep understanding of various types of power supplies.
- 3) Understand working of combinational/sequential logic circuits.
- 4) Understand working of various types of data converters.
- 5) Be able to solve different types of numerical problems involving topics covered.

- **Lasers and Applications (PHOT-114 C4)**

Students who have completed this course should

- 1) Have introduction with basic concepts, properties and types of lasers.
- 2) Understand three/ our level systems deeply
- 3) Understand different types of lasers thoroughly.

- 4) Have introduction with various applications of lasers.
- 5) Be able to solve numerical problems involving topics covered.

- **Physics Laboratory-I (PHCP-115)**

Students will have hand on experience of

- 1) Practical's related theoretical concepts of electronics so that one to one understanding of theory can be there.
- 2) To construct the different type of electronic devices and verify its behaviors
- 3) Working of various electronic devices constructed from different IC's.
- 4) To study electronic devices made OP-AMP's, Transistors, IC's etc.
- 5) Students get a direct hand on experience working with analog and digital circuits and operation.

### Course Outcomes (CO's) of Semester-II

- **Electrodynamics (PHCT-121)**

Students who have completed this course should

- 1) Be familiar with basic concepts and equations related to time varying fields.
- 2) Be able to write expression for energy, force and momentum relations for electromagnetic waves.
- 3) Able to write wave equations in terms of electromagnetic potentials.
- 4) Understand relativistic mechanics and four-dimensional spaces.
- 5) Be able to solve various numerical problems involving topics covered.

- **Atoms and Molecules (PHCT-122)**

Students who have completed this course should

- 1) Have deep understanding of atomic spectra and molecular spectra.
- 2) Calculate the energy spectrum of fine and hyperfine interactions, Zeeman effect and Stark's effect.
- 3) Developed skills in molecular spectra, particularly in diatomic molecules and lasers.
- 4) Apply the concepts of quantum mechanics in atomic and molecular physics.
- 5) Developed in solving problems on atomic and molecular (diatomic molecules) physics and lasers.

- **Quantum Mechanics (PHCT-123)**

Students who have completed this course should

- 1) Gain basic knowledge of Quantum Mechanics as well Skills and techniques to use Quantum mechanical principles in simple and complicated systems.

- 2) Have introduction with various operators used in Quantum Mechanics.
- 3) Gained basic knowledge to solve 1-dimensional and thereafter 3-dimensional potential problems.
- 4) Understand various types of perturbation theories and approximation methods.
- 5) Learn to solve the non-relativistic quantum mechanical problem and can demarcate the problems which are quantum mechanical.

- **Physics of Thin Films (PHOT-124 A4)**

Students who have completed this course should

- 1) Understand the basics of thin films and growth mechanism.
- 2) Acquire knowledge of various thin film deposition techniques and film thickness measurements methods.
- 3) Understand various electrical and mechanical properties of thin films.
- 4) Able to apply their knowledge to construct a thin film-based device.
- 5) Be able to solve various numerical problems involving topics covered.

- **Physics Laboratory-II (PHCP-125)**

Students who have completed this course should

- 1) Gain knowledge in some apparatus and can undertake the measurements of dielectric constant, specific heat of solid, skin depth, hall effect, four probe method, etc.
- 2) Develop a skill in assembling various kinds of apparatus, data taking manually as well as using computer interfaced instruments and data analysis. Skill developed to analyze data and optimized errors in a measurement.
- 3) Competent enough to assemble/design a setup for a given measurement.
- 4) Analyze and prepare and their laboratory reports using their own personal computers.
- 5) Acquire a hands-on experience of handling these instruments, collect and analyze data and verify some results that they learn in theory.

### Course Outcomes (CO's) of Semester-III

- **Statistical Mechanics (PHCT-231)**

After successful completion of the course, the student should be able to,

- 1) Acquire Introductory knowledge of Statistical Mechanics.
- 2) Explain statistical physics and thermodynamics as logical consequences of the postulates of statistical mechanics.
- 3) Grasp the basis of ensemble approach in statistical mechanics to a range of situations.

- 4) To learn the fundamental differences between classical and quantum statistics and learn about quantum statistical distribution laws.
- 5) Acquire skills of using the statistical principles and applying the techniques learnt thereof to simple thermodynamic systems under equilibrium are developed.

- **Solid State Physics (PHCT-232)**

After successful completion of the course, the student is expected to,

- 1) Understand the energy levels and electrical conductivity, Hall Effect, free electron model and band gap energy.
- 2) Have a clear picture of crystal structures and a clear understanding about x-ray diffraction and magnetic properties of matter.
- 3) Perform and verify the theory and experimental procedure for magnetism and super conductivity phenomenon
- 4) Expected to gain knowledge of superconductivity, its underlying principles and its applications in modern world.
- 5) Be able to solve various numerical problems involving topics covered.

- **Experimental Techniques in Physics - I (PHCT-233)**

After successful completion of the course, the student is expected to,

- 1) Learn the basic knowledge about Signal, Signal Analysis and Sensors.
- 2) Understand the concepts of vacuum physics thoroughly.
- 3) Learn the fundamentals of various vacuum pumps and their applications
- 4) Learn the various vacuum instruments and low temperature techniques.
- 5) Be able to solve various numerical problems involving topics covered.

- **Energy Studies - I (PHOT-234 H4)**

After successful completion of the course, the student should,

- 1) Have deep introduction with basic concepts of renewable energy sources.
- 2) Understand various aspects forms of renewable energy and their aspects.
- 3) Have deep understanding of nature of solar radiation and their measurements equipment's.
- 4) Learn about basics of heat transfer and various types of it.
- 5) Learn about energy storage devices and their usage.

- **Physics Laboratory-III (PHCP-235)**

After successful completion of the practical course of C-programming, the student should,

- 1) Develop the ability to analyze a problem and devise an algorithm to solve it.
- 2) Introduce the foundations of computing, programming and problem- solving using computers.
- 3) Build the necessary skill set and analytical abilities for developing computer-based solutions for real life problems.
- 4) To test, debug and execute programs
- 5) Able to solve various physics problem with the help of C programming.

## Semester-IV

### • Nuclear Physics (PHCT-241)

After successful completion of the course, the student is expected to

- 1) Have a deep knowledge about general properties of nucleus, Radio activity decays, Nuclear Models.
- 2) Understand the working of nuclear detectors and counters, realize the importance of Cosmic rays and its effects on earth.
- 3) Become familiar with nuclear particles and different particle accelerators. Student is expected to know the working of different accelerators.
- 4) Gain knowledge about basic particle physics.
- 5) Be able to solve various numerical problems involving topics covered.

