Course wised Outcome (CO): Economics

BA Programme		
Class	Course Name	Course Outcome
FYBA		1) The emphasis of this paper is on understanding economic concepts with the help of Indian economy.
	Indian Economy; Problems & Prospects (G1)	2) In this paper a student will be initiated into various economies' problems, which are related to current issues.
		3) This course develop practical skill and to the different skill and abilities of students.
		4) Students are doing practical work in different modules on regional economic aspects and they understand the Indian economic problems.
SYBA	Modern Banking (G2)	1) This course awareness among the students of Modern Banking System and banking constitutes important components towards understanding of economics.
		2) Clear understanding of the operations of banking their interaction with the rest of the economy is essential to realize how monetary forces operate through a multitude of channels- market, non-market, institutions and among others factors.
	Micro Economics(S1)	1) In this Paper, student is expected to understand the behavior of an economic agent, namely, a consumer, a producer, a factor owner and the price fluctuation in a market.
		2) The course incorporated in this Paper deal with the nature and scope of economics, the theory of consumer behavior, analysis of production function and equilibrium of a producer, the price formation in different markets structures and the equilibrium of a firm and industry.
		3) The principles of factor pricing and commodity pricing as also the problems of investment and welfare economics have been included.
	Macro Economics(S2)	1) On account of the growing influence and involvement of the State in economic fields, macroeconomics has become a major area of economic analysis in terms of theoretical, empirical as well as policy-making issues.

		2) It deals with the functioning of the economy as a whole, the objective of the course is to familiarize the students the basic concept of Macro Economics and application3) It deals with the functioning of the economy as a whole, including how the economy's total output of goods and services and employment of resources is determined and what causes these totals to fluctuate.
TYBA	Planning & Development(G3)	 The Study of Economic Development has gained importance because of stained interest of the developing countries in uplifting their economic conditions by restructuring their economics to acquire greater diversity, efficiency and equity in Consonance with their priorities. For this and other reasons, there have been many approaches to economic development. In recent times, besides hard core economic prescriptions to development, concern hitherto relegated to background, like education, health, sanitation and infrastructural development, have found place of pride in explaining the preference of various problems in developing countries.
	International Economics (S3)	 This course provides the students a thorough understanding and deep knowledge about the basic principles that tend to govern the free flow of trade in goods and services at the global level. The contents of the Paper spread over various modules, lay stress both on theory and applied nature of the subject that have registered rapid changes during the last decade. Besides this, the contents prepare the students to know the impact of free trade and tariffs on the different sectors of the economy as well as at the macro level. The students would also be well trained about the rationale of recent changes in the export import policies of India. This paper has become relatively more relevant from the policy point of view under the present waves of globalization and liberalization both in the North and in the South.

Public Finance (S4)	 The main objective of this paper is to train the students to use the techniques of statistical analysis, which are commonly applied to understand and analyze economic problems. The emphasis of this paper is on understanding economic concepts with the help of statistical methods.
	 2) Hence in this paper a student will be initiated into various economic concepts, which are amenable to statistical tools. 4) The paper also deals with simple tools and techniques, which will help a student in data collection, presentation, analysis and drawing inferences about various statistical hypotheses.

Course wised Outcome (CO): Economics

	MA Programme		
Class	Course Name	Course Outcome	
MA I	Micro Economic Analysis	The course entitled "Micro Economic Analysis" equips the students at the postgraduate level to understand systemic facts and latest theoretical developments for empirical micro analysis like demand, supply income and consumer satisfaction.	
	Public Economics	A Role and functions of the Government in an economy have been changing with the passage of time. The term 'Public Finance' has traditionally been applied to the package of those policies and operations which involve the use of tax and expenditure measures while budgetary policy is an important part to understand the basic problems of use of resources, distribution of income, etc	
	International Trade	The course intends to make students aware about the changing scenario of the international trade nature, theories, structure, performance and the current problems in India and also in the world.	
	Labour Economics	The course equips the students at the postgraduate level to understand systemic facts and latest theoretical developments for empirical analysis about labour.	
MA II	Macro Economic Analysis	The course entitled "Macro Economic Analysis" equips the students at the postgraduate level to understand systemic facts and latest theoretical developments for empirical analysis.	
	Growth & Development	The course includes the evolution of growth models as well as important concepts such as poverty, inequality and population dynamics in the context of developing countries.	
	Modern Banking	The course intends to make students aware about the changing scenario of the modern banking role, structure, performance and the current problems faced by the banking sector in India and also in the world.	
	Demography	This paper is to make the students aware of the importance of population in economic development and the various theories that explain the growth of population in a country.	

Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College, Manchar

DEPARTMENT OF ENGLISH

Course Outcomes (COs) for U.G.

Class: F.Y. B. A. (Compulsory English)

Sr. No.	Objectives
1.	To familiarize students with excellent pieces of prose and poetry in English so that they realize the beauty and communicative power of English.
2.	To expose them the native cultural experiences and situations in order to develop human values and social awareness.
3.	To develop overall linguistic competence and communicative skills of the students

Sr. No.	Course Outcomes
1.	Students realize the beauty and communicative power of English.
2.	Students develop human values and social awareness.
3.	Student-employability enhances and English becomes the medium of their livelihood and personality

Class: F.Y. B. A. (Optional English)- English Literature and Language

Sr.	Objectives
No.	
1.	To expose the students to the basics of literature and language.
2.	To familiarize them with different types literature in English, the literary devices and terms of language.
3	To introduce the units of language so that they become aware of the technical aspects and their practical usage.

4.	To prepare students to go for detailed study and understanding of	
	literature and language.	
5.	To develop integrated view about language and literature in them.	

Sr. No.	Course Outcomes
1.	Students realize various forms of literature and language.
2.	They understand the literary merit, beauty and creative use of language.
3.	Students become aware of the technical aspects and their practical usage
4.	Students develop the art of reading and understanding of literature and language.

Class: F.Y. B. A. Functional English

Paper-I - An Introduction to English Language and Writing Skills in English

Sr.	Objectives
No.	
1.	To introduce major features of spoken English
2.	To create awareness about using language according to the situation
3.	To help learners overcome common problems of Indian speakers of English
4.	To reinforce the grammar studied up to std. XII
5.	To help learners acquire the basic skills of effective writing.

Sr. No.	Course Outcomes
1.	Students realize major features of spoken language and its importance in real life situation.

2.	They understand the minute technical aspects which are necessary to make language use appropriate according to various real life situations
3.	They realize the errors of second language learners and try to overcome them.
4.	Students revise the background knowledge and concepts in grammar studied up to std. XII which functions as a frame for grammatically and meaningfully correct use of language.
5.	Students get exposure to make effective use of language in both oral and written forms.

F.Y.B.A. Functional English

Paper- II- Oral communication in English

Sr. No	Objectives
1	Building confidence in communicative English through active participation
2	Enabling students to learn through various activities
3	Creating awareness about what to say and when to say
4	Enhancing student's ability to communicate in oral mode.

Sr. No	Course Outcomes
1	Students communicate orally in English
2	They become aware to change the language according the situation
3	Students will become confident in communicative use of language
4	Students will be introduced with different communicative skills

S.Y.B.A.-Compulsory English

Paper- Literary Landscapes

Sr. No	Objectives
1	To develop competence among the students for self-learning
2	To familiarize students with excellent pieces of prose and poetry in English so that they

	realize the beauty and communicative power of English
3	To develop students interest in reading literary pieces.
4	To expose them to native cultural experiences and situations in order to develop human values and social awareness.
5	To develop overall linguistic competence and communicative skills among the students

Sr. No	Course Outcomes
1	The Student becomes the self- learned
2	The Students become familiar with various forms of literature.
3	The Students become independent readers
4	he Students become familiar with human values and social awareness

S.Y.B.A.-Optional English G-II

Paper- Study of English Language and Literature

Sr. No	Objectives
1	To make students understand the literary merit, beauty and creative use of language.
2	To expose students to the basics of short story, one of the literary forms.
3	To introduce some advanced units of language.
4	To prepare students for detailed study of literature and language.
5	To develop integrated view about language and literature.

Sr. No	Course Outcomes
1	Students will learn artistic and innovative use of language through prescribed literary text
2	Students will be acquainted with basic concepts and issues in linguistics
3	They will learn sub-disciplines of linguistics.
4	Students will be able to response emotionally to the literary text and will be acquired literary sensibility.

S.Y.B.A.-Optional English S-I

Paper- Appreciating Drama

Sr. No	Objectives
1	To acquaint and familiarize the students with the terminology in Drama and Criticism
	(i.e. the terms used in Critical Analysis and Appreciation of Drama)
2	To encourage students to make a detailed study of a few sample masterpieces of
	English Drama from different parts of the world
3	To develop interest among the students to appreciate and analyze drama independently
4	To enhance students awareness in the aesthetics of Drama and to empower them to evaluate drama independently

Sr. No	Course Outcomes
1	Students understand the terminology in Drama and Criticism.
2	Students understand few sample masterpieces of English Drama from different parts of the world.
3	They develop their interest and analyze drama independently.
4	Students become aware in aesthetics of Drama.

S.Y.B.A.-Optional English S-II

Paper- Appreciating Poetry

Sr. No	Objectives
1	To acquaint and familiarize the students with the terminology in poetry criticism.
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 indecently.

Sr. No	Course Outcomes
1	The students become familiar with the terminology in poetry
2	The students become studied some examples of poetry.
3	The Students become aware in the aesthetics of poetry and read independently.

S.Y.B.A. Functional English

Paper- III- Advanced Writing Skills and Introductions to Electronic Media

Sr. No	Objectives
1	Training students in extended writing in different formats
2	Developing awareness about the need to change language according to situation
3	Acquainting students to career options in electronic media and equipping them to be prepared for the same.
4	Helping students to recognize the need for reference work
5	Initiating students into research through scrape book and bibliography

Sr. No	Course Outcomes
1	Students will come to know advanced writing skills in different formats.
2	This course will enhance student's ability to communicate in written mode
3	The course will be more useful for students as it will offer more career options in print and electronic media
4	Students will have initiative in research

S.Y.B.A. Functional English

Paper- Oral Communication in English: Intermediate & Key Competency Modules

Objectives

Sr. No	Objectives
1	Building confidence in communicative English through active participation
2	Introducing students to a wide variety of conversational situations, both formal and informal
3	Creating awareness about developing voice quality for effective oral communication
4	Making students aware of proper use of body language during interaction or in video media

5	Leading students to overall development of personality through key

Sr. No	Course Outcome
1	The students started communicating among themselves in English
2	Students know the variety of formal and informal conversational situations.
3	Students are able to use proper body language during communication
4	Students are able to develop voice quality for effective oral communication

Class: T.Y. B. A. (Compulsory English)

Paper- Literary Pinnacles

Sr.	Objectives
No.	
1.	To develop communicative skills of the students and thereby develop their proficiency in English language.
2.	To develop competence among the students for self-learning.
3.	To encourage and enable the students to read the various types of texts on their own and discuss them among peers.

Sr. No.	Course Outcomes
1.	Students acquire the proficiency in English language
2.	The wider exposure of the English language enables them to acquire various skills in effective communication and it enhances their abilities of self-learning.
3.	The students acquire the skill of reading different types of texts in English.

T.Y.B.A.- Optional English G-III

Paper- Advanced Study of English Language and Literature

Sr. No	Objectives
1	To expose students to some of the best samples of Indian English Poetry
2	To make students study how Indian English Poetry expresses the ethos and culture of India
3	To make them understand creative use of language
4	To introduce students with some advanced area of language study
5	To prepare students for understanding and detailed study of both language and literature

Sr. No	Course Outcomes
1	Students will come to know the major figures of Indian literature in English
2	Students will acquire sense of appreciation of literary text.
3	Students will develop human values and concerns through literary text
4	Literary and linguistic competence of students will be enhanced

Class: T.Y. B. A. (English S- III)- Paper-Appreciating Novel

Sr.	Objectives
No.	
1.	To introduce students to the basics of novel as a literary form
2.	To expose students to the historical development and nature of novel
3.	To encourage and enable the students to read the various types of texts on their own and discuss them among peers.
4.	To develop literary sensibility and sense of cultural diversity in students

Sr. No.	Course Outcomes
1.	Students acquire the proficiency in English language
2.	The wider exposure of the English language enables them to acquire various skills in effective communication and it enhances their abilities of self-learning.
3.	The students acquire the skill of reading different types of texts in English.

T.Y.B.A.- Special English S-IV

Paper- Introduction to Literary Criticism

Sr. No	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

Sr. No	Course Outcomes
1	Students acquire the knowledge of basics of literary criticism.
2	They become aware of the nature and historical development of criticism.
3	They familiarize with the significant critical approaches and terms.
4	Students interpret literary works in the light of the critical approaches.

T.Y.B.A. Functional English

Paper- V- Introduction to Print Media and Writing for Mass Media & Key Competency Module

Sr. No	Objectives

1	Acquainting students to new career options and equipping them to be prepared for the same
2	Preparing students for various careers in language like translation, technical writing, writing for mass media, advertising, free lancing.
3	Creating awareness about language change from one media to other.
4	Encouraging students to observe, compare and analyze the language activities of media through exposure.
5	Providing them with basic data required for skills like translation especially related to media

Sr. No	Course Outcomes
1	The students become familiar with new career options like mass media.
2	The students compare the use of language in various media.
3	The students acquire the skills of data and translate these data in different media.
4	The students become familiar with various career potion through mass media like translator
5	The students become familiar with the use of language in media.

T.Y.B.A. Functional English

Paper- VI- Entrepreneurship development, Project Report & Oral Communication

in English: Advanced (Practical Paper)

Sr. No	Objectives
1	Encouraging students to thrash out the possibility of self-employment
2	Leading students to overall development of personality through key competency modules
3	Initiating students into research through project report

4	Exposing students to work environment and work experience through visits and field
	work

Sr. No	Course Outcomes
1	Students become aware of the self-employment.
2	Student's personality is developed through key competency modules.
3	Students acquire the knowledge research through project report.
4	Students get exposure to work environment and work experience through visits and field work.

Class: S.Y.B.Sc.- Optional English

Sr.	Objectives
No.	
1.	To introduce scientific facts and the philosophy of science through the study of literary pieces.
2.	To create awareness about using language according to the situation
3.	To help learners acquire the basic skills of effective speaking and writing.
4.	To reinforce the grammar in order to improve vocabulary and use of English language in real life situations.

Sr.	Course Outcomes
No.	
1.	Students become aware about the use of English language in literary texts and scientific writing.
2.	Students revise the background knowledge and concepts in grammar in order to improve the word power on which their effective use of English language is based.
3.	They understand the minute technical aspects which are necessary to make language use appropriate according to various real life situations.

4.	Students get exposure to make effective use of language in both oral and
	written forms.

Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College, Manchar

DEPARTMENT OF ENGLISH (P.G.)

P.G. COURSE OUTCOMES (Cos)

M.A. –I- Paper- 1.1/ Paper- 2.1 English literature from-1550-1798

Sr. No.	Objectives
1	To introduce students to major movements and figures of English
	Literature through the study of selected literary texts.
2	To create literary sensibility and emotional response to the literary texts and implant
	sense of appreciation of literary texts.
3	To expose students to the artistic and innovative use of language employed by the
	writers.
4	To instill values and develop human concern in students through exposure to literary
	texts.
5	To enhance literary and linguistic competence of students.