### • Experimental Techniques in Physics-II (PHCT-242)

After successful completion of the course, the student is expected to,

- 1) Learn about radiation sources like Gamma ray, X-ray, UV, VIS, IR etc. and their corresponding detectors
- 2) Understand structural analysis technique like X-ray diffraction spectroscopy and different thermal analysis techniques and their usage.
- 3) Learn more about morphological and magnetic characterization techniques.
- 4) Learn the various spectroscopic analysis using UV-VIS, FTIR, XPS, ESR, NMR etc.
- 5) Be able to solve various numerical problems involving topics covered.

### • Physics of Nanomaterials (PHOT-243 B4)

After successful completion of the course, the student is expected to,

- 1) Understand the introductory concept of nanomaterials like nucleation and growth, quantum size effect, surface effect etc.
- 2) Learn the various synthesis methods of nanomaterials like hydrothermal, sol-gel, ball milling, CBD, etc.



- 3) Understand the different properties of nanomaterials.
- 4) Understand some special nanomaterials and their applications.
- 5) Solve various numerical problems involving topics covered.

- **Energy Studies - II (PHOT-244 H4)**

After successful completion of the course, the student is expected to,

- 1) Understand the basic knowledge about solar energy and solar photovoltaic systems with their applications.
- 2) Understand the various photo-thermal devices and their applications.
- 3) Learn about sources, production and utilization of hydrogen energy.
- 4) Learn about wind energy and biomass energy.
- 5) Solve various numerical problems involving topics covered.

- **Project (PHCP-245)**

After successful completion of the course, the student is expected to

- 1) Describe the necessity, need, relevance and importance of the project undertaken.
- 2) Do Outline the work into small tasks like reference work, collection of equipment and materials, the apparatus as per the requirements of the aims and objectives of the project, actual performance of experiment, data collection etc.
- 3) Carry out the experiments as per the designed procedure to achieve the goals.
- 4) Standardize the entire procedure to obtain reliable, repeatable results. Compare and Contrast if necessary, with the published data to Justify the results obtained.
- 5) Prepare a project report, compile and quote the references properly. Develop an ability to communicate effectively and present project work to a panel of experts.

# Savitribai Phule Pune University, Pune

## M. Sc. Chemistry (Credit System) from the Academic Year 2019-20

### Under the Faculty of Science

#### Programme Outcomes (PO's)

1. Broaden students' professional foundations through activities such as teaching, internship & fellowships.
2. Enable students to communicate scientific results in writing & in oral presentation.
3. Acquire the basic tools needed to carry out independent research.
4. Make students proficient in their specialized area of chemistry & successfully complete an advanced research project.
5. Explain why chemistry is an integral activity for addressing social, economic & environmental problems.
6. Develop skills in problem solving, critical thinking & analytical reasoning as applied to scientific problems.

#### Programme Specific Outcomes (PSO's)

1. Get and apply basic knowledge of the various aspects of Chemistry in real life Situations
2. Understand the experimental skills, designs and their implementation in novel synthetic methods.
3. Develop an aptitude towards academic and professional skills; understand the basic concepts of structural elucidation with hyphenated techniques in Chemistry.
4. Familiarize with fundamental biological processes and create rationale towards computer assisted drug designing.

## Course Outcome COs

### Semester I

#### CHP-110 Physical Chemistry – I

At the end of course student,

1. Understand the concept of state function, path function, exact differential and inexact differential internal energy and enthalpy, Reversible and irreversible adiabatic expansion, entropy.
2. Knowledge about applications of Quantum Chemistry
3. Understand Collision theory of biomolecular gas phase reactions, diffusion controlled and activation controlled reaction in solution, activated complex theory of reaction rate, Eyrings equation.
4. Explain reaction dynamics of complex reactions.
5. Understand enzyme catalysis with mechanism.

#### CHI-130 Inorganic Chemistry – I

At the end of course student,

1. Understand the concept of symmetry, point group, product of symmetry operation, SALC and able to pass various symmetry elements through the molecule.
2. Apply the concept of point group for determining optical activity and dipole moment.
3. Understand the importance of Orthogonality Theorem, projection operator
4. Learn the advance chemistry of boranes, fullerene, zeolites, polymers etc.
5. Understand organometallic chemistry of some important elements from the main groups and their applications

#### CHO-150 Organic Chemistry – I

At the end of course student,

1. Understand the criteria for aromaticity in non-benzenoid molecules and other advanced polycyclic aromatics

2. Understand the chemistry of monocyclic heterocycles, nomenclature and reactions
3. Understand the role of various reaction intermediates like carbocation, carbanion, carbenes, radicals, and nitrenes in organic reactions; concept of NGP
4. Describe mechanism of different rearrangement reactions. Appreciates the various steps involved in the molecular rearrangements.
5. Understand the chemistry of Ylides and study Ylides and their reaction
6. Use synthetic reagent of oxidation and reduction for solving the problems

### **CHG-190 General Chemistry - I**

#### **Section I: Elective Option-A: Introduction to Solid State of Matter**

At the end of course student,

1. Explain bonding in solids – band theory
2. Know electronic conductivity, Semiconductors, photoconductivity, Non-stoichiometry, defects and types of defects in solids
3. Understand Ionic conductivity and their applications
4. Explain superconductivity and theory of superconductivity
5. Describe method of synthesis of solids

### **CHG-190 General Chemistry - I**

#### **Section II: Elective Option-A: Inorganic Material Analysis, Synthesis and Applications**

At the end of course student,

1. Do quantitative analysis of ore and alloys.
2. Synthesize of Colloidal silver nanoparticles and determine band gap by absorption spectroscopy
3. Synthesize nanoparticles of Zn, Fe, Ti, etc.
4. Characterize nanoparticles by absorption spectra.
5. Get knowledge about solid state character of material

### **CHP – 107: Practical Course-II**

At the end of course student,

1. Get the idea about monitoring of organic reactions using TLC technique
2. Understand about importance of quality of product by TLC and physical constant
3. Knowledge about purification and separation techniques
4. Knowledge about importance of green reagents and methods in organic synthesis.
5. Knowledge about single stage synthesis.

### **CHP-210: Physical Chemistry – II**

At the end of course student,

1. Knowledge about types of molecules on the basis of moment of inertia and rotational spectra of di- and polyatomic molecules
2. Explain the Quantum and Classical theory of Raman effect , pure rotational Raman Spectra , Vibrational Raman Spectra
3. Explain the principle , instrumentation , and Applications of Mossbauer Spectroscopy
4. Knowledge about Interaction of radiation with matter, Interaction of gamma radiation with matter, units for measuring radiation absorption.

### **CHI-230- Inorganic Chemistry – II**

At the end of course student,

1. Get knowledge about find out the no of microstates and meaningful term symbols, construction of microstate table for various configurations with help of Hund's rules.
2. Understand inter-electronic repulsion & concept of weak and strong ligand field.
3. Interpretation of electronic spectra for spin allowed oh and td complexes using Orgel diagram.
4. Understand the various terms involved in magnetochemistry.
5. Understand the various Quenching of orbital angular momentum.
6. Importance of bioinorganic chemistry-role of metals in Metalloprotein, metalloenzymes and importance and transport of metal ions.

## CHO-250 Organic Chemistry – II

At the end of course student,

1. Understand free radicals formation, stability and reactivity and should also be able to use the basic understanding in writing probable reaction mechanisms.
2. Draw MO diagram for various olefinic compounds and should be able to predict the products, the stereochemistry as well as should be able to understand the preferred reaction pathways.
3. Know various key factors responsible for the spectroscopic data acquisition and should be able to solve Problems based on UV, IR, MS, <sup>1</sup>H-NMR, <sup>13</sup>C-NMR.
4. Understand MOT and will be able to extend this in predicting reaction mechanism and stereochemistry of electrocyclic reactions.
5. Understand the basic principle of spectroscopic methods and their applications in structure elucidation of organic compounds using given spectroscopic data or spectra.

## Semester II

### CHG-290 General Chemistry - II

#### Elective Option-A: Material Characterization Technique

At the end of course student,

1. Know different characterization technique of solids.
2. Understand principle of XRD, instrumentation of powder XRD, Bragg's law, applications of XRD for crystal structure determination, numerical problems.
3. Explain principle of SEM, instrumentation of SEM and interpretation of surface morphology of solid from SEM.
4. Principle of TEM, instrumentation of TEM and interpretation of TEM images.
5. Basics of X-rays, Principle of XRF, types of XRF, instrumentation, qualitative and quantitative analysis, numerical.

### CHG-290 General Chemistry - II

#### Elective Option-B: Organometallic and Inorganic Reaction Mechanism

At the end of course student,

1. Explain valence electron count, back bonding in organometallics, spectral characterization of organometallic compounds.
2. Understand catalytic reaction involving organometallic compounds and mechanism of these reactions
3. Know types of reaction involving organometallic compounds
4. Know types of reactions in coordination compounds, inert and labile complexes, substitution reactions in coordination complexes and their mechanism, stereochemistry of reaction, kinetics of reactions.

### **CHG-290: General Chemistry – II**

#### **Elective Option-A: Electrochemical Methods of Analysis**

At the end of course student,

1. Introduce fundamental concepts in Electrochemical Analysis.
2. Students will be able to explore new areas of research in chemistry and electrochemical fields of science and technology.
3. Students will be able to understand statistical treatment of experimental data.
4. Explain polarographic method of analysis elements.

### **CHP – 227: Practical Course-II**

At the end of course student,

1. Synthesize of coordination complexes.
2. Student will be able to measure the conductance of metal complexes.
3. Making derivatives of organic compounds will help them in industry or while doing research in medicinal chemistry for Drug development.
4. This practical course is also designed to make student aware of green chemistry and role of green chemistry in pollution reduction.
5. The students learn how to avoid solvents and do solvent free reaction.
6. Students are trained to different purification techniques in organic chemistry like recrystallization, distillation, steam distillation and extraction.

7. Students are made aware of safety techniques and handling of chemicals.
8. Students are made aware of carrying out different types of reactions and their workup methods.





## Department of Chemistry

### M. Sc. Analytical Chemistry

#### Programme Specific Outcome

- PSO1** Student will have knowledge about fundamentals chemical analytical techniques and their applications.
- PSO2** Students will able to use appropriate techniques for the qualitative and quantitative Chemical Analysis.
- PSO3** Students will able to prepare sample for analysis, prepare solutions of various concentrations for synthesis and analysis purpose
- PSO4** Student will aware and used to work in chemical laboratory safely.
- PSO5** Students will able to characterize samples using proper instrumentation techniques.
- PSO6** Students will able to develop analytical and problem solving skills among them.
- PSO7** Students will able to develop analytical method for analysis of sample and can apply statistical treatment to the analytical data.
- PSO8** Students will able to determine API (Active Pharmaceutical Ingredient) from pharmaceutical Products
- PSO9** Students will able to understand the causes of environmental pollution and aware about steps to control Environmental Pollution.

## M. Sc. (II) Analytical Chemistry

### Course Outcome

### Semester III

#### CHA-390: Electrochemical and Thermogravimetric Methods of Chemical Analysis

At the end of course student,

1. Define various terms in electrochemistry and thermogravimetry. Explain instrumentation in electrochemistry and thermogravimetry, basic principles of electrochemistry and thermogravimetry.
2. Explain /Describe applications of electrochemistry and thermogravimetry in industry and in analytical laboratory.
3. Apply / select particular method of analysis for sample to be analysed.
4. Solve numerical problems on electrochemistry and thermogravimetry.
5. Interpret polarogram, cyclic voltammogram, pulse polarogram, thermogram, differential thermogram and DSC thermogram.

#### CHA-391: Analytical Method Development and Extraction Techniques

At the end of course student,

1. Define / understand various terms in analytical extraction and method development and validation.
2. Apply / select particular method of analysis for sample analysis.
3. Solve numerical problems on analytical extraction and method development and validation.
4. Develop analytical method for analysis of given sample.
5. Apply statistical treatment to the analytical data. Select appropriate parameters for the development of analytical method

#### CHA-392: Advanced Chromatographic Methods of Analysis

At the end of course student,

1. Define / understand various terms, instrumentation of chromatography (GC and HPLC) and mass spectroscopy.
2. Explain /Describe applications chromatography (GC and HPLC) in industry and in analytical laboratory.
3. Apply / select particular method / instrumental parameters for analysis for sample GC / HPLC.
4. Solve numerical problems on chromatography (GC and HPLC) and mass spectroscopy.
5. Integrate GC and HPLC chromatogram, Mass spectrum

#### **CHA-393: A) Bioanalytical Chemistry**

At the end of course student,

1. Define / understand various terms and instrumentation of Electrophoresis, capillary electrophoresis, HPTLC, Body fluid analysis, ELISA, RIA.
2. Explain / describe basic principles, column and detectors in GC, HPLC, MS.
3. Explain /Describe applications chromatography in industry and in analytical laboratory.
4. Apply / select particular method / instrumental parameters for analysis for sample.
5. Solve numerical problems on chromatography and mass spectroscopy.
6. Differentiate among the chromatography methods of analysis.