Sr. No.	Course Outcomes
1	Students learn about major movements and literary figures in English Literature.
2	Students develop emotional response and sense of interpretation to the literature.
3	Students get exposure to artistic use and techniques used by the authors.
4	Students inculcate moral and human values through the study of literary text.

Paper- 1.2/ Paper- 2.2- English literature from 1798 to the Present

Sr. No.	Objectives
1	To introduce students to major movements and figures of English
	Literature through study of selected literary texts
2	To create literary sensibility for appreciation in students and expose them to artistic and
	innovative use of language by writers and to various worldviews
3	To instill values and develop human concern in students through exposure
	to literary texts
4	To enhance literary and linguistic competence of students

Sr. No.	Course Outcomes
1	The Students become familiar with major movements through selected literary text.
2	The Students become familiar with the use of language in various writers
3	The Students develop human values through selected literary text.
4	The students develop their literary and linguistics competence.

Paper- 1.3/ Paper- 2.3- Contemporary Studies in English language

Sr. No.	Objectives
1	To introduce students to the basic tools essential for systematic study of
	Language.
2	To acquaint students with the basic concepts and issues in linguistics.
3	To introduce them to various sub-disciplines of linguistics.
4	To initiate them into theoretical perspectives and enable them to apply the Acquired linguistic skills in real life situations.

Sr. No.	Course Outcomes
1	Students become acquainted with the basic linguistic tools.
2	They learn basic concepts and issues in Linguistics.
3	Students adopt various sub-disciplines and various trends in linguistics.
4	They use theoretical knowledge of language and imply it in real life situations.

Paper 1.4/ Paper- 2.4- Literary Criticism and Theory

Sr. No.	Objectives
1	To introduce students to the nature, function and relevance of literary criticism and theory.
2	To introduce them to various important critical approaches and their tenets.
3	To encourage them to deal with highly intellectual and radical content and thereby develop their logical thinking and analytical ability.
4	To develop sensibility and competence in them for practical application of critical approach to literary texts.

Sr. No.	Course Outcomes
1	Students learn historical development of criticism with its basics.
2	Students develop critical approach towards literature.
3	Students get deep understanding of various critical approaches and their principles.
4	Logical thinking and analytical ability of students is enhanced through the study of prescribed critical essays and articles.

M .A. II Paper 3.1/ Paper 4.1- Indian Writing in English

Sr. No.	Objectives
1	To introduce students to major movements and figures of Indian Literature in
	English through the study of selected literary texts
2	To create literary sensibility and emotional response to the literary texts and implant
	sense of appreciation of literary text
3	To expose students to the artistic and innovative use of language employed by the
	writers
4	To instill values and develop human concern in students through exposure to literary
	texts

Sr. No.	Course Outcomes
1	Students learn how Indian English Poetry expresses the ethos and culture of India.
2	Students acquire literary sensibility for appreciation of literary text.
3	Students learn the major movements and figures in Indian English Literature
4	Students are aware of human values and concerns reflected in literary texts

Paper 3.4/ Paper 4.4- Indian Literatures in English Translations

Sr. No.	Objectives
1	To introduce students to some of the significant Indian regional language writers of various periods and to their works

2	To acquaint students with the major ancient, medieval and modern literary movements in India and their influence on literature
3	To enable students to compare the features and peculiarities of Indian societies, cultures and languages

Sr. No.	Course Outcomes
1	The students acquaint with some of the significant Indian regional language writers of various periods and to their works.
2	The students familiarize with the major ancient, medieval and modern literary movements in India and their influence on literature.
3	Students become capable enough to compare features and peculiarities of Indian societies, cultures and languages.

Paper 3.6/ Paper 4.6 – American Literature

Sr. No.	Objectives
1	To 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	To familiarize students with the issues and problems America has gone through and
	how they find expression in her literature.
3	To provide students a general idea about the religious, socio-political, literary and
	cultural movements in America.
4	To familiarize students with the rich diversity of American writing

Sr. No.	Course Outcomes
1	Students become familiar with major texts of American authors through selected literary writings.
2	Students become familiar with the issues and problems America has gone through and how they find expression in American literature.
3	Students get a general idea about the religious, socio-political, literary and cultural movements in America.
4	Students get facilitated with the rich diversity of American writings.

Paper 3.8/ Paper 4.8- World Literatures in English

Sr. No.	Objectives
1	To introduce students to some of the important literary texts of the world
2	To help them in gaining some insights into the socio-cultural aspects of the regions from where the texts are chosen
3	To enable students to compare the authors of the world with Indian writers in English or the writers in their own languages
4	To introduce students to the various techniques employed by the authors and how the techniques are adapted/adopted by Indian authors

Sr. No.	Course Outcomes
1	Students get introduced with some of the important literary texts of the world
2	Students gain some insights into the socio-cultural aspects of the regions from where the texts are chosen
3	Students become enable to compare the authors of the world with Indian writers in English or the writers in their own languages
4	Students acquire various techniques employed by the authors and how the techniques are adapted/adopted by Indian authors

Course Outcomes: Geography

Course Outcomes (CO):

1. F. Y. B. A. Physical Geography and Human Geography (G1)

A) Objectives:

1. To introduce the students to the basic in physical Geography

2. To explain the students of physical features with the formation of ocean and land.

3. To develop the basic concept about the Earth and Human Activities.

4. To introduce the students to various theories related earth's movement and Urbanisation.

5. To acquaint the knowledge of formation of mountains, valley and trench, settlement, Transports, Treads, etc.

6. To acquaint the knowledge in endogenetic and exogenetic process.

7. To introduce about application of Physical Geography, Environment Geography in human activity.

B) Outcomes:

1. Introduced the students to the knowledge in physical geography.

2. Acquainted the knowledge of formation of land and ocean.

3. Student understands the theories in physical and human geography to develop their view about the formation of different relief features.

4. acquainted the students with the endogenetic and exogenetic process.

5. Developed their attitude in the applied geomorphology, Climatology, Agriculture, Industries etc.

2. S.Y. B. A. Environmental Geography (G2)

A) Objectives:

- 1. To give basic knowledge of Environment and relationship between with geography.
- 2. To explain the climatic changes and human behaviour.
- 3. To acquire information about climatic, earth's, anthropogenic movement and the environment changes.

- 4. To acquire the causes, effects and remedies in Environmental studies.
- 5. To search the articles, news and case studies in environment disaster management.

B) Outcomes:

- 1. The students acquired the information about environment.
- 2. Acquired information about climatic, earth's and anthropogenic movement and environment changes.
- 3. The students improved their role in environment.
- 4. The students increased the knowledge in research.
- 5. To create awareness about environment in the society.

3. S.Y. B. A. Geography of Maharashtra (S1)

A) Objectives:

- 1. To study the different elements of physical geography of Maharashtra such as location, geological structure, climate, geomorphological structure etc.
- 2. To intellectual about historical, Political background of Maharashtra
- 3. To describe the administrative divisions in details.
- 4. To observe drainage system, climatic regions, drought prone regions, flood areas etc.
- 5. To study the Maharashtra's agricultural land, different crops, industrial area and their importance, population, settlements, Tourism and urbanization.

B) Outcomes:

- 1. Study the different elements of physical geography of Maharashtra.
- 2. Identify key about historical, Political background of Maharashtra.
- 3. Describe the administrative divisions in details as well drainage system, climatic regions, drought prone regions, flood areas etc.
- 4. Details in Maharashtra's agricultural land, different crops, industrial area and their importance, population, settlements, Tourism and urbanization

4. S.Y.B. A. Fundamentals of Geographical Analysis (S2)

A) Objectives:

1. To enable the students to use various Projections and Cartographic Techniques.

- **2.** To acquaint the students with basic of Map and types of map.
- **3.** To acquaint the students with the Statistical information.
- **4.** To give the knowledge in principles of surveying, its importance and utility in the geographical study.

B) Outcomes:

- 1. Enable the students to use various Projections and Cartographic Techniques.
- 2. Acquainted them with the basic of Map and types of map.
- 3. Encouraged the students to make a detailed study in Statistical information.
- 4. Developed among the students an ability of reading and appreciating drama.

5. T.Y.B. A. Geography of India (S1)

A. Objectives -

- 1. To acquaint the students with basic in physical structure of India.
- 2. To enable the students in river system of India. Such as Ganga and its tributary, Sindhu and Brahmhaputra's river system
- 3. To explain the students with the natural recourses in India with help of map.
- 4. To give the knowledge in principles of surveying, its importance and utility in the geographical study.
- 5. To make the students aware of the magnitude of problems and prospectus at national level.

B. Outcome -

- 1. Acquainted the students in physical as well as human geography of India.
- 2. Enable the students in knowledge of river system of India.
- 3. Increased knowledge in the natural recourses in India with help of map.
- 4. Student got aware of the magnitude of problems and prospectus at national level.
- 5. Help the students to understand the inter relationship between the subject and the society.

6. T.Y.B. A. Tourism Geography (G3)

A. Objectives:

1. To introduce the students to the basic concepts in Tourism Geography.

- 2. To study the different elements of geography and their relationship with tourism.
- 3. To identify key tourism attractions from state, international and global dimension.
- 4. To describe the major climatic elements that effects on tourism and identify the world climatic zones.
- 5. To observe the ethnic culture and religions of major tourism destinations.
- 6. To understand the history of Tourism
- 7. To introduce the students to the basic concepts in Tourism Geography.

B. Outcomes:

- 1. Study the different elements of geography and their relationship with tourism.
- 2. Identify key tourism attractions from state, international and global dimension.

3. Describe the major climatic elements that affect tourism and identify the world climatic zones.

- 4. Observed the ethnic culture and religions of major tourism destinations.
- 5. Introduce the students to the basic concepts in Tourism Geography.

7. T.Y.B. A. Techniques of Spatial Analysis (S4)

A. Objectives -

- 1. To Introduce the Students with basic in Maps such as SOI Toposheets.
- 2. To acquire the Knowledge of Reading and Interpretation of Toposheet.
- 3. To acquaint the students with IMD weather maps and to gain the knowledge of weather map reading and interpretation.
- 4. To train the students in elementary statistics as an essential part of geography, such as central tendency, standard deviation, student t test, chi square test etc.
- 5. To awareness about remote sensing and geographical information system (GIS) among the students

B. Outcome -

- 1. Students brought up with the basic in Maps such as SOI Toposheets.
- 2. Acquired the Knowledge of Reading and Interpretation of Toposheet.
- 3. Acquainted the students with IMD weather maps and to gain the knowledge of weather map reading and interpretation.

- 4. Student trained in the elementary statistics as an essential part of geography, such as central tendency, standard deviation, student t test, chi square test etc.
- 5. Student understands about remote sensing and geographical information system (GIS).
- 1. Courses:

Skill Enhanced Course (SEC)

1. S.Y. B. A. Geography of Disaster Management (SEC)

A) Objectives:

- 1. To give basic knowledge of Disaster and relationship between with geography.
- 2. To explain the structural and Nonstructural measures in disaster management.
- 3. To acquire information about climatic, earth's and anthropogenic disasters.
- 4. To acquire the causes, effects and remedies in disaster.
- 5. To search the articles, news and case studies in disaster management.

B) Outcomes:

- 1. The students acquired the information about disaster management.
- 2. Acquired information about climatic, earth's and anthropogenic disasters.
- 3. The students improved their role in environment.
- 4. The students increased the knowledge in research.

2. S.Y. B. A. Tourism Geography (SEC)

A) Objectives:

- 1. To study the different elements of geography and their relationship with tourism.
- 2. To identify key tourism attractions from state, international and global dimension.
- 3. To describe the major climatic elements which is affects on tourism and identify the world climatic zones.
- 4. To observe the ethnic culture and religions of major tourism destinations.

C) Outcomes:

- 1. Study the different elements of geography and their relationship with tourism.
- 2. Identify key tourism attractions from state, international and global dimension.
- 3. Describe the major climatic elements that affect tourism and identify the world climatic zones.

4. Observed the ethnic culture and religions of major tourism destinations.

Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce & Hutatma Babu Genu Science College, Manchar.

Course Outcomes: B.A. History

2019-20

* Course Outcome

Sr. No	Course	Subject	Learning Outcomes
1			CO-1. It provides a base for understanding the entire Indian history.
(FYBA (Sem.I&II)	Early India: From Pre-History to Rashtrakkutas	CO-2. Helps the student to understand the history of early India from theprehistoric times to the age of the Mauryas.
			CO-3. Emphasizes on the factors and forces behind the rise, growth and spread of civilization and culture of India along with the dynastic history.
			1.Student will develop the ability to analyze sources for Maratha History.
2.	SYBAG-2 (Sem.III&I V)	History of the Marathas (1630 to 1818)	CO-2. Student will learn significance of regional history and political foundation of the region.
			CO-3. It will enhance their perception of 17th century Maharashtra and India in context of Maratha history.
			CO-4. Appreciate the skills of leadership and the administrative system of the Marathas.
			CO-1. Provides examples of sources used to study various periods in history.

3.	SYBA S-1 (Sem.III&I V)	Medieval India :- Sultanate Period To Mughal Preiod	CO-2. Relates key historical developments during medieval period occurring in one place with another.
			CO-3. Analyses of socio - political and economic changes during medieval period
			CO-4. Estimate the foreign invasion and the achievement of rulers
			CO- 1. It will enable students to develop the overall understanding of the Modern World.
4.	SYBA (S-2) (Sem.III&IV)	Glimpses of the Modern World - Part I &II	CO-2.The students will get acquainted with the Renaissance, major political, socio-religious and economic developments during the Modern World.
			CO-3. It will enhance their knowledge of the history of the Modern World.
			CO-4. It will enable students to understand the significance of the intellectual, economic, political developments in the Modern World.
			CO-1. Students will get an overall understanding of the process of Tourism Management.
5.	SYBA (Sem.III&I V)	Tourism Management & Travel Agency & Tour Business	CO-2. They will get on opportunity to work in the Tourism Management with great potential.
			CO-3.They will be able to seek self- employment by starting their own tourism related business.

Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce & Hutatma Babu Genu Science College, Manchar.

COURSE OUTCOMES: T.Y.B.A.

2021-22

 Course Outcome 				
Sr. No	Course	Subject	Learning Outcomes	
1.	TYBA G-3 (Sem. V&VI)	Indian National Movement (1885- 1991)	CO-1. It will enable students to develop an overall understanding of Modern India.	
			CO-2. It will increase the spirit of healthy Nationalism Democratic Values and Secularism among the Students.	
			CO-3. Students will understand various aspects of the Indian Independence Movement and the creation of Modern India.	
			various interpretative perspectives.	
2.	TYBA S-3 (Sem. V)	Introduction to History	CO-1. Students will be introduces to the Information and importance of Historiography. CO-2. Students can study the	
			interdisciplinary approach of History. CO-3. This curriculum develops Research ability and process of	
			Research Methodology in History. CO-4. Students will learn about the usefulness of History in the 21 st century, its changing perspectives, the new ideas that have been invented.	
3.	TYBA SEC-2B (Sem. V)	Museology	CO-1. The Students will understand the concepts of Museum ad learn the Basic Principles of Museology.	