#### **CHA-394 Practical I: Basics of Instrumental Methods of Chemical Analysis**

At the end of course student,

1. Maintain proper record of analytical data in notebook. Observe personal safety in laboratory and able handle all chemicals, instruments, etc. safely in laboratory.
2. Explain instrumentations of colorimeter, spectrophotometer, photofluorometer, TGA, HPLC, GC, Flame-photometer, CV, AAS, etc.
3. Explain / describe basic principles of different instrumental methods of analysis. Able to handle particular instrument according to SOP.

4. Design / modify and validate new analytical method for chemical analysis of particular sample.
5. Give mathematical treatment to analytical data and able to interpret the results accurately.
6. Differentiate among the various analytical methods / techniques of chemical analysis.

## Semester IV

### CHA-490: Advanced Analytical Spectroscopic Techniques

At the end of course student,

1. Define / understand various terms in atomic absorption, atomic emission, fluorescence, ESR and electron spectroscopy.
2. Explain instrumentation and principle of atomic absorption, atomic emission, ICPAES, ICPAES-MS, fluorescence, ESR and electron spectroscopy.
3. Explain advantages of ICPAES-MS over AES spectroscopy, fluorescence spectroscopy.
4. Solve numerical problems on analysis all these spectroscopic methods.
5. Interpret ESR spectra, super hyperfine splitting and g value in ESR, and parameters affecting it.
6. Calculate theoretical parameters from ESR data and characterize compound.

### CHA-491: Chemical Methods of Pharmaceuticals Analysis

At the end of course student,

1. Describe basic principles of methods of pharmaceutical analysis according to IP.
2. Perform and explain importance of limit tests, identification tests and microbiological limit test of raw materials and finished products.
3. Solve numerical problems on analysis pharmaceutical raw material and finished product analysis.
4. Interpret IR spectra, HPLC chromatogram and UV-Visible spectra of pharmaceutical materials.
5. To perform total analysis of pharmaceutical raw material and finished product analysis

according to IP / BP / USP.

6. Standardize analytical instruments according IP /BP/ USP.

### **CHA-492: A) Laboratory Automation and Environmental Analytical Chemistry**

At the end of course student,

1. Define / understand various terms laboratory automation, sensors, environmental pollution, analysis water and air.
2. Describe basic principles, instrumentation and importance of automated laboratory analysis and sensors.
3. Describe sources of water and air pollution and pollutants.
4. Describe / explain methods / techniques of sampling of water and air and their analysis.
5. Solve numerical problems on analysis water and air.

### **CHA-493: Optional Analytical Chemistry Practical**

At the end of course student,

1. Maintain proper record of analytical data in notebook. Observe personal safety in laboratory and able to handle all chemicals, instruments, etc. safely in laboratory.
2. Define / understand various terms involved practical methods of quantitative analysis.
3. Analyse organic and inorganic materials using appropriate chemical / instrumental methods
4. Explain / describe basic principles of chemical / instrumental methods used for analysis. Able to handle particular instrument according to SOP.
5. Perform analysis of sample with described procedure. Able to handle analytical instruments.

### **CHA-494: Practical II: Applied Analytical Chemistry**

At the end of course student,

1. Perform analysis of sample with described procedure. Able to handle analytical instruments.
2. Apply / select particular method / instrumental parameters for analysis of given sample.

3. Maintain appropriate reaction conditions as described in procedures.
4. To perform i) selective analysis of particular component from sample. ii) Analysis at trace level from sample.
5. To conclude the results able to take the decision regarding quality of sample.
6. To perform calculations and interpret the results.



## Department of Chemistry

### M. Sc. (II) Organic Chemistry

#### Programme Specific Outcome

- PSO1** Familiar with the different branches of chemistry like Stereochemistry, Spectroscopy, Medicinal, Asymmetric Synthesis, Carbohydrate Chemistry Heterocyclic Chemistry
- PSO2** Able to designing organic syntheses in feasible and economically cheaper method
- PSO3** Able to prepare sample for solution preparation, prepare solution of various Concentration for synthesis and analysis purpose
- PSO4** Able to find procedure form literature to synthesize separate & purify compounds in laboratory and characterize using proper instrumentation techniques.
- PSO5** Awared with use of Organometallic Reagents in Organic Synthesis
- PSO6** Learnt Use of Chemistry software's useful in future career such as Research, Industries & Academia
- PSO7** Develop synthetic methods to maximize rate of reaction along with reduction in byproducts
- PSO8** Able to use spectroscopic methods for structure determination of Organic Compounds
- PSO9** Able to retrosynthetic approach to design organic syntheses
- PSO10** Learnt methods for preparation of specific groups of heterocyclic systems

## Course Outcome

### CHO-350: Organic Reaction Mechanism and Biogenesis

At the end of course student will able to-

1. Write reaction mechanism by understanding basic terminologies like electrophile, nucleophile, solvent effects, structural effects, etc
2. Know methods of generations of free radicals, stability of free radicals, their reactions and applications.
3. Understand Hammet equation, Hammett plot, reaction constant, Taft equation and solvent effect.
4. Define terpenes, Isoprene rule, MVA pathway, classification of terpenes and biogenesis of terpenoids which involve 1,2 methyl shift, 1,3 methyl shift, Wagner meerwein rearrangement, oxidative coupling reaction, role of SAM, oxidation and reduction.
5. Define Alkaloids, classification of alkaloids, process involved in biogenesis of alkaloids like decarboxylation, Schiff base formation, Trans amination reaction.
6. Understand shikimic acid pathway.

### CHO-351: Structure Determination of Organic Compounds by Spectroscopic Methods

At the end of course student,

1. Recognize spectroscopy in  $H^1$  NMR, CMR and Mass Spectrometry
2. Learn to interpret  $H^1$  NMR, CMR, DEPT, COSY, HETCOR & Mass spectra
3. Students trained to solve combined spectra problems
4. Understand concepts of 2D NMR Spectrometry, different types of spectra & Applications
5. Understand Principles and Applications of Mass spectroscopy

### CHO-352: Stereochemistry and Asymmetric Synthesis of Organic Compounds

At the end of course student will able to -



1. Draw conformations of different polysubstituted cyclohexane compounds and calculate their potential energy by considering butane gauche effect, steric effect.
2. Understand stereochemical principles involved in reaction of six membered ring and other than six membered rings.
3. Describe methods of formation of racemization and resolution of racemic mixture.
4. Apply crams rule, crams dipolar model, Felkin-Anh model in diastereoselective reaction.
5. Define asymmetric synthesis, chiral pool and chiral auxiliary.
6. Understand transition metal catalyzed homogenous asymmetric hydrogenation, epoxidation, dihydroxylation.
7. Solve problems based on diastereoselectivity by using models.

### **CHO-353(B): Designing Organic Syntheses and Heterocyclic Chemistry**

At the end of course student,

1. Knowledge of the retrosynthetic approach to plan organic syntheses
2. Knowledge of the key reactions in organic chemistry including substitution reactions of heterocycles, enols and enolate's.
3. To equip students with the skills to plan how to prepare Organic molecules
4. Knowledge of retrosynthetic method for the logical disconnection of complex organic molecules and synthetic organic methods
5. Understand heterocyclic Chemistry which includes various methods for ring synthesis
6. Knowledge of methods for the preparation of specific groups of heterocyclic systems

### **CHO-354: Practical-I Solvent Free Organic Synthesis**

At the end of course student,

1. Student familiar with solvent free synthesis methods
2. Need of environmentally friendly synthesis processes
3. Think to develop compounds by of sustainable methods
4. Understand toxicity and volatile nature of many organic solvents
5. Use of clays, zeolites, silica, alumina or other matrices in organic synthesis

6. Use techniques to achieve high degree of stereoselectivity in the products,
7. Develop synthetic methods to maximize rate of reaction along with reduction in byproducts

### **CHO-450: Chemistry of Natural Products**

At the end of course student,

1. Students should be able to learn total synthesis and retrosynthesis of various natural products
2. Predict stereochemistry of the intermediate formed in synthesis of drugs
3. Understand role of different reagents and reaction mechanism
4. Knowledge about importance of drugs, their synthesis, regio and stereoselectivity
5. Knowledge about different techniques for isolation of natural products.

### **CHO-451: Organometallic Reagents in Organic Synthesis**

At the end of course student,

1. Knowledge about the stability and reactivity of the various types of Organometallic compounds
2. Knowledge about transition metal complexes on organic synthesis
3. Knowledge about carbon – carbon, Carbon – Oxygen, Carbon- Nitrogen Bond formation reactions
4. Knowledge about geometrical isomerism that is Syn and anti-stereochemistry
5. Knowledge about catalytic cycles for C-O, C-C, C-N bond formation reactions.
6. Well known about Reagents in Organic Chemistry.

### **CHO-452(A): Concepts and Applications of Medicinal Chemistry**

At the end of course student,

1. Learnt Chemistry of peptides and proteins, nucleic acids, cofactors/coenzyme
2. Learnt Chemistry of TPP, PLP, Folic Acid and other vitamins
3. Understood the Chemistry of diseases, Principle of drug design and development
4. Learnt Peptides, synthesis, sequencing and their applications in therapeutics
5. Understood use modern techniques for biomolecules and disease diagnosis.

6. Learnt Case Study: Design of Oxamniquine & Statins
7. Understood the concepts Pharmacokinetics and Pharmacodynamics of drug
8. Use of Structure and activity Relationship i.e. QSAR in drug development
9. Developments, SAR, Mode of action, limitations and adverse effect of medicines

### **CHO-453: Practical-III**

#### **Section-I: Ternary Mixture Separation**

#### **Section-II: Carbohydrates Synthesis and Isolation Natural Products**

At the end of course student,

1. Get the idea about monitoring of organic reactions using TLC technique
2. Student will able to learn how to separate ternary mixture.
3. Understand about importance and method of synthesis of carbohydrates.
4. Knowledge about Various methods for isolation of natural products.
5. Student will able to handle equipment required for isolation of natural products.

### **CHO-454: Practical-II: Convergent and Divergent Organic Syntheses**

At the end of course student,

1. Get the idea about monitoring of organic reactions using TLC technique
2. Understand about importance of quality of product by TLC and physical constant
3. Knowledge about purification and separation techniques
4. Knowledge about importance of green reagents and methods in organic synthesis.
5. Knowledge about single stage synthesis, Convergent and Divergent synthesis.

# Savitribai Phule Pune University, Pune

## M. Sc. Botany (Credit System) from the Academic Year 2019-20

### Under the Faculty of Science

## Programme Outcome

1. Understand the scope and significance of the discipline.
2. Imbibe love and curiosity towards nature through the living plants.
3. In order to make students open-minded and curious, we try our best to enhance and develop a scientific attitude.
4. We make the students fit for the society by enabling them to work hard.
5. Make the students exposed to the diverse life forms.
6. Make them skilled in practical work, experiments, laboratory equipment and to Interpret correctly on biological materials and data.
7. Develop interest in Biological research.
8. Encourage the students to do research in related disciplines.
9. Develop a thirst to preserve the natural resources and environment.
10. Develop ability for the application of acquired knowledge in various fields of life so as to make our country self-sufficient
11. Appreciate and apply ethical principles to biological science research and studies

## Programme Specific Outcome

PSO1 Student gets understand scope and significance of life sciences. The classification of plants from cryptogams to Spermatophyte. Identification of the flora within field enhances basics of plants. Study of biodiversity in relation to habitat will correlates with climate change, land and forest degradation. Application of Botany in agriculture is through study of plant pathology.