			CO_{-2} The Students will gain
			Comprehensive Knowledge of the Process
			Comprehensive Knowledge of the Process
			of Cringe and Conserving Museum of
			objects.
			CO-3. To enable the students to collect
			Various Articles as a tool of History
			CO-4. To encourage the students to
			collect the material or sources of History
			for local, regional and National History
			through Museum.
			CO-1. Students will be develop the ability
			to analyze sources for 19 th century
			Maharashtra History.
			CO-2. Student will learn significance of
		di di	Regional History and Socio-religious
4	TYBA S-3	Maharashtra in the $19^{m} \& 20^{m}$	reformism foundation of the region.
	(Sem. V&VI)	Century	CO-3 It will enhance their perception of
			$19^{\text{th}} \& 20^{\text{th}}$ Century Maharashtra
			CO(4) Appreciate the skills of
			Lordership and the Socia Paligious
			System of the Maharashtra
			System of the Manarashtra.
			CO-1. Students will be introduced to the
	TYBA S-3 (Sem. VI)		information and importance of applied
			History.
			CO-2. Students will be learn about the
			Historical significance of Archaeology
			and Archives and opportunities in the field
			of Archaeology and Archives.
5		Applied History	CO-3.Through this course, students will
5.			be informed about the opportunities in the
			field of Media, Museums.
			CO-4. Students will learn about the
			usefulness of history in the 21 st
			Century, its changing perspectives,
			the new ideas that have been
			invented, and the importance of
			history in a Competitive World.
			CO-1. Student will be able to identify and
6.			decipher the Coins
	TYBA SEC-2B (Sem. VI)		
		Numiconsting	CO-2. They will also be able to
		Numismatics	understand the Socio-Political background
			that accurse through the coinege of the
			time there extrine helt is the first
			ume, thus getting nonstic picture of that
			economic system prevalent in Ancient
			India.

Course Outcomes (CO) : Marathi :

BA Programme		
Class	Course Name	Course Objectives & Outcome
FYBA	Course Name मराठी साहित्य : कथा आणि एकांकिका किंवा व्यवहारिक व उपयोजित मराठी भाग १/२ (G1-k/v)	Course Objectives & Outcome Objectives : ?. मराठी साहित्यासंबंधी रुची निर्माण करणे. ?. विद्यार्थांच्या वाङ्मयीन अभिरुचीचा विकास करणे 3. कथा आणि एकांकिका साहित्य प्रकार समजून घेणे. %. भाषिक व लेखन कौशल्य विकसित करणे. %. मराठीचा कार्यालयीन / व्यवसायिक कामकाजात वापर, गरज व स्वरूप विशेषांची माहिती करून देणे. Outcome : १. मराठी साहित्यासंबंधी रुची निर्माण झाली. ?. भाषिक क्षमता विकसित झाली. ?. भाषिक व लेखन कौशल्य विकस झाला.
FYBCOM	भाषा, साहित्य आणि कौशल्यविकास (G1)	 Objectives : १. मराठी साहित्यासंबंधी रुची निर्माण करणे. २. विविध क्षेत्रातील कर्तृत्ववान व्यक्तींच्या कार्याची व विचारांची ओळख करून देणे. ३. भाषिक क्षमता विकसित करणे. ४. भाषिक व लेखन कौशल्य विकसित करणे. ५. मराठीचा कार्यालयीन / व्यवसायिक कामकाजात वापर, गरज व स्वरूप विशेषांची माहिती करून देणे. Outcome : १. मराठी साहित्यासंबंधी रुची निर्माण झाली. २. भाषिक क्षमता विकसित झाली. ३. भाषिक व लेखन कौशल्य विकस झाला. ४. विद्यार्थांच्या वाङ्मयीन अभिरुचीचा विकास झाला.
SYBA	भाषिक कौशल्यविकास आणि आधुनिक मराठी साहित्यप्रकार:कांदबरी / ललित गद्य व व्याहारीक उपयोजित मराठी (G2-k/v)	Objectives : १. कांदबरी या साहित्यप्रकाराचे स्वरूप ,घटक,प्रकार आणि वाटचाल समजून घेणे, २. नेमलेल्या कांदबरीचे आकलन ,आस्वाद आणि विश्लेषण करणे. ३. भाषिक कौशल्याची क्षमता विकसित करणे. ४. नेमलेल्या अभ्यासपुस्ताकातील ललीतगद्याचे आकलन ५. कार्यालयीन भाषा व्यवहारातील लेखन कौशल्याची ओळख करून देणे. ६. आकलन व आस्वाद क्षमता विकसित करणे. ७. उपयोजित व सर्जनशील लेखनाची क्षमता विकसित करणे.

	 ८. मराठी भाषेची लियीन, व्यावसायिक कामकाजातील गरज, स्वरूप आणि उपयोजन यांची माहिती करून घेणे. ९. कार्यालयीन व्यावसायिक भाषा व्यवहारासाठी आवश्यक लेखनकौशल्ये प्राप्त करणे. १०. नवसमाजमाध्यमांतील विविध भाषिक आविष्कारांचे स्वरूप समजून घेणे. ११. पारिभाषिक संज्ञाची ओळख करून देणे. Outcome: १. कांदबरी या साहित्य प्रकारांच्या तात्विक घटकांचे ज्ञान झाले. २. आधुनिक मराठी साहित्यातील निवडक चरित्र-आत्मचरित्र यांचे आपका का प्राप्त यांचे भाषा का प्राप्त यांचे
	३. पारिभाषिक संज्ञाची ओळख करून दिली.
आधुनिक मराठी साहित्य : सत्र पहिले प्रकाशवाटा (DSE 1A(3))	Objectives : १. आत्मचरित्र या साहित्यप्रकाराचे स्वरूप, संकल्पना समजावून घेणे. २. आत्मचरित्र या साहित्यप्रकाराच्या प्रेरणा आणि वाटचाल यांची ओळख करून घेणे. ३. ललित गद्यातील अन्य साहित्यप्रकारांच्या तुलनेत आत्मचरित्राचे वेगळेपण समजावून ४. नेमलेल्या या आत्मचरित्राचे आकलन, आस्वाद आणि विश्लेषण करणे. मराठी साहित्यप्रकारांच्या तात्विक घटकांचे ज्ञान देणे. ९. साहित्याचे आकलन व मूल्यमापन करण्याची दृष्टी निर्माण करणे. ६.साहित्याचे आकलन व मूल्यमापन करण्याची दृष्टी निर्माण करणे. ७. मराठीतील अभिजात साहित्यकृतीचा संस्कार घडवणे. ८. साहित्याचा सूक्ष्म पातळीवर अभ्यास करण्याची क्षमता विकसित करणे. ९. आत्मचरित्र या साहित्यप्रकाराचे स्वरूप, संकल्पना समजावून घेणे. १०. आत्मचरित्र या साहित्यप्रकाराचे स्वरूप, संकल्पना समजावून घेणे. १०. आत्मचरित्र या साहित्यप्रकाराच्या प्रेरणा आणि वाटचाल यांची ओळख करून घेणे. ११.ललित गद्यातील अन्य साहित्यप्रकारांच्या तुलनेत आत्मचरित्राचे वेगळेपण समजावून १२. नेमलेल्या या आत्मचरित्राचे आकलन, आस्वाद आणि विश्लेषण करणे. १३. मध्ययुगीन गद्य-पद्य साहित्यप्रकारांची ओळख करून घेणे. १४. नेमलेल्या अभ्यासपुप्तकातील मध्ययुगीन गद्य-पद्याचे आकलन, भाष्मवाद भाणि विश्लेषण
	Outcome : १. मराठी साहित्यप्रकारांच्या तात्विक घटकांचे ज्ञान झाले. २. साहित्याचे आकलन व मूल्यमापन करण्याची दृष्टी निर्माण करण्यात

		आली.
		३. साहित्याचा सूक्ष्म पातळीवर अभ्यास करण्याची क्षमता विकसित
		झाली.
	सत्र दुसर	Objectives : १ मराठी साहित्य परंपरेचे स्थल जान करून देणे
	मध्ययुगान मराठा	२ विशिष्ट कालखंडाच्या साहित्यासागील प्रेरणा जात करून देणे
	साहित्य: निवडक	3 विशिष्ट कालखंडाच्या साहित्यामागील प्रवनी जात करून देणे
	मध्ययुगीन गद्य,	४. माहित्यप्रकारांच्या तिकमनशील परंपरेचे म्थल जान करून देणे
	पद्य [DSE 2 A(3)]	४ महित्याच्या पार्श्वभमी संबंधी आकृतन करून देणे
		Outcome :
		१. मराठी साहित्य परंपरेचे स्थूल ज्ञान प्राप्त झाले.
		२. विशिष्ट कालखंडाच्या साहित्यामागील प्रेरणा आणि प्रवृत्ती ज्ञात
		झाल्या.
		३. साहित्याची पार्श्वभूमी आकलन झाली.
·	साहित्यविचार DSE	१. भारतीय आणि पाश्चात्य साहित्यविचाराच्या आधारे साहित्याची
	1B (3) सत्र पहिले	संकल्पना, स्वरूप आणि प्रयोजनविचार समजावून घेणे.
		२. साहित्याची निर्मितिप्रक्रिया समजावून घेणे.
	साहित्य समीक्षा DSE 2B (3) सत्र दुसरे	३. साहित्याची भाषा आणि शैली विषयक विचार समजावून घेणे.
		४. साहित्य समीक्षेची संकल्पना, स्वरूप यांचा परिचय करून घेणे.
		५.साहित्य आणि समीक्षा यांचे परस्पर संबंध समजावुन घेणे व
		अभ्यासणे.
		६. साहित्यप्रकारानुसार समीक्षेचे स्वरूप समजावुन घेणे व अभ्यासणे.
		७. ग्रंथ परिचय, परीक्षण व समीक्षण यातील फरक समजावून घेणे.
		Outcome
		१. साहित्यनिर्मिती प्रक्रिया समजली
		२. साहित्याच्या भाषेचे स्वरूप समजले.
		३. साहित्यसमीक्षा संकल्पना समजली.
		 साहित्य आणि समीक्षा यांचा परस्पर संबंध समजून घेण्यास
		मदत झाली.
	ग्रह्मा	Objective :
	भागि मंगटन (SEC	्रणकाशनत्यात्वाय आणि मंपादन यामाठी भावश्यक कौशव्ये मिलविणे
	2 A (2)]	
		र. अपगरागण्ययहार आणि समादग पासाठा आरपायापगसह उपपाठागाया कौशन्त्रो मिलतिगो
		יייגורא וסטואיו. תהואם הבאו הורחה היאו הווהום אחום אייניאי ה
		איזיגויו מדשו, שוואנות מדשו, שוששום, קמשא מושומש, וסמצט חדשו איז האר השור הלא איז איז איז איז איז איז איז איז איז אי
		तत्त्वा, ग्रंच विक्रा दुकान, पलक्स निम्ता कद्र, वाताहर याना मटा देऊन मनिष्यम केमो
		ี หาะเดา นา.

	मराठी भाषिक संज्ञापन कौशल्ये MIL 2(2) सत्र पहिले नवमाध्यमे आणि समाज माध्यमांसाठी मराठी MIL 2(2) सत्र दुसरे	 ४. जहिरात, मुलाखतलेखन आणि संपादन यासाठी आवश्यक कौशल्ये मिळविणे. ५. जाहिरात, मुलाखतलेखन आणि संपादन यासाठी आवश्यक प्रशिक्षण घेणे. ६. जाहिरात, मुलाखतलेखन आणि संपादन यासाठी प्रात्यक्षिकासह उपयोजनाची Outcome १.प्रकाशन व्यवहार आणि संपादन प्रक्रिया समजण्यास व विकसित होण्यास मदत झाली. १. प्रात्यक्षिक आणि संदर्भीय लेखन समजण्यास मदत झाली. ३. जाहिरात व मुलाखत लेखन कौशल्ये विकसित झाली ४. प्रगत आषिक कौशल्यांची क्षमता विकसित करणे. Objectives : १. प्रसारमाध्यमांतील संजापनातील स्वरूप आणि स्थान करणे, १. व्यक्तिमत्त्व विकास आणि भाषा यांच्यातील सहसंबंध स्पष्ट करणे. ३. लोकशाहीतील जीवनव्यवहार आणि प्रसारमाध्यमे यांचे परस्पर संबंध स्पष्ट करणे. ४.प्रसारमाध्यमांसाठी लेखनक्षमता विकसित करणे. ५.संजापनातील नवमाध्यमे आणि समाजमाध्यमांचे स्वरूप आणि स्थान स्पष्ट करणे. ६.आषा, जीवनव्यवहार आणि नवमाध्यमे, समाजमाध्यमांचे परस्परसंबंध ७.नवमाध्यमे आणि समाजमाध्यमांताठी लेखनक्षमता विकसित करणे. ८.नवमाध्यमे आणि समाजमाध्यमांवा वापर आणि परिणाम याबद्दल चर्चा करणे. ९.प्रगत आणिक कौशल्ये विकसित होण्यास मदत झाली. ९. प्रगत आणि क कौशल्ये विकसित होण्यास मदत झाली. ९. प्रगत आणि क कौशल्ये विकसित होण्यास मदत झाली. ९. प्रगत आणि क कौशल्ये विकसित होण्यास मदत झाली. ९. प्रगत आणि क कौशल्ये विकसित हाण्यास मदत झाली. ९. प्रगत आणिक कौशल्ये विकसित होण्यास मदत झाली. ९. प्रगत आणिक कौशल्ये विकसित होण्यास मदत झाली. ९. प्रगत आणि लेखन करण्याचे सामर्थ्य प्राप्त झाले.
ТҮВА	भाषा कौशल्यविकास आणि आधुनिक मराठी साहित्यप्रकार : प्रवासवर्णन (CC-1E)/ व्याहारीक उपयोजित मराठी	Objectives : १. मुद्रित माध्यमासाठी लेखन कौशल्य आत्मसात करणे. २. प्रवासवर्णन या साहित्यप्रकाराचे स्वरूप, प्रेरणा, प्रयोजने, वैशिष्ट्ये आणि वाटचाल समजून घेणे. ३. नेमलेल्या प्रवासवर्णनाचे आकलन,आस्वाद आणि विश्लेषण करणे. ४. मराठी साहित्य, भाषा कौशल्यविकास आणि शासनव्यवहार यांची
	सत्र पाहल	माहता करून दण.

भाषा कौशल्य विकास आणि आधुनिक मराठी साहित्यप्रकार : कविता (CC-1F) / व्याहारीक उपयोजित मराठी सत्र दुसरे	 ७. कविता या साहित्यप्रकाराची विविध आविष्कार व भाषा रूपांची अभ्यास पुस्तकातील कविताच्या आधारे ओळख करून देणे. Outcome : मुद्रित माध्यमासाठी लेखन कौशल्य आत्मसात झाली. मुद्रित माध्यमासाठी लेखन कौशल्य आत्मसात झाली. प्रवासवर्णन या साहित्यप्रकाराचे स्वरूप, प्रेरणा, प्रयोजने, वैशिष्ट्ये आणि वाटचाल समजून घेतली. नेमलेल्या प्रवासवर्णनाचे आकलन,आस्वाद आणि विश्लेषण करून घेतले. मराठी साहित्य, भाषा कौशल्यविकास आणि शासनव्यवहार यांची माहिती झाली. कविता या साहित्यप्रकाराची विविध आविष्कार व भाषा रूपांचा अभ्यास कसा करावा यासंदर्भातील ज्ञान विद्यार्थ्यांना मिळाले. 				
मध्ययगीन मराती	Objectives :				
वांग्मयाचा स्थल	१. वांग्मय इतिहास संकल्पना, स्वरूप,प्रेरणा,प्रवृत्ती समजून घेणे.				
इतिहास : प्रारंभ ते	२. मध्ययुगीन कालखंडाची सामाजिक, सांस्कृतिक पार्श्वभूमी समजून				
इ.स.१६०० (DSE1C)	घेणे.				
सत्र पहिले	३. मराठी भाषा साहित्याचा कालखंडानुरूप इतिहास समजून घेणे.				
मध्ययुगीन मराठी	Outcome :				
वांग्मयाचा स्थूल	१. वांग्मय इतिहास संकल्पना, स्वरूप,प्रेरणा,प्रवृत्ती समजून घेतली.				
इतिहास : १६०१ ते	२. मध्ययुगीन कालखंडाची सामाजिक, सांस्कृतिक पार्श्वभूमीचे				
इ.स.१८१७ (DSE1D)	आकलन विध्यार्थ्यांना झाले.				
सत्र दुसरे	३. मराठी भाषा साहित्याचा कालखंडानुरूप इतिहास समजून घेतला.				
	Objectives :				
वर्णनात्मक	१. भाषा स्वरूप, वैशिष्टे व कार्य समजून घेणे.				
भाषाविज्ञान :भाग १	२. भाषा अभ्यासाची आवश्यकता स्पष्ट करणे.				
(DSE 2C) सत्र	३. भाषा अभ्यासाच्या शाखा आणि विविध पद्धतीचा थोडक्यात परिचय				
पहिले	करून देणे.				
	४. स्वनिम संकल्पना आणि रुपिम व्यवस्था समजावून देणे.				
वणनात्मक काकार्यकर काल्का व	५. वाक्यविन्यास व अर्थविन्यास या वैज्ञानिक संकल्पनांचा सूक्ष्म परिचय				
भाषाविश्वान :भ्राग १	करून देणे.				
(USE 2D) सत्र	Outcome :				
दुसर	४. भाषा स्वरूप, वाशष्ट व काय समजून घतल.				
	२. भाषा अम्यासाचा आवश्यकता का आहं यासदभाचा जाणाव झाला.				
	३. भाषा अभ्यासाच्या शाखा आणि विविध पद्धतीचा परिचय झाला.				
	४. स्वानम संकल्पना आणि रुपिम व्यवस्था समजून घेतली.				
	७. वाक्यावन्यास व अथावन्यास या वैज्ञानिक संकल्पनाचा परिचय झाला.				
	4				
MA Programme					
--------------	---	--	--	--	--
Class	Course Name	Course Objectives & Outcome			
M.A I	भाषाव्यावहार आणि भाषिक कौशल्य भाग १/ भाग २	Objectives : १. विविध स्तरावरील भाषिक कौशल्य व क्षमता विकसित करणे. २. व्यक्तिमत्व विकास व भाषिक कौशल्य परस्पर संबंध समजावून देणे. ३. प्रसारमाध्यमे स्वरूप समजावून देणे. ४. मुलाखत लेखन व भाषांतर या कौशल्याचे स्वरूप समजावून देणे. ५. जनसंपर्क कौशल्याची आवशकता व तंत्रे समजावणे. Outcome : १. विविध स्तरावरील भाषिक कौशल्य व क्षमता विकसित झाल्या. २. मुलाखत लेखन व भाषांतर या कौशल्याचा विकास झाला. ३. जनसंपर्क कौशल्याची आवशकता व तंत्रे समजली.			
	अर्वाचीन मराठी वाङ्मयाचा इतिहास (इ.स. १८१८ ते इ.स. २०१०)	Objectives : १. मराठी साहित्य परंपरेचे स्थूल ज्ञान करून देणे. २. विशिष्ट कालखंडाच्या साहित्यामागील प्रवृत्ती ज्ञात करून देणे. ३. विशिष्ट कालखंडाच्या साहित्यामागील प्रवृत्ती ज्ञात करून देणे. ४. साहित्याप्रकारांच्या विकसनशील परंपरेचे स्थूल ज्ञान करून देणे. ५. साहित्याच्या पार्श्वभूमी संबंधी आकलन करून देणे. Outcome : १. मराठी साहित्य परंपरेचे स्थूल ज्ञान प्राप्त झाले. २. विशिष्ट कालखंडाच्या साहित्यामागील प्रेरणा आणि प्रवृत्ती ज्ञात झाल्या. ३. साहित्याची पार्श्वभूमी आकलन झाली.			
	ऐतिहासिक भाषाविज्ञान आणि सामाजिक ऐच्छिक : ग्रामीण / दलित साहित्य	Objectives : १. भाषाकुलाची संकल्पना व उत्पत्तीचा अभ्यास करणे. २. मराठी भाषेचा उत्पत्ती काळ आणि स्थितीगती जाणून घेणे. ३. भाषा म्हणून मराठीच्या वाटचालीचा आढवा घेणे. ४. समाजातील भाषा उपयोजनातील विविधता समजून घेणे. ४. समाजातील भाषा उपयोजनातील विविधता समजून घेणे. ५. सामाजिक भाषाविज्ञान संकल्पना, स्वरूप व व्याप्ती अभ्यासणे. Outcome : १. भाषाकुलाची संकल्पना व उत्पत्ती समजली. २. मराठी भाषेचा उत्पत्ती काळ आणि स्थितीगती समजली. ४. समाजातील भाषा उपयोजनातील विविधतेचे आकलन झाली. ५. सामाजिक भाषाविज्ञान संकल्पना, स्वरूप व व्याप्ती समजली. ४. समाजातील भाषा उपयोजनातील विविधतेचे आकलन झाली. ५. सामाजिक भाषाविज्ञान संकल्पना, स्वरूप व व्याप्ती समजली. ४. सामाजिक भाषाविज्ञान संकल्पना, स्वरूप व व्याप्ती समजली. ७ ठाjectives : १. ग्रामीण साहित्याची निर्मिती व कारण परंपरा समजावून देणे. २. दलित साहित्याची निर्मिती व कारण परंपरा समजावून देणे.			
	साहत्य	3. ग्रामीण साहित्याचे स्वरूप व कार्य यांची चिकित्सा करणे.			

		४. दलित साहित्यातील वेदना, विद्रोह याचे स्वरूप समजावून देणे.
		अ. ग्रामाण व दालत साहित्यांच यागदान, गता आणि दिशा याचा
		मामासा करण.
		र. ग्रामीण आणि दालत साहत्याचा निर्मिता व कारण परपरा समजला.
		\cdot
		3. दालत साहित्यातील वदना, विद्राह याच स्वरूप समजल.
		४. ग्रामीण व दलित साहित्याचे योगदान, गती आणि दिशा याचे आकलन झाले.
M.A II	प्रसारमाध्यमे आणि	Objectives :
	माहित्यव्यवहार	१. लेखन कौशल्य आत्मसात करण्यास मदत करणे.
		२. प्रसारमाध्यमाचे समाजातील महत्त्व विशद करणे.
		३. प्रसारमाध्यमातील मराठी भाषेचे स्थान स्पष्ट करणे.
		४. प्रसारमाध्यमासाठी भाषिक क्षमता विकसित करणे.
		 प्रसारमाध्यमे आणि साहित्यव्यवहार यातील परस्पर संबंध
		समजावन देणे.
		Outcome :
		१. प्रसारमाध्यमासाठीचे लेखन कौशल्य आत्मसात झाले.
		२. प्रसारमाध्यमासाठी भाषिक क्षमता विकसित झाल्या.
		३. प्रसारमाध्यमे आणि साहित्यव्यवहार यातील परस्पर संबंध स्पष्ट
		झाला.
	साहित्य : समीक्षा व	Objectives :
	संशोधन	१. साहित्य समीक्षा व्यवहाराची समज व संकल्पना समजावून देणे.
		२. समीक्षा पद्धतीमागील दृष्टी समजावून देणे.
		 मराठी साहित्य समीक्षकांची परंपरा व क्षमता ज्ञात करून देणे.
		४. संशोधनाची संकल्पना, प्रयोजने व पद्धती समजावून देणे.
		५. संशोधन करण्याची दृष्टी व क्षमता विकसित करणे.
		Outcome :
		१. साहित्य समीक्षा व्यवहाराची समज व संकल्पना समजली.
		२. मराठी साहित्य समीक्षकांची परंपरा व क्षमता विकसित झाल्या.
		३. संशोधनाची संकल्पना, प्रयोजने व पद्धती समजल्या.
	नेमलेल्या अर्वाचीन	Objectives :
	साहित्यकतीचा	१. अर्वाचीन कालखंडातील साहित्यप्रकार, संकल्पना व स्वरूप लक्षात
	अभ्यास	घेणे.
		२. साहित्यकृतींची वैशिष्टये जाणून घेणे.
		3. साहित्यकृतींतील साहित्यिकमूल्ये आणि जीवनमूल्ये जाणून घेणे.
		. अर्वाचीन साहित्यप्रकारांची वैशिष्टेये जाणन घेणे .
		९. कालखंड आणि साहित्यकतीच्या निर्मितीचा अनबंध शोधणे.

	Outcome :
	१. अर्वाचीन कालखंडातील साहित्यप्रकार, संकल्पना व स्वरूप समजले.
	२. साहित्यकृतींची वैशिष्टये समजली.
	३. कालखंड आणि साहित्यकृतीच्या निर्मितीचा अनुबंध शोधला.
ऐच्छिक :	Objectives :
लोकमाहित्याची	१. लोकसाहित्याची संकल्पना समजावून देणे.
मलतत्त्वे आणि	२. लोकसाहित्याचे स्वरूप व व्याप्ती समजावून घेणे.
मगठी नोकमाहित्य	३. लोकसाहित्याची सर्वसमावेशता लक्षात आणून देणे.
	४. लोकसाहित्यातील विविध प्रकार समजावून देणे.
	५. मराठी लोकसाहित्यातील सामाजिक, सांस्कृतिक, धर्मिक जाणिवा
	स्पष्ट करणे.
	Outcome :
	१. लोकसाहित्याची संकल्पना, स्वरूप व व्याप्ती आकलन झाली.
	२. लोकसाहित्यातील विविध प्रकार समजले.
	३. मराठी लोकसाहित्यातील सामाजिक, सांस्कृतिक, धर्मिक जाणिवा
	स्पष्ट झाल्या.

HOD

Department of Marathi

Rayat Shikshan Sanstha's Annasaheb Awate Art's, Commerce & Hutatma Babu Genu Science College, Manchar Tal- Ambegao Dist-Pune

Faculty: Bachelor of Arts Department: Political Science

Course Outcomes (CO):

1.B. A. I- Political Science

General-1 Introduction to

Indian Constitution

A) Objectives:

- 1. To Student understand the philosophy if Indian Constitution
- 2. To Student identify the causes, impacts of British Colonial Rule
- 3. To understand the various Government of Indian Acts
- 4. To appreciate the various phases of Indian National Movement

B) Outcomes:

- 1. Student understood the philosophy if Indian Constitution
- 2. Student identified the causes, impacts of British Colonial Rule
- 3. Understood the various Govt. of Indian Acts
- 4. Students appreciated the various phases of Indian National Movement

2.B A II Western Political Thought S-I

A) Objectives:

- 1. To Student will demonstrate of knowledge key thinkers & concept
- 2. To Students will compare thinkers on similar concept
- 3. To Students use various concepts to analyze new situation

B) Outcomes:

- 1. Student will demonstrated of knowledge key thinkers & concept
- 2. Students will compared thinkers on similar concept
- 3. Students used various concepts to analyze new situation

3. B A II Political Journalism S-II

A) Objectives:

- 1. To understand the intellectual foundation of Political Journalism
- 2. To understand the role of media
- 3. To understand the process & agencies of Journalism

B) Outcomes:

- 1. Understood the intellectual foundation of Political Journalism
- 2. Understood the role of media
- 3. Understood the process & agencies of Political Journalism

4.B. A. An Introduction to Political Ideology G-II

A. **Objectives**:

- 1. To understand the concept of Political Ideology
- 2.To understand the general framework for the interpretation of the ideology
- 3. To understand the different aspects of several contemporary ideology

B. Outcome –

- 1. Understood the concept of Political Ideology
- 2. Understood the general framework for the interpretation of the ideology
- 3. Understood the different aspects of several contemporary ideology

5.B.A.-III Public Administration S-III

A. Objectives:

- 1. To understand the scope & significance of public administration
- 2. To introduce new approaches of public administration
- 3. To students will be able to analyze, think critically, solve problems & make decision

B. Outcome:

- 1. Understood the scope & significance of public administration
- 2. learned new approaches of public administration
- 3. students should be able to analyze, think critically, solve problems & make decision

6.B.A.-III International Relations

A. Objectives :

- 1. To understand the evolution, scope & significance of International Relations
- 2.To criticized the various ideologies which lead to destruction of world
- 3. To identify various issues & challenges toward International Relations
- 4. To understand the International Political Economy

B. Outcome :

- 1. Understood the evolution, scope & significance of International Relations
- 2. Criticized the various ideologies which lead to destruction of world

- 3. Identified various issues & challenges toward International Relations
- 4. Understood the International Political Economy

7.B.A.-III Modern Political Analysis

A. Objectives :

- 1. To understand the evolution Modern Political Analysis
- 2. To identify various functions of Political System
- 3. To understand the various social and political agency

B. Outcome :

- 1. Understood the evolution Modern Political Analysis
- 2. Identified various functions of Political System
- 3. Understood the various social and political agency

8.B.A.-III Local Self Government of Maharashtra G-III

A. Objectives:

- 1. To understand the evolution, scope & significance of local self Govt. of Maharashtra
- 2. To understand the 73rd& 74th amendments of Indian Constitution

3.To understand the various structure & functions of Local Self Government

B. Outcome:

- 1. Understood the evolution, scope & significance of local self Govt. of Maharashtra
- 2. Understood the 73rd& 74th amendments of Indian Constitution
- 3. Understood the various structure & functions of Local Self Government



Annasaheb Awate College Arts, Commerce & Hutatma Babu Genu Science College, Manchar

(Reaccredited with 'A' Grade by NAAC)

Affiliated to Savitribai Phule Pune University, Pune

DEPARTMENT OF PSYCHOLOGY

Academic Year 2020-21

Course Outcomes

Class	Semester	Pattern	Course Code	Paper Code	Course Type & Name of the Course	Credits	Course Outcomes
FYBA	Ι	CBCS	DSC- PSY-1A	11221	Foundations of Psychology	3	 CO1: Understand the basic psychological processes and their applications in day-to-day life. CO2: Develop the ability to evaluate cognitive processes, learning and memory of an individual. CO3: Understand the importance of motivation and emotion of the individual. CO4: Understand the personality and intelligence of the individuals by developing their psychological processes and abstract potentials.
FYBA	II	CBCS	DSC- PSY-1B	11222	Introduction to Social Psychology	3	 CO1: Understand the basics of social psychology. CO2: Understand the nature of self, concept of attitude and prejudice of the individual. CO3: Assess the interactional processes, love and aggression in our day today life. CO4: Understand group dynamics and individual in the social world.
SYBA	III	CBCS	SEC-1A	11223	Health Psychology	3	 CO1: 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.
SYBA	IV	CBCS	SEC-1b	11224	Positive Psychology	3	 CO1: Understand how the positive psychology as the science of happiness, human strengths, positive aspects of human behavior and 'psychology of well-being.' CO2: How we lead our lives, find happiness and satisfaction, and face life's challenges. CO3: How positive psychology has become an evolving mosaic of research and theory from many different areas of psychology.