- PSO2 To understand molecular techniques like DNA Barcoding. Understand the ultra-structure and function of cell membranes, cell Communications, signalling, genetics, anatomy, taxonomy, ecology and plant Physiology and biochemistry. To understand the multi functionality of plant cells in production of fine chemicals and their wide spread industrial applications.
- PSO3 Students get knowledge of production and use of bio-fertilizers, bio-pesticides, bio insecticides, bio fungicides and its applications in sustainable agriculture. Molecular and Physiological adaptations in plants in response to biotic and abiotic stress. Genes responsible for stress tolerance genetic engineering of plants.
- PSO4 Students get acquainted with the different advanced technology mainly based on agriculture production and sustainable utilisation of natural resources.
- PSO5 To aware the post graduate students about conservation of biodiversity through tissue culture techniques which is a need of time.
- PSO6 Students able to understand the sophisticated techniques based on biotechnological approaches.
- PSO7 Students use biological science software based on Bioinformatics and advanced computing
- PSO8 In this course students can take up teaching at different levels, research work in research institutes and or industry, doctoral work, environment impact assessment, biodiversity studies, entrepreneurship, scientific writing relevant topics have been included in the curriculum.
- PSO9 Effective Communication and collaborate with other disciplines by effectively communicating the fundamental concepts of Botany in written and oral format.
- PSO10 Analyze and interpret results generated through studies in botany, taxonomical treatments, field studies, excursion tours and laboratory techniques used in the subject.

## Course Outcome

### **BO UT 111: PLANT SYSTEMATICS I**

1. This paper deals with scientific morphological and anatomical study of plants
2. Students help to understand for correct plant identification,
3. Students know basic principle of classification and systematic study of plants.
4. Their commercial applications for society. Students knowing about various cryptogamic diversity and its various useful applications.
5. Students also understand the advanced plant classification.

### **BOUT 112 CELL BIOLOGY AND EVOLUTION**

1. The basic terminology In these fundamental streams like cell biology concept.
2. Basic principal of molecular biology in life sciences.
3. The student's participation with laboratory experiments for understanding the basic principles of life sciences.

### **BOUT 113 CYTOGENETICS AND PLANT BREEDING**

1. It is fundamental branch of Botany, its syllabus deals with basic plant propagation technique and plant improvement.
2. Students understand will be beneficial for the students to understand to create a new variety of medicinal and agronomic crops.
3. Understand basic in diplodisation and triplodisation of crops plants.

### **BODT 114 BIOFERTILIZER AND ALGAL TECHNOLOGY:**

1. This paper deals with types and Scope of bio fertilizers with their production technology on the basis of various strains selection.
2. The microorganism in bio fertilizer renovate the soils natural nutrients cycle and build soil organic matter. Through the use of biofertilizers, healthy plants can be grown and enhance the sustainability and the health of the soil.
3. They reduce the use of synthetic fertilizers and pesticides. Students will know about

potential of various algae with their commercial application in foods, pharmaceutical industries.

### **SEM I Practical: BODP 114: Practical based on I14**

1. Student understand the isolation procedure *Azospirillum*, *Azotobacte*, *Rhizobium*. and P-solubilizers and Cyanobacteria.
2. Students get aware hands on training on equipment in Bio fertilizer unit
3. Isolation of AM fungi -Wet sieving method and sucrose gradient method.
4. Mass multiplication of Bio-fertilizers.

### **BOUP 115: Based on BOUT11, 112, 113**

1. Gain adequate knowledge on comparative account of various algal divisions.
2. Study and impart knowledge about the occurrence, distribution, structure and life history of lower plants such as algae, fungi, lichens, bryophytes, pteridophytes and gymnosperms
3. Learn the phylogeny and evolutionary concepts in lower group of organisms. Know about role of fossil in oil exploration and coal excavation, study of paleopalynology. Learn about structural organization and function of intracellular organelles.
3. Gain knowledge on the organization of genes and chromosomes. Study about the structure of atoms, molecules and chemical bonds & Composition, structure and function of biomolecules Know in detail about breeding systems. Learn the techniques of Hybridization
4. Learn about the selection methods for self- pollinated, cross pollinated plants. Understand the role of mutations in plant breeding.

## **SEM II**

### **BOUT 121 PLANT SYSTEMATICS II**

1. This paper deals with scientific morphological and anatomical study of plants which helps for correct identification.
2. Student understand molecular level classification and systematic study of higher plants.

### **BOUT 122 MOLECULAR BIOLOGY**

1. The basic terminology in these fundamental streams like cell and molecular biology.
2. Students understand the mechanism of recombination and transposition, protein synthesis and role of various bacteria for genetic transformation.
3. The student's participation with laboratory experiments for understanding the basic principles of life sciences.

### **BOUT 123 BIOCHEMISTRY**

1. This syllabus mainly deals with basic concept of biochemistry, fundamental aspect of various biomolecules.
2. In this syllabi learn about phytochemical investigation, extraction method, qualitative and quantitative analysis of secondary metabolites with the applications.
3. Students will learn about various biomolecules such as carbohydrates, protein and lipid, amino acid with their properties, classification, structure and uses.

### **BODT 124 FLORICULTURE AND NURSERY MANAGEMENT**

1. Syllabus deals with information on economically important plant species which are commercialized for the local and international market.
2. Some aspects like habitat, growth condition, production of healthy plantlets and cultivation techniques.
3. Students understand the role of entrepreneur during this course work in nursey management and marketing.

### **BODP 124: Practical Based on 124**

1. The student able to understand basis of plant propagation techniques in horticultural and floriculture plant species.
2. Students gain the information about the importance of nursery in horticulture practices.



3. Students understand the advanced technologies in floriculture and horticulture sectors.

### **BOUP 125: Practical Based on BOUT 121, 122, 123**

1. The course focuses on morphology, anatomy, reproduction and evolution in Pteridophytes and Gymnosperms.

2. The students develop the basic understanding of important characteristics, anatomy, reproduction and evolution along with economic importance of these two groups.

3. This course aims to add to understanding of the students about the diversity of plants, their Description, Identification, Nomenclature and their classification including recent advances in the field

4. The students will know about the systematic position of Genera, Species and Families. 2. The students develop knowledge about plant nomenclature.

5. Students will understand the role of plant cytoskeleton and accessory proteins in major cellular processes of plants. 3. Student will focus on various components of the eukaryotic nuclear and organellar genome, with special reference to their regulatory role

6. Student will understand importance of metabolism to maintain living state of cells. They also understand role of nitrogen cycle in environment. CO4: Students will understand how enzymes serve important function in body, in digestion and metabolism. They have developed knowledge about pathways of water through xylem and phloem.

### **Semester III**

#### **BOUT 231 COMPUTATIONAL BOTANY**

1. This syllabus mainly deals with basic concept of computer technology, introduction of basic bio statistics, correlation and regression with various test.

2. Advanced statistical techniques based on advanced excel and other software's. This includes the some application and computer programme helpful for analysing the data in life science experiments. Introduce fundamental.