Annasaheb Awate College Arts, Commerce & Hutatma Babu Genu Science College, Manchar

(Reaccredited with 'A' Grade by NAAC) Affiliated to Savitribai Phule Pune University, Pune

DEPARTMENT OF PSYCHOLOGY

ТҮВА	NA	Annual	NA	3227	Industrial & Organizational Psychology	NA	 CO1: The emergence of Industrial and Organizational Psychology CO2: The work done in Industrial and Organizational Psychology CO3: The significance of training, performance appraisal, leadership models CO4: The importance of Engineering Psychology
------	----	--------	----	------	--	----	--



Annasaheb Awate College Arts, Commerce & Hutatma Babu Genu Science College, Manchar

(Reaccredited with 'A' Grade by NAAC)

Affiliated to Savitribai Phule Pune University, Pune

DEPARTMENT OF PSYCHOLOGY

Academic Year 2021-22 onwards

Course Outcomes

Class	Semester	Pattern	Course Code	Paper Code	Course Name	Credits	Course Outcomes
FYBA	Ι	CBCS	DSC-PSY-1A	11221	Foundations of Psychology	3	 CO1: Understand the basic psychological processes and their applications in day-to-day life. CO2: Develop the ability to evaluate cognitive processes, learning and memory of an individual. CO3: Understand the importance of motivation and emotion of the individual. CO4: Understand the personality and intelligence of the individuals by developing their psychological processes and abstract potentials.
FYBA	II	CBCS	DSC-PSY-1B	11222	Introduction to Social Psychology	3	 CO1: Understand the basics of social psychology. CO2: Understand the nature of self, concept of attitude and prejudice of the individual. CO3: Assess the interactional processes, love and aggression in our day today life. CO4: Understand group dynamics and individual in the social world.
SYBA	III	CBCS	SEC-1A	23223	Health Psychology	3	 CO1: 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.
SYBA	IV	CBCS	SEC-1b	24223	Positive Psychology	3	CO1: Understand how the positive psychology as the science of happiness, human strengths, positive aspects of human behavior and 'psychology of well-being.'CO2: How we lead our lives, find happiness and satisfaction, and face life's challenges.



Annasaheb Awate College Arts, Commerce & Hutatma Babu Genu Science College, Manchar

(Reaccredited with 'A' Grade by NAAC) Affiliated to Savitribai Phule Pune University, Pune

DEPARTMENT OF PSYCHOLOGY

							CO3: How positive psychology has become an evolving mosaic of research and
							theory from many different areas of psychology.
							CO1: Describe the concept of industrial and organizational psychology, selection
							and training, evaluation and motivation at workplace.
					Industrial &		CO2: Explain job profile, job analysis, recruitment techniques and employee
TYBA	V	CBCS	SEC-1C (3)	35223	Organizational	3	training.
					Psychology		CO3: Identify and classify the appraisal rating system.
							CO4: Compare different theories of motivation.
							CO5: Evaluate the training programme and job performance
			SEC-1D (3)	36223			CO1: Describe the concept of applied psychology, educational psychology, family
							structure and developmental patterns.
							CO2: Know the clinical psychology related mechanisms, social issues, and criminal
							behavior.
TYBA	V	CBCS			Applied	3	CO3: Classify the intellectual ability, abnormality, criminal behavior.
					1 Sychology		CO4: Identify the problems and solutions in the field of education,
							CO5: Evaluate the interpersonal relations.
							CO6: Apply psychological remedies to assess abnormal behaviour, to tackle the
							social issues and to rectify the problematic behaviour.



Accredation:NAAC - 'A' Grade Establishment: 1966



ANNASAHEB AWATE ARTS, COMMERCE AND HUTATMA BABU GENU SCIENCE COLLEGE, MANCHAR

Department of Commerce & Management

COURSE OUTCOMES (CO):

F.Y.B.COM SEMESTER – I Course Code: 112 FINANCIAL ACCOUNTING- I CO 1. To impart knowledge of basic accounting concepts

C O 2. To create awareness about application of these concepts in business world

C O 3. To impart skills regarding Computerised Accounting

C O 4. To impart knowledge regarding finalization of accounts of various establishments.

Course Code: 114

BUSINESS MATHEMATICS & STATISTICS-I

C O 1. To introduce the basic concepts in Finance and Business Mathematics and Statistics

C O 2. To familiar the students with applications of Statistics and Mathematics in Business

CO3. To acquaint students with some basic concepts in Statistics.

C O 4. To learn some elementary statistical methods for analysis of data.

C O 5. The main outcome of this course is that the students are able to analyze the data by using some elementary statistical methods

Course Code: 115

ORGANIZATIONAL SKILLS DEVELOPMENT-I

C O 1. To introduce the students to the emerging changes in the modern office environment

C O 2. To develop the conceptual , analytical , technical and managerial skills of students efficient office organization and records management

C O 3. To develop the organizational skills of students

C O 4. 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 organisation

C O 5. To develop employability skills among the students

Course Code: 116(d)

CONSUMER PROTECTION AND BUSINESS ETHICS – I

CO 1. To develop general awareness of consumerism among the students.

CO 2. To understand the consumers rights, responsibility and role of United Nations.

CO 3. To have a comprehensive understanding about the existing law on consumer protection in India.

CO 4. To create awareness among the students about dispute redresses machinery and basic procedures for handling consumer dispute.

CO 5. To understand the issues relating to e-commerce, e-Banking emerging issues and internet regulations.

Course Code: 116(e)

BUSINESS ENVIRONMENT & ENTREPRENEURSHIP – I

CO 1. To understand the concept of Business Environment and its aspects

CO 2. To make students aware about the Business Environment issues and problems of Growth

CO 3. To examine personality competencies most common to majority of successful entrepreneurs and to show how these competencies can be developed or acquired

CO 4. To understand the difference between Entrepreneurial and non-Entrepreneurial behavior

CO 5. To provide knowledge of the significance of Entrepreneurship in economy

CO 6. To familiarize the students with the contribution of selected institutes working to promote Entrepreneurship

Π

CO 7. To generate entrepreneurial inspiration through the study of successful Entrepreneurs

SEMESTER-

Course Code - 122

FINANCIAL ACCOUNTING- II

CO 1. To impart knowledge of various software used in accounting

CO 2. To impart knowledge about final accounts of charitable trusts CO 3. To impart knowledge about valuation of intangible assets CO 4. To impart knowledge about accounting for leases

Course code: - 124 (A)

BUSINESS MATHEMATICS AND STATISTICS – II

CO 1. To introduce the basic concepts in Finance and Business Mathematics and Statistics

CO 2. To familiar the students with applications of Statistics and Mathematics in Business

CO 3. To acquaint students with some basic concepts in Statistics.

CO 4. To learn some elementary statistical methods for analysis of data.

CO 5. The main outcome of this course is that the students are able to analyze the data by using some elementary statistical methods

Course code: - 125 (a)

ORGANIZATIONAL SKILL DEVELOPMENT- II

CO 1. To imbibe among the students the qualities of a good manager and develop the necessary skill sets

CO 2. To develop the technical skills of the students to keep up with the technological advancements and digitalization

CO 3. To develop the communication skills of students and introducing them to the latest tools in communication CO 4. To develop writing, presentation, interpersonal skills of the students for effective formal corporate reporting.

CO 5. To educate the students on the recent trends in communication technology and tools of office automation

Course code: - 126 (d)

BUSINESS ETHICS – II

CO 1. To enhance students' general awareness of ethical dilemmas at work.

CO 2. To understand differing perceptions of interests in business-related situations

CO 3. To introduce the concept of Corporate Social Responsibility, corporate Governance and explore its relevance to ethical business activity

CO 4. To examine whether ethics set any boundaries on Accounting, marketing, IT, Social Media and workplace.

CO 5. To prepare students to play a constructive role in improving the sustainable development with which they may become involved.

Course code: - 126 (e)

Business Environment & Entrepreneurship – I

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

S.Y.B.COM

SEMESTER -III

Course Code: 231

BUSINESS COMMUNICATION-I

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

Course Code: 232

CORPORATE ACCOUNTING -I

CO 1. To acquaint the student with knowledge about various Concepts, Objectives and applicability of some important accounting standards associated with to corporate accounting.

CO 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.

CO 3. To update the students with knowledge for preparation of final accounts of a company as per Schedule III of the Companies Act 2013

CO 4. To empower to students with skills to interpret the financial statements in simple and summarized manner for effective decision making process.

CO 5. To acquaint the student with knowledge about various Concepts, Objectives and applicability of some important accounting standards associated with to corporate accounting.

CO 6. 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.

CO 7. To update the students with knowledge for preparation of final accounts of a company as per Schedule III of the Companies Act 2013

CO 8. To empower to students with skills to interpret the financial statements in simple and summarized manner for effective decision making process.

Course Code: 234

BUSINESS MANAGEMENT-I

CO 1. To provide basic knowledge and understanding about various concepts of Business Management.

CO 2. To help the students to develop cognizance of the importance of management principles.

CO 3. To provide an understanding about various functions of management.

CO 4. To provide them tools and techniques to be used in the performance of the managerial job.

Course Code: 235

ELEMENTS OF COMPANY LAW -I

CO 1. To develop general awareness of Elements of Company Law among the students.

CO 2. To understand the Companies Act 2013 and its provisions.

CO 3. To have a comprehensive understanding about the existing law on formation of new company in India.

CO 4. To create awareness among the students about legal environment relating to the company law.

CO 5. To acquaint the students on e-commerce, E governance and e-filling mechanism relating to Companies.

CO 6. To enhance capacity of learners to seek the career opportunity in corporate sector.

Course Code: 236(H)

MARKETING MANAGEMENT-I

CO 1. To create awareness and impart knowledge about the basics of Marketing Management which is the basic foundation of Marketing subject.

CO 2. To orient the students in Marketing Strategy and Consumer Behaviour.

CO 3. To help students understand how to craft Marketing Plan which help the organisation outline their marketing goals and objectives.

CO 4. To enable students to apply this knowledge in practicality by enhancing their skills in the field of Marketing.

Course Code: 236(E)

COST AND WORKS ACCOUNTING -I

CO 1. To remember and understand basic concept of cost accounting. Development of an overall outlook of Cost Accounting

CO 2.To understand the concept of cost, costing and cost accounting.

CO 3. To trace the cost to cost centres and cost units.

CO 4. To identify role of cost accountant in an organisation

CO 5. To Understand different elements of cost

CO 6.To understand the purchase procedure and its documentation

Course Code: 236(G)

BUSINESS ENTREPRENEURSHIP (SPECIAL PAPER-I)

CO 1. Acquaint knowledge and skills of the entrepreneurial process, it shows that creative thinking of an entrepreneur. Understand the concept of innovation that how it refers to develop effective ideas for successful entrepreneurship in the global edge.

CO 2.Students should be able to understand the business ethics and social responsibility of business w.r.t. practices in entrepreneurship (e.g. corruption, harmful behaviour to the society).

CO 3. Acquaint knowledge and skills of the entrepreneurial process, it shows that creative thinking of an entrepreneur. Understand the concept of innovation that how it refers to develop effective ideas for successful entrepreneurship in the global edge.

SEMESTER- IV

Course Code: 241

BUSINESS COMMUNICATION-II

CO 1.To understand the concept, process and importance of communication.

CO 2.. To acquire and develop good communication skills requisite for business correspondence.

CO 3.. To develop awareness regarding new trends in business communication.

CO 4. To provide knowledge of various media of communication.

CO 5. To develop business communication skills through the application and exercises.

Course Code: 242

CORPORATE ACCOUNTING-II CO 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.

CO 2. To develop the knowledge among the student about consolidation of financial statement with the process of holding.

CO 3. To update the students with knowledge of the process of liquidation of a company

CO 4. To introduce the students with the recent trends in the field of accountancy

Course Code: 244

BUSINESS MANAGEMENT-II

CO 1.Students will get an idea about the basic motivational tools used in the field of management.

CO 2.Students will get an idea about how leadership influences organizational success.

CO 3.To understand the significance of coordination and control in modern business management.

CO 4.Students will come across various emerging trends in management.

Course Code: 245

ELEMENTS OFCOMPANY LAW-II

CO 1. To develop general awareness among the students about management of company

CO 2. To have a comprehensive understanding about Key managerial Personnel of company and their role in Company administration.

CO 3. To acquaint the students about E Governance and E Filling under the Companies Act, 2013.

CO 4. To equip the students about the various meetings of Companies and their importance.

Course Code: 246(E)

COST& WORKS ACCOUNTING-II

CO 1. To know the documents that are used in stores and how to calculate the issuing price of material.

CO 2. To provide knowledge to students on classification and codification.

CO 3. To equip students with knowledge regarding the ascertainment of labour cost.

CO 4. To understand the concept of payroll.

CO 5. To know the concepts of labour turnover and merit rating.

CO 6. To understand recent trends in cost accounting.

Course Code: 246(H)

MARKETING MANAGEMENT -- II

CO 1. To create awareness and impart knowledge about the basics of Marketing Management which is the basic foundation of Marketing subject.

CO 2. To orient the students in recent trends in marketing management.

CO 3. To understand the concept of Green Marketing.

CO 4. To enable students to apply this knowledge in practical by enhancing their skills in the field of Marketing.

Course Code: 246(G)

BUSINESS ENTREPRENEURSHIP-II (SPECIAL PAPER-I)

CO 1.Students will identify the opportunities of entrepreneurship in the present market, in terms of production, trading or by providing services

CO 2. To understand the concept Individual Entrepreneurship and Group Entrepreneurship along with their significance.

CO 3.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.

CO 4. Information on role of each industry will help the students to develop their interest in entrepreneurship.

CO 5.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 enterprisers or to be an entrepreneurs.

CO 6.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

T.Y.B.COM

SEMESTER – V

Course code: - 351

BUSINESS REGULATORY FRAMEWORK (MERCANTILE LAW)- I

CO 1. To acquaint students with the basic concepts, terms & provisions of Mercantile and Business Laws.

CO 2. To develop the awareness among the students regarding these laws affecting business, trade and commerce.

Course code: - 352

ADVANCED ACCOUNTING-I

CO 1.To impart the knowledge of various accounting concepts

CO 2.To instill the knowledge about accounting procedures, methods and techniques.

CO 3.To acquaint them with practical approach to accounts writing by using software package.

Course code: - 354

AUDITING & TAXATION-I

CO 1. To acquaint themselves about the concept and principles of Auditing, Audit process, Assurance Standards, Tax Audit, and Audit of computerized Systems.

CO 2. To get knowledge about preparation of Audit report.

CO 3. To understand the basic concepts and to acquire knowledge about Computation of Income, Submission of Income Tax Return, Advance Tax, and Tax deducted at Source, Tax Collection Authorities under the Income Tax Act, 1961. Course code: - 355-E

COST AND WORKS ACCOUNTING SPECIAL PAPER II

CO1. To provide knowledge about the various methods of costing

CO2. To understand the applications of different methods of costing in manufacturing and service industries.

CO3. To enable students to prepare cost statements under different types of manufacturing industries and Service Industries

CO4. To build the applicability of cost accounting standards in the method of costing.

Course code: - 356-E

COST AND WORKS ACCOUNTING SPECIAL PAPER III

CO 1.To prepare learners to understand the basic techniques in Cost Accounting

CO 2. To understand the learner, application of Cost Accounting techniques in cost control and decision making.

CO 3. To enable the learners to prepare various types of Budgets.

CO 4. To learn the basic concept of Uniform Costing and Inter-firm comparison

CO 5. To enhance the knowledge of students about MIS and Supply Chain Management

Course code: - 355-h

MARKETING MANAGEMENT. II

CO 1. To understand the concept and functioning of marketing planning and sales management

- CO 2. To know marketing strategies and organization
- CO 3. To inform various facets of marketing with regulatory aspects
- CO 4 To understand marketing in globalize scenario

Course code: - 356-H

MARKETING MANAGEMENT. III

- CO 1. To know detailing of Marketing Research
- CO 2. To understand the role Brand and Distribution Management in marketing

CO 3. To inform about Marketing and Economic Development

CO 4. To Know of the importance of control on marketing activities

Course code: - 355-G

BUSINESS ENTREPRENEURSHIP SPECIAL PAPER II

CO 1. To develop understanding of MSME and its formation

CO 2. To Develop Knowledge and understanding in creating and managing new venture.

CO 3.To Equip students with necessary tools and techniques to set up their own business venture

CO 4. To help students to bring out their own business plan.

CO 5. To make students aware about business crises and sickness.

Course code: - 356-G

BUSINESS ENTREPRENEURSHIP SPECIAL PAPER III

CO 1. To acquaint students with knowledge and skills required for organizing and carrying out entrepreneurial activities.

CO 2. To develop the ability of analysing and understanding business situations.

CO 3. To study the interdependent, fast-changing and diverse world of entrepreneurship and innovation.

CO 4. To familiarize students with various concepts and processes involved in entrepreneurship and business formation and development.

CO 5. To provide students with the knowledge, skills and motivation to encourage entrepreneurial approach in a variety of settings.

CO 6. To study the application of group dynamics to counselling, personal growth and other psychologically-oriented groups

SEMESTER- VI

Course code: - 361

BUSINESS REGULATORY FRAMEWORK -II

Co 1. To Develop General Awareness Of Business Law Among The Students.

Co 2. To Understand the Various Statutes Containing Regulatory Mechanism Of Business And Its Relevant Provisions Including Different Types Of Partnerships.

Co 3. To Have a Understanding about the Landmark Cases/Decisions Having Impact on Business Laws

Co 4. To Create Awareness Among The Students About Legal Environment Relating To The Business Activities And New Ways Dispute Resolutions Provided Under Arbitration Act.

Co 5. To Acquaint The Students On Relevant Developments In Business Laws To Keep Them Updated.

Co 6. To Enhance Capacity Of Learners To Seek The Career Opportunity In Corporate Sector And As A Business Person.

Course Code: 362

ADVANCED ACCOUNTING – II

CO 1. To acquaint the student with knowledge about the legal provisions regarding preparation and presentation of final accounts of Co-operative Societies.

CO 2. To empower to students about the branch accounting in simple.

CO 3. To make aware the students about the conceptual aspects of various recent trends in the field of accounting especially forensic accounting, accounting of CSR activities, accounting of derivative contracts and Artificial Intelligence in Accounting.

CO 4. To understand the procedure and methods of analysis of financial statements.

Course Code: 364

AUDITING & TAXATION - II

CO 1. To understand the basic concepts of Income Tax Act, 1961 and create awareness of direct taxation among the students.

CO 2. To understand the income tax rules and regulations and its provisions.

CO 3. To have a comprehensive knowledge of calculation various types of income.

CO 4. To know the recent changes made by the finance bill (Act) every year and its impact on taxation of person.

CO 5. To acquaint the students on Income tax department portal (ITD), e-filing and e-services mechanism relating to Assessee.

Course Code -: 365 – E

COST AND WORKS ACCOUNTING. SPECIAL PAPER II

CO 1. To provide knowledge about the various methods of costing.

CO 2. To understand the applications of different methods of costing in manufacturing and service industries.

CO 3. To enable students to prepare cost statements under different types of manufacturing industries and Service Industries

CO 4. To build the applicability of cost accounting standards in the method of costing

Course Code -: 366 – E

COST AND WORKS ACCOUNTING SPECIAL PAPER III

Techniques of Cost Accounting and Cost Audit

CO 1. To impart knowledge about Standard Costing and Variance Analysis

CO 2. To learn about pricing policy and its implementation.

CO 3. To know the related Cost Accounting Standards and Cost Management practices in specific sectors

CO 4. To provide a conceptual understanding of procedures and Provisions of Cost Audit.

Course Code - 365(h)

MARKETING MANAGEMENT-II

CO 1. The primary purpose of this course is to brief students about agricultural marketing, various marketing regulations, importance of global marketing and various measures used by cyber security marketers in today's digital world.

CO 2. To understand meaning of agricultural marketing, identify its problems and find solutions for the same.

CO 3. To provide an understanding of the factors that has led to the growth of global marketing

Course Code: 366(H)

MARKETING MANAGEMENT – III

CO 1. To introduce the concept of Marketing of Service.

CO 2. To provide the students the knowledge of Creative Advertisements.

CO 3. To acquaint the students to various social media marketing.

CO 4. To make the student understand the technique and process of Marketing Control and Audit.

CO 5. To enable the students to apply this knowledge in practicality by enhancing their skills in the field of advertising.

Subject code -: 365 (g)

BUSINESS ENTREPRENEURSHIP (SPECIAL PAPER II)

CO 1. To Develop understanding of MSME and its formation

CO 2. To Develop Knowledge and understanding in creating and managing new venture.

CO 3. To Equip students with necessary tools and techniques to set up their own business venture

CO 4. To help students to bring out their own business plan.

CO 5. To make students aware about business crises and sickness.

Course Code : 366 (g)

BUSINESS ENTREPRENEURSHIP (SPECIAL PAPER-III)

CO 1. To acquaint students how to establish connections, encourage communication and teamwork, foster innovation and creativity and building team bonds.

CO 2. To develop the ability in students to tap personal strengths for preventing stress and achieving meaningful goals.

CO 3. To develop the ability in students how to accept the responsibility of taking charge of your own levels of stress.

CO 4. To identify theories of motivation and evaluate their applicability.

CO 5. To study the students how design thinking is made for a digital world.









MANNASAHEB AWATE ARTS, COMMERCE AND HUTATMA BABU GENU SCIENCE COLLEGE, MANCHAR

Department of Commerce & Management PG Courses M.COM. (Spl. Accounting) M.Com (Spl. – Costing)

COURSE OUTCOME (COS):

M.COM-I SEM-I

Course Code :101

MANAGEMENT ACCOUNTING

CO 1 To enhance the abilities of learners to develop the concept of management accounting and its significance in the business.

CO 2 To enhance the abilities of learners to analyze the financial statements.

CO 3 To enable the learners to understand, develop and apply the techniques of management accounting in the financial decision making in the business corporate

. CO 4 To make the students develop competence with their usage in managerial decision making and control

Course Code :102

STRATEGIC MANAGEMENT

CO 1 To introduce the students to the emerging changes in the modern business environment

CO 2 To develop the analytical , technical and managerial skills of students in the various areas of Business Administration

CO 3 To empower to students with necessary skill to become effective future managers and leaders

CO 4 To develop Technical skills among the students for designing and developing effective Functional strategies for growth and sustainability of business

Course Code :103

ADVANCED ACCOUNTING

CO 1. To lay a theoretical foundation of Accounting and Accounting Standards.

CO 2. To gain ability to solve problems relating to Company Accounts, Valuations and special types of situations.

Course Code :104

INCOME TAX

CO 1.To gain knowledge of the provisions of Income - tax including Rules

CO 2. To develop ability to calculate taxable Income of 'Individual', 'Hindu Undivided Family' and 'Firm'Assesses

Course Code: 107

ADVANCED COST ACCOUNTING

- CO 1. Development of overall outlook of Cost Accounting
- CO 2.Understanding the related weightage of employee cost in the total cost of product/service
- CO 3.Understand the significance of overheads in the total cost of product/service
- CO 4.Understand formats of cost sheets as per Industry Specifications

Course Code: 108

COSTING TECHNIQUES AND RESPONSIBILITY ACCOUNTING

- CO 1. Understand Budget Preparation Process
- CO 2. Understand the impact of adverse and favourable variances on cost of a product/service.
- CO 3. Understand the industry specific cost ratios.
- CO 4. To understand the importance of various tools to evaluate the business centers.

M.COM-I SEM-II

Course Code: 108

FINANCIAL ANALYSIS & CONTROL

CO 1 To enable the students to acquire knowledge of financial analysis and control tools

CO 2 To Make appropriate application and uses of financial analysis and control

INDUSTRIAL ECONOMICS

CO 1 To make the students understand concepts of industrial economics

CO 2. To help the students know theories of industrial economics

CO 3. To impart students' knowledge about sources of industrial finance and Indian industrial growth

Course Code: 203 SPECIALIZED AREAS IN ACCOUNTING

- CO 1. To develop competency of students to solve problems relating Special areas in accounting including accounting for Services Sector.
- CO 2. To understanding of Financial Reporting Practices.
- CO 3. To familiarize the student with procedure of accounting for Taxation.

Course Code: 204 BUSINESS TAX ASSESSMENT& PLANNING

CO 1. To provide understanding of Direct Taxes including Rules pertaining thereto and their application to different business situations.

CO 2. To understand principles underlying the Service Tax.

CO 3. To understand basic concepts of VAT, Excise Duty and Customs Duty.

Course Code: 207 APPLICATION OF COST ACCOUNTING

- CO 1. Learners must be able to reconcile the cost and financial data
- CO 2. Understand the concepts of PLC and VCA.
- CO 3.Understand the Cost Distortions in Traditional Costing and compare it with ABC .
- CO 4.Get insight into the concept of Transfer Pricing & Target Costing.

Course Code: 208

COST CONTROL AND COST SYSTEMS

CO 1. Students must understand the role of Marginal Costing in short term decision making.

- CO 2. Understand the relevance of pricing
- CO 3. Students will be able understand process of installation of costing system.

CO 4. Develop insight into Cost Reduction and Cost Control technique & to understand measurement of productivity

MCOM-II SEM III

Course Code: 301

BUSINESS FINANCE/ FINANCIAL SYSTEM

CO 1.To enable students to acquire sound knowledge of concepts, nature and structure of business finance.

Course Code: 302

RESEARCH METHODOLOGY FOR BUSINESS

CO 1. To acquaint the students with the areas of Business Research Activities.

CO 2. To enhance capabilities of students to conduct the research in the field of business and social sciences

CO 3. To enable students, in developing the most appropriate methodology for their research studies.

CO 4. To make them familiar with the art of using different research methods and techniques.

Course Code: 303

ADVANCED AUDITING

CO 1.To impart knowledge and develop understanding of methods of auditing and their application

- CO 2. To enable the students to acquire knowledge of Auditing.
- CO 3. To Make appropriate application and uses of Auditing.
- CO 4. To understand various concepts of Audit under GST

Course Code: 304

SPECIALIZED AUDITING

- CO 1.To impart knowledge and develop understanding of methods of audit in Specialized areas.
- CO 2. To understand the concept, need, importance, utility of Auditing in special field.
- CO 2. To develop the skills of students to face the modern world of Auditing.
- CO 3. To create awareness among the students to face the modern world of Auditing.

Course Code: 307

COST AUDIT

- CO 1. To provide adequate knowledge to the students on Cost Audit Practices.
- CO 2. To acquaint students to understand the role and responsibilities of Cost Auditor

CO 3. To familiarise the students how Cost Audit Report is prepared.

Course Code: 308

MANAGEMENT AUDIT

CO 1.To acquaint the students with the knowledge of the techniques and methods of planning and execution of Management Audit.

CO 2. To familiarise the students with the knowledge of corporate image.

CO 3. To provide knowledge to students on operational audit.

M.COM- II SEM- IV

Course Code: 401

CAPITAL MARKET AND FINANCIAL SERVICES

CO 1.To enable students to acquire sound knowledge, concept and structure of capital market and financial services.

CO 2. To make the students aware about the latest developments in the field of capital market in India. CO 3. To enable the students to understand various transactions in stock exchanges and agencies involved in it.

CO 4. To give exposure of financial services offered by various agencies and financial adviser to students.

CO 5. To acquaint the students with working of capital market.

Course Code: 402

INDUSTRIAL ECONOMIC ENVIRONMENT

CO 1. To study the basic concepts of Industrial Finance.

CO 2. To study the effects of New Economic Policy.

CO 3. To study the impact of Labor reforms on Industries.

Course Code: 403

RECENT ADVANCES IN ACCOUNTING, TAXATION, TAXATION AND AUDITING CO 1. To up-date the students with latest developments in the Subject CO 2. To inculcate the habit of referring to various periodicals and publications in the given

subject, apart from text books and reference books

CO 3. To develop the ability to read, understand, interpret and Summarize various articles from

Course Code: 407

RECENT ADVANCES IN COST AUDITING AND COST SYSTEM

- CO 1. Understand Cost Accounting Standards in depth
- CO 2. Understand GST and Productive Audit
- CO 3. Understanding ERP
- CO 4. Able to understand different areas of recent changes
- CO 5. To study the students how design thinking is made for a digital world.



Rayat Shikshan Sanstha's Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College Manchar, Tal. Ambegaon, Dist. Pune

DEPARTMENT OF BOTANY

Course Outcomes - Under graduate

Sr.	Class	Course	Course Outcomes (CO)
No.			
I	F. Y. B. Sc Botany (Choice Based Credit System -CBCS Pattern) Semester I	BOIII: Plant life and utilization I	 CO1. Students will be made aware of plant life and its classification CO2. Students will know lower cryptogams, higher cryptogams and phanerogams CO3. The student will understand the role of lower and higher crypotogams with detailed understanding of their life cycles, and applications. CO4. To provide thorough knowledge about various primitive plant groups and their utilization.
		BO112: Plant morphology and Anatomy	 CO1. The learners will be made aware of definition, descriptive and interpretative morphology so as to distinguish the plant forms. CO2. Students will acquire knowledge on different morphological features like, fruit, flower, inflorescences their types and distinguishing features. CO3. The learner will also have a deep understanding of anatomical features, types of tissues and its organization in the plant body with special emphasis on its role and functions. CO4. These learning points will help the student in further applied aspects of the subjects during their higher studies. CO5. The course will also develop their thinking ability to identify and let know the knowhow and importance of the plants to wider societal reach.