3. Along with statistics students understand the steps involved in proposal, research article and thesis writing. Describe basic principles of bioinformatics and bioanalytical techniques.

### **BOUT 232 DEVELOPMENTAL BOTANY**

1. Describe basic principles of plant development deals with intrinsic and extrinsic factors, embryology, developmental stages of embryo and endosperm, physiological and molecular basis of plant parts development.
2. Students understand molecular and cellular events in plants during cell differentiation.

### **BOUT 233 PLANT PHYSIOLOGY**

1. This subject syllabus based on the basic life science process in relation to the plant metabolism and catabolism process. It linked with interrelation between plant adaptations to external environment.
2. The included chapters deal with plant metabolic cycles with Photosynthesis and Respiration process. Students understand outline of secondary metabolites synthesis pathway.

### **BODT 234 MYCOLOGY**

1. This curriculum beneficial for understanding fungal classification and their significance.
2. Ecological importance of fungal species like mycorrhiza, and its affinities of various classes.
3. General characters and variation of fungal classes of higher fungi.
4. Students understand the ecologically and economically important fungal species.

### **BODP 234 : Practical Based on BODT 234 Mycology**

1. Handle instruments related to fermentation. Conversant with Spectroscopic, Chromatographic, techniques, HPLC, HPTLC, and various techniques

2. Screening of fungi for acid, alcohol, cellulose, amylase and various organic acid production.
3. Students understand genetic characterization mechanism of high valued active metabolites synthesis through fungi.

### **BOUP 235: Based on BOUT (Practical based on 231, 232 & 233).**

After completion of the course the students are familiar with various physiological aspects involved in the plant development.

1. Also, the role of enzymes in it and mechanism of photosynthesis, respiration, nitrogen and lipid metabolism. The students are able to isolate starch, pectin and various nutritive products from the plants. Qualitative and quantification of the plant contents and its biochemistry and mode /mechanism of synthesis etc.
2. Know about plants anatomical structure, their developmental patterns. Plant reproductive parts development of male, female gametophytes and fruits. Vascular tissues and its constituents by sections and maceration, wood anatomy, TS, TLS and RLS.
3. Mechanical tissues (Collenchyma, Sclerenchyma, Stone cells and Xylem), Secretary tissues (Mucilage Canals, Resin canals, Nectaries, and oil glands), laticifers (Latex cells and Vessels). Normal and abnormal secondary growth etc.
4. Classify different types of Biological Databases. Introduction to the basics of sequence alignment and analysis. □ Explain about different types of protein and other organism specific databases

## **Semester IV**

### **BOUT 241 BOTANICAL TECHNIQUES**

1. Students acquainted and understand the terminology in Advanced molecular, cellular, computational (bioinformatics) techniques, microscopy, microtomy and micrometry.
2. Knowledge about some importance aspects based on qualitative and quantitative data analysis mainly based on sophisticated techniques TLC, HPLC, Gas Chromatography, spectrophoretic and electrophoretic techniques.

3. Explain the principle, instrumentation, and Applications Principle of Spectrophotometers and centrifugation.

#### **BOUT 242 ADVANCED ECOLOGY**

1. Subject syllabus based on level of species diversity, ecosystem types and classification, stability, biome, concern issues of forest, type of agri-economy zones, field ecology and its conservation, concept of gene pool, RET concept, all environmental burning aspects of, environmental biotechnology.

2. Advanced ecological concepts give the idea regarding the impact of pollution on human health and on ecological cycles.

3. Students understand the human and ecology relationship and Environmental assessment.

#### **BODT 243 APPLIED MYCOLOGY**

1. This curriculum beneficial for understanding fungi and its ecological role, agriculture and forest pathology, significance and importance, bio fertilizers, medicinal, industrial mycology and food technology.

2. Understand production of industrial economically important metabolites like antibiotics, alcohol and enzymes.

#### **BODT 244 RESEARCH METHODOLOGY**

1. Students aware about basic concept of research data collection, observation and documentation.

2. Overview of biological statistical analysis terminology and problems.

3. Students will understand ethics and good practices in scientific writing.

#### **BOUP 245: based on BOUT 241 and BOUT 242**

1. On completion of this course the students are able to analyse various types of ecosystems, correlate different ecosystems.

2. To analyze the threat and suggest conservative measures. The students are also trained in the environmental impact analysis. Students are able to analyze, monitor various physical, chemical and biological properties of soil water and air.
3. Students will know about the use of computational approach to analyze, manage & store biological data. They are able to know, the use of information technology in biotechnology for data storage, Analyzing the DNA sequences
4. Students Learn about basics of biosafety and good lab practices like safe chemical handling, Hazardous wastes management, Safe and proper use of lab equipment's. Learn about the principles of various basic and advanced microscopy Know about Camera lucida, Digital cameras, photomicrography and image analysis. Gain knowledge on methods of molecular separation and characterization. Familiarize with floristic survey methods like RI, IVs, QUVs & CI.

#### **BODP 243 based on BODT 243 Applied Mycology**

1. Student understand the Fermentation Media - Media Composition, Growth Factors, Precursors, Antifoaming Agents, Inoculum Media, Media Economics Scale up-Off
2. Fermentation- Fermentation tank, Laboratory fermenters, Pilot-Plant fermenters, Designing of fermenters. Industrial Effluent- Application of Industrial waste, Management of Industrial waste, Management of Industrial waste disposal.
3. Biological waste management -Objectives of Biological treatment, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Imhoff-tanks, Sludge-Digestion tanks, Culture Maintenance - Slants and broths, Freezing liquid Nitrogen, Importance of Culture maintenance with reference to R&D laboratories.

#### **BOUP 244 Project Work**

On completion of the research project the students will be able to-

1. Design the experiments of his interest and execute it
2. Trained in handling of the basic and advance instruments
3. Generate the data, compile and analyze and interpret the data.
4. Presentation skill is developed in the students
5. The student is ready to work in any R&D setup

# **Savitribai Phule Pune University, Pune**

## **M. Sc. Computer Science from the Academic Year 2019-20**

### **Under the Faculty of Science**

#### **Program Outcome (PO)**

1. Provides technology-oriented students with the knowledge and ability to develop creative solutions.
2. Develop skills to learn new technology.
3. Apply computer science theory and software development concepts to construct computing-based solutions.
4. Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Mobile applications.