		BO113: Practical, Practical based on BO 111 & BO 112	To get acquainted with the subject in live form and visits to natural habitats.
	F. Y. B. Sc Botany (Choice Based Credit System - CBCS Pattern) Semester II	BO 121 : Plant life and utilization II	 CO1. Students will be made aware of plant diversity in Pteridophytes, Gymnosperms and Angiosperms with reference to vascular plants CO2. The student will understand the role of these groups with detailed understanding of their life cycles, and applications. CO3. The learners will be acquainted with understanding of application and uses of such plants in utilization CO4. Gain knowledge about various primitive plant groups and their utilization.
		BO 122: Principles of plant science	 CO1. The learner will understand the physiological processes in the plants. CO2. The students will get acquainted with different cellular functions and processes of cell division CO3. The learners will get knowledge of the subatomic molecules and their role and functions in the cell. CO4. The course will create an applied interest of the students in the subject and will provoke to consider research as one of the potential field as career.
		BO 123: Practical based on BO 121 & BO 122	To create foundation for further studies in Botany. To get acquainted with the subject in live form and visits to natural habitats.
2	S. Y. B. Sc Botany (Choice Based Credit System -CBCS Pattern) Semester I	BO 231: Taxonomy of Angiosperms and Plant Ecology	 CO1. The students will be able know the objectives, importance and scope of plant systematics. CO2. The learners will get acquainted with sources of data on systematics, botanical nomenclature. CO3. The learner will have a deep knowledge on different plant families and its characterization features. CO4. The students will be made aware of environmental awareness, ecological grouping and community dynamics. CO5. The course will be made aware of his/her role in environment and will make them a responsible citizen it

		will also force to think students about sustainable ecology.
	BO 232: Plant Physiology	CO1. Learners will have an in deep knowledge about importance of plant physiology and its application
		CO2. Students will acquire understanding about biophysical phenomenon and various process in plants like plasmolysis, osmosis, diffusion, permeability
		CO3. The learner will have an understanding about water absorption, various cells involved in the process and their functioning.
		CO4. The course also emphasizes on understanding of various processes such as mineral and salt absorption with references to growth.
		CO5. The students will understand the role of plant growth regulators its types and also the process of flowering.
		CO6. The course will help students to take up research as career and will also those provoke understanding of growth and flowering to make them successful entrepreneurs.
	BO 233: Practical based on BO 231 & BO 232	To get acquainted with the subject in live form and visits to ecological belts.
S. Y. B. Sc Botany (Choice Based Credit	BO 241: Plant Anatomy and Embryology	CO1. The students will have an in deep knowledge about different types of tissues with understanding of their role in plant system
System -CBCS Pattern) Semester II		CO2. The learner of the course will also understand the process of tissues systems in plants and will be able to know the growth types happening in the plant body.
		CO3. The student will understand the process of embryo formation, types of embryos and process of fertilization in plants. Which will help them to know about its application in horticulture and agricultural practices.
		CO4. The learner will also get an in deep idea about a branch of botany i.e., palynology, with its application in lucrative industries viz. honey making. This will certainly

			help them select the stream as one of the potential careers.
		BO 242: Plant Biotechnology	CO1. The student will be introduced and made acquainted with the applied field of biotechnology with special reference to the plants.
			CO2. The learner of the course will have a detailed knowledge on plant genome, genetic engineering and bioprocesses.
			CO3. The student will have an understanding about the different applied industries in the stream and its applications in food, medicine etc.
			CO4. The learner will not only be acquainted with production processes but also will be made aware about scale ups in upstream and downstream processes.
			CO5. The course will ensure enhanced the level of understanding of students in the subject area and provoke them to consider it as a potential career.
		BO 243 : Practical Practical based on BO 241 & BO 242	To equipped the students with skills related to laboratory as well as field based studies.
3	T. Y. B. Sc. Botany (Choice Based Credit System -CBCS Pattern) Semester I Discipline Specific Elective Course	BO 351: Botany Theory Paper 1 Cryptogamic Botany (Algae and Fungi	 CO-1. To understand about Introduction: Cryptogamsmeaning. Types- Lower Cryptogams, brief Review with examples. CO-2. Gain idea about Algae: General characters, distribution, Thallus organization, habit and Habitat reproduction and Classification (G.M.Smith 1955) up to classes. CO-3. Study of life cycle of algae with reference to taxonomic position, Occurrence, Thallus structure, and reproduction of Nostoc, Oedogonium Chara, Sargassum and Batrachospermum. CO-4. Know Economic importance of algae- Role in industry, agriculture, fodder and medicine. CO-5. To study Fungi: General characters, Habit and habitats, thallus organization, cell wall composition, nutrition and Classification. (Alexopoulos and Mims 1979) up to classes.

			 CO-6. Study of life cycle of fungi with reference to taxonomic position, thallus structure, and reproduction of Mucor (Zygomycotina), Saccharomyces (Ascomycotina), Puccinia (Basidiomycotina), Penecillium and Cercospore (Deuteromycotina) [Two members of Deutero.] CO-7. Gain idea Symbiotic Associations - Lichens, Mycorrhiza and their significance.
		BO 352: Botany Theory Paper 2 Archegoniate	CO-1. Get idea about Introduction to Archegoniate. CO-2. To study Introduction, general characters, distribution of Bryophytes to land habit, classification of Bryophytes according to G.M. Smith (1955) up to classes with reasons.
			CO-3. Understand Range of thallus organization, origin of Bryophytes - Pteridophytes and Algal hypothesis, evolution of sporophyte.
			CO-4. Study of Life Cycle of Bryophytes with respect to Taxonomic position, Morphology, Anatomy, Reproduction, Gametophytes and sporophytes of Marchantia, Anthoceros and Funaria.
			CO-5. Gain knowledge about Ecological and economic importance of Bryophyte.
			CO-6. Get idea about Introduction, Vascular Cryptogams, General characteristics, Classification according to K.R. Sporne (1975) up to classes with reasons, Diversity and Distribution of Pteridophytes.
			CO-7. To study Resemblances of Pteridophytes with Bryophytes, Differences between Pteridophytes and Bryophytes, Origin of Pteridophytes -Algal and Bryophytes, Evolution of Pteridophytes- Telome Theory and Enation Theory.
			CO-8. Study of Life Cycle of Pteridophytes with respect to Taxonomic position, Morphology, Anatomy, Reproduction, Sporophytes and Gametophytes of Psilotum, Selaginella and Equisetum.
			CO-9. To know Ecological and Economical Importance of Pteridophytes.
BO 353: E Theory Pa Spermato Paleobota	BO 353: Botany Theory Paper 3 Spermatophyta and Paleobotany	 CO-1. Understand Origin of angiosperms: with reference to time, place and ancestry- 1) Pseudanthial theory 2) Transitional-Combinational Theory. CO-2. Know Speciation & Endemism Species concept (Biological, Taxonomic & Phylogenetic Species Concept), Speciation (Allopatric, Sympatric & Parapatric), Endemism and its types (Palaeoendemism, Holoendemism and Neoendemism). CO-3. Gain knowledge about Classification: Outline, Merit and Demerits of Cronquist's System and APG IV system of classification. Study of following families with reference to systematic position (Ac per Benthem 2) 	
---	--	--	
		Hooker), Diagnostic characters, floral formula, floral diagram and any five examples with their economic importance – Nymphaeaceae, Oleaceae, Amaranthaceae, Cannaceae.	
		CO-4. Understand Herbaria and Botanical Gardens Functions of Herbarium, Important herbaria (World: Kew herbarium; India: Central National Herbarium, Kolkata).	
		Botanic gardens of the world (Royal Botanic Garden, Kew) and India (Lead Botanic Garden, Shivaji University, Kolhapur).	
		CO-5. Get idea about Introduction, general characters, economic importance and classification according to Chamberlain (1934).	
		CO-6. Study of life cycle of Pinus and Gnetum with reference to distribution, morphology, anatomy, reproduction, gametophyte, sporophyte, seed structure and alternation of generations.	
		CO-7. Know Fossil- Definition, process of fossil formation, types of fossils. Impression, Compression, Petrifaction, Pith cast and Coal ball.	
	BO 354: Botany Theory Paper 4 Plant Ecology	CO-1. To study Introduction, interrelationship between the living world and the environment, levels of organization, components and dynamism of ecosystem, homeostasis, niche concept, concept of limiting factors.	
		CO-2. Understand Biogeography: Floristic realms, speciation and its types, biogeographic regions of India.	

		Plant indicators.
		CO-3. To know Population ecology: Definition, characteristics, population growth form, r and k selection.
		CO-4. Gain Knowledge about Community ecology: Introduction and Definition, community structure, physiognomy, Raunkiaer's life form classification, keystone species, edge and ecotone.
		CO-5. Get idea about Biogeochemical cycles: The carbon cycle, N-cycle, Phosphorus cycle, and Hydrologic cycle.
		CO-6. To study Ecological Impact Assessment (EIA) Introduction, Historical Review of EIA, Objectives of EIA, Stages of EIA process: Screening; Scoping; Baseline study; Impact prediction and assessment; Mitigation; Producing Environmental Impact Statement (EIS); EIS review; Decision making; Monitoring, Compliance and Enforcement; Benefits of EIA.
		CO-7. Understand Environmental Audit; Meaning and concept, need, objectives, benefits, types, audit protocol, process, certification, personnel environmental audit.
		CO-8. To know Remote Sensing Definition, basic principles, process of ecological data acquisition and interpretation, global positioning system, application of remote sensing in ecology.
		CO-9. Gain knowledge of Ecological management: Concepts, sustainable development, sustainability indicators.
	BO 355: Botany Theory Paper 5 Cell and Molecular Biology	 CO-1. Get idea about Introduction to Cell Biology: Definition, Brief history of Cell Biology, Units of measurement for cell, Interdisciplinary nature of Cell Biology. CO-2. Understand Cell organelles: Ultrastructure, components and functions of Cell wall and cell membranes, mitochondria and Chloroplast, endoplasmic Reticulum, Golgi apparatus, Lysosomes, Vacuoles, Peroxisomes & Glyoxysomes.
		CO-3. To study Nucleus: Morphology and ultrastructure of nucleus, nucleolus and nucleolar organizer nuclear

envelope – structure of nuclear pore complex, transport of molecules across nuclear envelope.

CO-4. Understand Chromosomes: Euchromatin and heterochromatin Histones, Packing of DNA into chromosomes in eukaryotes, Karyotype and ideogram, Polytene chromosomes and lampbrush chromosomes.

CO-5. Gain idea about Cell signaling: Introduction and definition, signaling molecules and receptors, Calcium signaling pathway in plants.

CO-5. To study Genetic material DNA: historical perspective from 1953 to 2020, Griffith's and Avery's transformation experiments, Hershey-Chase bacteriophage experiment

CO-6. Understand DNA replication (Prokaryotes and Eukaryotes): Molecular mechanism of DNA replication. Enzymes involved in both prokaryotic and eukaryotic DNA replication and their inhibitors (antibiotics).

CO-7. Know Gene expression: Transcription (Prokaryotes in details and passing remarks on Eukaryotes) Types of RNA: mRNA, tRNA, rRNA; types of promoters; types of RNA polymerase enzymes in eukaryotes; molecular mechanism of transcription.

CO-8 To study Translation (Prokaryotes and Eukaryotes): Definition, concept and properties of genetic code; molecular mechanism of translation.

CO-9. Gain idea about Regulation of gene expression: Concept of operon, lac operon and trp operon, positive and negative control, one gene one enzyme hypothesis.

BO 356: BotanyCO-1. Understand Introduction to Genetics: History,Theory Paper 6Definition, Concept, branches and applications of
Genetics.

CO-2. Know Mendelism: Genetical terminology, Monohybrid cross, Law of dominance, Incomplete dominance, Law of segregation, Dihybrid cross, Dihybrid ratio, Law of independent assortment, back cross and Test cross.

CO-3. Understand Neo Mendelism (Gene Interaction): Genetic interaction, Epistatic interactions –supplementary

Genetics

gene (recessive epistasis 9:3:4), Inhibitory genes (13:3), Masking genes (12:3:1), non-Epistatic inter-allelic genetic interactions-Complementary genes (9:7), Duplicate genes (15:1).

CO-4. To study Multiple alleles: Definition, Concept, Characters of multiple alleles, Examples of multiple alleles – Blood group in human and self-incompatibility in Nicotiana.

CO-5. Gain knowledge about Linkage, Recombination and Crossing Over, Linkage- Definition and Types, Crossing over: Definition and Types, Construction of a linkage map by two-point test cross and three-point test cross, Recombination: Concept, definition and types.

CO-6. To study Mutation: Concept, definition and types.

CO-5. Get idea about Numerical alterations of chromosomes.: Euploidy, Aneuploidy-Concept and Types, Aneuploidy in Plants and Human, Polyploidy in Plants & Animals, Induced Polyploidy, applications of Polyploidy.

CO-6. To study Structural alterations of chromosomes.: Types, cytology and genetic effects of Deletion, Duplication Inversion and Translocation with examples.

Cytoplasmic CO-7. Understand & Ouantitative Inheritance: Concept of quantitative inheritance, Inheritance of quantitative trait in Maize (Cob length), Definition and Cytoplasmic inheritance concept, Chloroplast-Varigation in Four O'clock plants, Mitochondria- Petite mutants in yeast.

CO-8. Gain idea about Sex Linked Inheritance: Concept of Sex chromosomes and autosomes, Inheritance of X-linked genes –Inheritance of colour blindness in humans, Inheritance of Y-linked (Holandric genes) in humans, Sex influenced genes, Sex-limited genes.
 CO-1. Study of Algae with respect to systematic position,

BO 357: BotanyCO-1. Study of Algae with respect to systematic position,Practical Paper Ithallus structure and reproduction of Nostoc,
Oedogonium, Chara, Sargassum, Palmaria/Chondrus.Practical based onPractical based on

BO351 and BO352 CO-2. Study of Fungi respect to systematic position, thallus structure and reproduction of Mucor, Saccharomyces, Penicillium, Puccinia and Cercospora.