#### **Program Specific Outcome (PSO)**

1. Graduate of program should be able to demonstrate the principles and working of the hardware and software aspects of computer system.
2. Graduate of program should be able to use professional software practices strategies and tactics for the development, maintenance and testing of software solutions.
3. Graduate of program should be able to provide effective and efficient real time solutions using practical knowledge in IT domain.
4. To prepare graduates to adapt to technological advancements by engaging inlifelong learning.

5. To prepare graduates to apply their skills in creative innovative computing solutions by employing effective communication, team work, leadership, ethical practices and professionalism.

## Course Outcome (CO)

**Course Code: CSUT111**

**Course Name: Paradigm of Programming Language**

**Course Outcomes: -**

1. To Understand the basic language implementation techniques
2. Develop ability to learn new languages more quickly
3. To understand the concept of functional programming language
4. Develop ability to learn and write small programs in different programming Languages

**Course Code: CSUT112**

**Course Name: Design and Analysis of Algorithm**

**Course Outcomes: -**

1. To design efficient algorithms using various algorithm designing strategies
2. To analyze the problem and develop the algorithms related to these problems
3. To classify the problem and apply the appropriate design strategy to develop algorithm
4. To design algorithm in context of space and time complexity and apply asymptotic notation

**Course Code: CSUT113**

**Course Name: Database Technologies**

**Course Outcomes: -**

1. To study types of NoSQL databases (Document oriented, key Value pairs, Column-oriented and Graph)
2. To understand detailed architecture, define objects, load data, query data and performance tune NoSQL databases.
3. Able to handle large volumes of structured, semi-structured, and unstructured data using database technologies.

**Course Code: CSDT114A**

**Course Name: Cloud Computing**

**Course Outcomes: -**

1. To understand the principles and paradigm of Cloud Computing
2. Ability to design and deploy Cloud Infrastructure
3. Understand cloud security issues and solutions
4. Ability to understand role of Virtualization Technologies
5. Design & develop backup strategies for cloud data based on features

**Course Code: CSDT114B**

**Course Name: Artificial Intelligence**

**Course Outcomes: -**

1. To analyze and formalize the problem as a state space, graph, design heuristics
2. Ability to represent solutions for various real-life problem domains using logic-based techniques
3. Understand the numerous applications and huge possibilities in the field of AI
4. Ability to express the ideas in AI research and programming language related to emerging technology.



**Course Code: CSDT 114C**

**Course Name: Web Services**

**Course Outcomes: -**

1. To understand the details of web services technologies like WSDL, UDDI, SOAP
2. Ability to learn how to implement and deploy web service client and server
3. Learn how to explore interoperability between different frameworks
4. Understand architectural elements of a RESTful system

**Course Code: -CSUP115**

**Course Name: PPL and Database Technologies Practical**

**Course Outcomes: -**

1. Apply the knowledge of Scala to develop web-based applications
2. Provides knowledge of code optimization
3. To understand concept of interoperability.
4. Students are able to build and maintain the databases handling in real life applications and daily needs.
5. Able to perform hands-on NoSQL database lab assignments that will allow students to use the four NoSQL database types via products such as Cassandra, MongoDB, Neo4J and Riak.

**Semester-II**

**Course Code: CSUT121**

**Course Name: Advanced Operating System**

**Course Outcomes: -**

1. To design and understand the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.

2. To evaluate, and compare OS components through instrumentation for performance analysis.
3. To analyze the various device and resource management techniques for timesharing and distributed systems.
4. To develop and analyze simple concurrent programs using transactional memory and message passing, and to understand the trade-offs and implementation decisions.

**Course Code: CSUT122**

**Course Name: Mobile Technologies**

**Course Outcomes: -**

1. To gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment.
2. An ability to use the techniques, skills, and modern technology.
3. To develop the different applications that mobile computing offers to people, employees, and businesses
4. To develop high levels of technical competence in the field of mobile technology

**Course Code: CSUT123**

**Course Name: Software Project Management**

**Course Outcomes: -**

1. To identify the impact of IT projects on the performance of the organizations
2. To understand, manage and develop IT infrastructure in different projects
3. To develop strategies to calculate risk factors involved in IT projects
4. To use project management software to control the design, implementation, closure, and evaluation of IT projects
5. To estimate, plan, calculate, and adjust project variables.

6. Apply project management practices to launch new programs, initiatives, products, services, and events relative to the needs of stakeholders.

**Course Code: CSDT124C**

**Course Name: Soft Computing**

**Course Outcomes: -**

1. To discuss the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
2. To relate with neural networks that can learn from available examples and generalize to form appropriate rules for inference systems
3. To describe with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations.

### **Semester-III**

**Course Code: CSUT231**

**Course Name: Software Architecture and Design Patterns**

**Course Outcomes:**

1. Recognize the characteristics of patterns that make it useful to solve real-world problems.
2. Process available data using python libraries and predict outcomes using Machine Learning algorithms to solve given problem.
3. Able to use specific frameworks as per applications need.
4. Design java application using design pattern techniques.

**Course Code: CSUT232**

**Course Name: Machine Learning**

**Course Outcomes:**

1. Recognize the characteristics of machine learning that make it useful to real-world problems.

2. Process available data using python libraries and predict outcomes using Machine Learning algorithms to solve given problem.
3. Able to estimate Machine Learning models efficiency using suitable metrics.
4. Design application using machine learning techniques.

**Course Code: CSUT233**

**Course Name: Web Frameworks**

**Course Outcomes:**

1. Students will be ready with the technology which is used widely in Industry as a part of full stack developer.
2. Students will know the powerful way to develop the web application in Python.
3. Students will understand what really the asynchronous programming.
4. Build and deploy robust Django Web App.
5. Integrate with Restful web services.

**Course Code: CSDT234A**

**Course Name: Big Data Analytics**

**Course Outcomes:**

1. Recognize the characteristics, applications of big data that make it useful to real-world problems.
2. Process available data using big data tools Hadoop file system and predict outcomes to solve given problem.
3. Study & Design various case studies using big data tools/commands and analyse it.

**Course Code: CSUP235**

**Course Name: Practical on CSUT231, CSUT232 and CSUT233**

**Course Outcomes:**

1. Able to use specific frameworks as per applications need.
2. Design java application using design pattern techniques.
3. Process available data using python libraries and predict outcomes using Machine Learning algorithms to solve given problem.
4. Able to estimate Machine Learning models efficiency using suitable metrics.