			CO-3. Study of Marchantia with respect to systematic position, morphology of thallus –rhizoids and scales, Gemma Cup, structure of sporophyte, reproduction.		
			CO-4. Study of Anthoceros with respect to systematic position, structure of gametophyte, anatomy of thallus, structure of Sporophytes, reproduction.		
			CO-5. Study of Funaria with respect to systematic position, morphology of thallus- leaf, rhizoids, operculum, Anatomy of axis, leaf, reproduction.		
			CO-6. Study of Sporophyte evolution in Bryophytes with the help of permanent slides. CO-7. Study of Psilotum with respect to Taxonomic position, Morphology of sporophyte, anatomy and reproductive structure.		
			CO-8. Study of Selaginella with respect to Taxonomic position, Morphology of sporophyte, Anatomy and reproductive structures.		
			CO-9. Study of Equisetumwith respect to taxonomic position, Morphology of Sporophyte, anatomy and reproductive structure. CO-10. Study of Stelar evolution in Pteridophytes with the help of permanent slides.		
			Note: Botanical Excursion and submission of Tour Report with Photographs is compulsory.		
		BO 358: Botany Practical Paper 2 Practical based on BO252 and BO254	CO-1. Study of following families with reference to systematic position (following Bentham & Hooker), Diagnostic characters, floral formula, floral diagram of Nymphaeaceae, Oleaceae, Amaranthaceae, Cannaceae.		
			CO-2. Preparation of Botanical keys: Indented and bracketed keys by using vegetative and reproductive characters.		
			CO-3. Study of internal and external morphology of Gnetum.		
			CO-4. Study of internal and external morphology of Pinus.		
			CO-5. Study of the following with the help of slides and/		

		or specimens. i) Impression ii) Compression iii) Petrifaction.		
		CO-6. Study of polluted water body with ref. to BOD (D zero day and D fifth day).		
		CO-7. Study of physicochemical properties of water body by using Sacchi disc, pH meter and electric conductivity meter.		
		CO-8. Acquisition of ecological data of particular locality by using GPS/ altimeter/geographicloa maps etc.		
		CO-9. Study of suitable ecosystem by line/belt transect method/ nested quadrate method.		
		Note: Excursion tours of long and short duration are compulsory		
	BO 359: Botany Practical Paper 3	CO-1. Cytological techniques-preparation of Fixatives, preparation of stains (Aceto [°] carmine and Aceto-orcein).		
	Practical based on BO355 and BO356	CO-2. Isolation of nuclei and characterization.		
		CO-3. Study of various stages of mitosis and meiosis.		
		CO-4 Induction of C metaphase in suitable plant material.		
		CO-4. Study of Chromosomes Morphology (from colchicines pretreated Onion root tip cells).		
		CO-6. Isolation of plant genomic DNA by suitable method.		
		CO-7. Estimation of Plant DNA by DPA method.		
		CO-8. Extraction and estimation of RNA by Orcinol Method.		
		CO-9. To study the monohybrid and dihybrid crosses with suitable data and its analysis by Chi-Square test.		
		CO-10. Induction of tetraploidy in onion root cells and preparation of squash for observation of tetraploid cells.		
		CO-11. Preparation of salivary gland chromosomes in Chironomous larvae.		
		CO-12. Study of human genetic traits viz. PTC taste sensitivity, earlobe and rolling tongue, height, Skin colour,		

			 Hair colour, Eye colour in known population. CO-13. Genetic problems on gene mapping using three-point test cross data. CO-14. Study of structural heterozygotes (multiple translocations) in Rhoeo. CO-15. Problems on quantitative inheritance. (Cob length in Maize). CO-16. Problems on Multiple Alleles. (Blood group in Human). 		
	Skill Enhancement course	BO 3510: Botany Theory Paper 7 Medicinal Botany	 CO-1. Gain idea about Medicinal Plants: History, Scope and Importance CO-2. Understand Indigenous Medicinal Sciences; Definition and Scope. 		
			 CO-13. Genetic problems on gene mapping using threepoint test cross data. CO-14. Study of structural heterozygotes (multiple translocations) in Rhoeo. CO-15. Problems on quantitative inheritance. (Cob length in Maize). CO-16. Problems on Multiple Alleles. (Blood group in Human). CO-1. Gain idea about Medicinal Plants: History, Scope and Importance CO-2. Understand Indigenous Medicinal Sciences; Definition and Scope. CO-3. To study Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments. CO-4. Know about Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. CO-5. Get idea about Unani: History, concept: Umoor-etabiya, tumors treatments/ therapy, polyherbal formulations. CO-6. To understand Conservation of endangered and endemic medicinal plants; Definition: endemic and endangered medicinal plants; Red list criteria; In situ conservation: Biosphere reserves, sacred groves, National Parks; Ex situ conservation: Botanic Gardens, Ethnomedicinal plant Gardens. CO-5. To know about Propagation of Medicinal Plants: Objectives of the nursery, its classification, important components of a nursery, sowing, pricking, use of green house for nursery production, propagation through cuttings, layering, grafting and budding. CO-6. Understand Ethnobotany and Folk medicines: Definition; Ethnobotany in India: Methods to study 		
			CO-4. Know about Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.		
			CO-5. Get idea about Unani: History, concept: Umoor-e- tabiya, tumors treatments/ therapy, polyherbal formulations.		
			CO-6. To understand Conservation of endangered and endemic medicinal plants: Definition: endemic and endangered medicinal plants, Red list criteria; In situ conservation: Biosphere reserves, sacred groves, National Parks; Ex situ conservation: Botanic Gardens, Ethnomedicinal plant Gardens.		
			CO-5. To know about Propagation of Medicinal Plants: Objectives of the nursery, its classification, important components of a nursery, sowing, pricking, use of green house for nursery production, propagation through cuttings, layering, grafting and budding.		
			CO-6. Understand Ethnobotany and Folk medicines: Definition; Ethnobotany in India: Methods to study ethnobotany; Applications of Ethnobotany: National		

		interacts, Palaeo-ethnobotany.			
		interacts, Palaeo-ethnobotany. CO-7. Gain knowledge about Folk medicines of ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India. Application of natural products to certain diseases- Jaundice, cardiac, infertility, diabetics, Blood pressure and skin diseases. CO-1. Gain idea about Plant diversity and its scope- Genetic diversity, Species diversity, Plant diversity at the ecosystem level. CO-2. Know Agrobiodiversity and cultivated plant taxa, wild taxa. Values and uses of Biodiversity: Ethical and aesthetic values, Precautionary principle, Methodologies for valuation, Uses of plants, Uses of microbes. CO-3. Understand Loss of Biodiversity: Loss of genetic diversity, species diversity, ecosystem diversity, agrobiodiversity, Projected scenario for biodiversity loss.			
	BO 3511: Botany Theory Paper 8 Plant Diversity and Human Health	CO-1. Gain idea about Plant diversity and its scope- Genetic diversity, Species diversity, Plant diversity at the ecosystem level. CO-2. Know Agrobiodiversity and cultivated plant taxa, wild taxa. Values and uses of Biodiversity: Ethical and			
		for valuation, Uses of plants, Uses of microbes.			
		CO-3. Understand Loss of Biodiversity: Loss of genetic diversity, species diversity, ecosystem diversity, agrobiodiversity, Projected scenario for biodiversity loss.			
		CO-4. Gain knowledge about Management of Plant Biodiversity: Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations.			
		CO-5. Understand Conservation of Biodiversity: Conservation of genetic diversity, species diversity and ecosystem diversity, In situ and ex situ conservation, Social approaches to conservation, Biodiversity awareness programmes, Sustainable development.			
		CO-6. To study Role of plants in relation to Human Welfare; a) Importance of forestry their utilization and commercial aspects b) Avenue trees, c) Ornamental plants of India. d) Alcoholic beverages through ages. Fruits and nuts: Important fruit crops their commercial importance. Wood and its uses.			
T. Y. B. Sc. Botany (Choice Based Credit System -CBCS Pattern)	BO 361: Botany Theory Paper I Plant Physiology and Metabolism	CO-1. To understand Mineral nutrition: Classification of mineral elements, macro and micronutrients; Role of essential elements; Transport of ions across cell membrane, lonophores, Carriers and Channels.			
Semester II		CO-3. To study Photosynthesis: Mechanism of photosynthesis- Electromagnetic spectrum Ultra- Structure of Chloroplast, Organization of Light-			

	Discipline Specific Elective Course		Absorbing Antenna Systems, Light Reaction: (Cyclic and Non-cyclic photophosphorylation), Dark Reaction: Calvin–Benson Cycle, Photorespiration, C4 cycle and CAM pathway of carbon fixation).		
			 CO-4. Understand Respiration: Types of respiration (Aerobic and anaerobic), Mechanism of aerobic respiration (Glycolysis, TCA cycle, Terminal oxidation and phosphorylation in respiratory chain); Pentose Phosphate Pathway. CO-5. Know Stomatal Biology: Light-dependent Stomatal Opening, Mediation of Blue-light Photoreception in Guard Cells by Zeaxanthin, Reversal of Blue Light-Stimulated Opening by Green Light, The Resolving Power of Photo physiology (Overview). CO-6. Get idea about Translocation in phloem: 		
			CO-6. Get idea about Translocation in phloem Composition of phloem sap, girdling experiment Pressure flow model.		
			CO-7. To study Plant growth regulators: Discovery and physiological roles of auxins, gibberellins, cytokinins, ABA, ethylene.CO-8. Gain knowledge about Photomorphogenesis: Red and far-red light responses on photomorphogenesis; Phytochrome (discovery and mode of action).		
		BO 362: Botany Theory Paper 2 Biochemistry	CO-1. Understand Foundation of Biochemistry: From molecules to the first cell (origin of a cell), Miller and Urey experiment. Biomolecules of a cell, functional groups in biomolecules, conformations and configurations of biomolecules.		
			CO-2. Know about Water: The solvent of life: Physica properties of water, structure of water molecule, polarit of water molecule, weak interactions in aqueou solutions.		
			CO-3. To study Amino acids and proteins: Structure, classification, properties and functions of amino acids. Structure (primary, secondary, tertiary and quaternary), properties and functions of proteins. Biological disorders of amino acid metabolism. Commercial applications.		
			CO-4. Gain idea about Enzymes: Definition, nature of enzymes and co-factors, classification and properties of		

	enzymes, active site. Mechanism of enzyme action: free energy, activation energy, binding energy, transition state, lock and key hypothesis, induced fit theory. Factors affecting enzyme activity: pH, temperature, substrate concentration, enzyme concentration. Enzyme inhibition: Competitive, uncompetitive, non-competitive. Reversible and irreversible inhibition, feedback inhibition. CO-5. To study Carbohydrates: Definition, classification of carbohydrates-Monosaccharides: aldoses and ketoses, configurations, linear to ring structure; Oligosaccharides: glycosidic bond, reducing and non-reducing sugars; Polysaccharides: homopolysaccharides, heteropolysaccharides, examples, their structures, locations and role. Properties and functions of carbohydrates. Commercial applications. CO-6. Gain knowledge about Lipids: Definition, classification of lipids: simple, conjugate and derived lipids, properties and functions of lipids. Biological disorders of lipid metabolism. Commercial applications.
	vitamins. source and functions of vitamins.
BO 363: Botany Theory Paper 3 Plant Pathology	CO-1. To study Fundamentals of Plant Pathology: Introduction, Important terminology- Incitants, Host, Symptoms, Parasite, Pathogen, Inoculum, Penetration, Infection, Incubation, Disease. Economic importance of plant diseases, History of plant pathology, Introduction to Indian Agriculture Research Institute (IARI), International Crop Research Institute for Semi-Arid Tropics (ICRISAT), Contribution of Anton De Bary and Prof. B.B. Mundkur.
	CO-2. Understand Disease Development: Concept of disease cycle, Inoculation, Prepenetration, Penetration, Infection, Dissemination. Epidemics-Forms. Decline, Exponential model.
	CO-3. Know Defense Mechanisms: Concept and Definition, Types-Preexisting-Structural and chemical, Induced- Structural and Biochemical.
	CO-4. Gain knowledge about Methods of Studying Plant Diseases. Macroscopic study, Microscopic study, Koch''s postulates. Types of culture Media, Pure culture

methods- Streak plate, pour plate, Spread plate.

CO-5. Get idea about Fungal Plant Diseases Introduction to fungi as plant pathogens. Study of Diseases- Downy mildew of Grapes, Head smut of Jowar, Tikka diseases of Groundnut with reference to causal organism, symptoms and disease management.

CO-6. To study Bacterial Plant Diseases. Introduction to bacteria as plant pathogens, Study of Diseases- Citrus Canker, Black arm of Cotton with reference to causal organism, symptoms and disease management.

CO-5. Know Mycoplasma Plant Diseases: Introduction to Mycoplasma as plant pathogens, Study of Diseases-Grassy shoot disease of sugarcane, Little leaf of brinjal with reference to causal organism, symptoms and disease management.

CO-6. Understand about Nematodal Plant Diseases: Introduction to Nematodes as plant pathogens. Study of Diseases- Root knot diseases of vegetables, Soyabean cyst Nematodes with reference to causal organism, symptoms, Integrated management of Nematodal diseases.

CO-7. To study Viral Plant Diseases: Introduction of Virus as plant pathogens. Study of Diseases- Papaya Mosaic Disease, Bunchy top of Banana with reference to causal organism, symptoms and causal organism.

CO-8. Understand Non-Parasitic Diseases. The impact and abiotic causes- Temperature, Soil moisture and relative humidity, Poor oxygen, Poor light, Air pollutants, mineral deficiencies. Herbicidal injury, Study of Mango necrosis, Black Heart of Potato.

CO-9. Know Principles of plant diseases control: General account, Quarantine, Eradication, cultural control practices, biological control. Curative measures, chemical control, Use of Effective Microorganism solution (EMS), Microbial Pesticides.

BO 364: BotanyCO-1.UnderstandOrganicEvolution:DistinctionTheory Paper 4between Origin of life and Organic Evolution, Historical
account of Origin of life, Origin of Earth Vs Origin of life:
Gaia Hypothesis, Earliest Fossils, Prebiotic Evolution,
Abiotic synthesis of organic matter, Primordial soup,

		Population genetics	origin of membranes, Oparin's Coacervate model, Theory of Panspermia, Early life and RNA and Origin of genetic code.			
			CO-2. To study Organic Evolution: The concept of organic evolution, Theories of Evolution, Pre-Darwinian period, Theory of Inheritance of acquired characters (Lamark's), Darwinism- Theory of Natural Selection, Post-Darwinian period- Modern synthetic theory.			
			CO-2. Gain idea about Evidences of Evolution: Direct evidences and conclusions from fossil records, Indirect evidences, Evidences from Genetics, Evidences from bio- geographical relations.			
			CO-4. Understand Evolution Through Ages: Fossils and Geological Time scale: Fossils and Fossilization, Conditions of fossilization, Dating of fossils: Uranium Lead method, Radio-carbon method, U-series and ESR method, Geological Time scale: Eras, Periods, epochs, and duration in millions of years and plant life.			
			CO-5. Gain knowledge about Population Genetics and Evolution: Concept of Mendelian population, Gene Pool and its models, Hardy-Weinberg law of gene frequencies, Factors affecting allelic frequency, Genetic polymorphism.			
			CO-5. To study Speciation and Isolating Mechanisms: Introduction, Morphological Criteria for Species and Races, Allopatric and Sympatric Populations, Isolating Mechanisms: Pre zygotic Isolation mechanisms: Concept, Spatial & Ecological; Seasonal Isolation, Ethological Isolation, Mechanical Isolation, Post zygotic Isolation mechanisms: Concept, Hybrid in viability, Hybrid sterility and Hybrid breakdown.			
		BO 365: Botany Theory Paper 5 Advanced Plant Biotachnology	CO-1. Understand Biotechnology: Introduction, Traditional and modern Biotechnology. Impact of Biotechnology on Health care, Agriculture, and Environment.			
		Diotechnology	CO-2. Know about Plant Tissue Culture: Concepts of Cell theory & Cellular totipotency, Landmarks in plant tissue culture. Pluripotency, Differentiation, dedifferentiation, redifferentiation, Hormones used in PTC, 'Explant' for plant tissue culture and Response of explants in vitro- callus formation, organogenesis (direct			

and indirect) and embryogenesis (direct and indirect). Micro propagation of Banana (in detail from Selection of explant to hardening and marketing).

CO-3. Get idea about Techniques of Genetic Engineering and Methods of gene transfer in Plants- Introduction to Molecular tools: Definition and role of Nucleases, Polymerases, Ligases, Polynucleotide kinases, Alkaline Phosphatases. Types of vectors- Definition and characters (2-4) of Plasmids, Phages, Cosmids, BAC, YAC, Plant viruses, Animal viruses. Methods of gene transfer in Plants – Direct gene transfer – Definition and concept of Electroporation, Microinjection, and Gene gun Indirect gene transfer- Agrobacterium mediated gene transfer method, Ti-plasmid: structure and functions, T-DNA Gene amplification technique -Polymerase chain reaction DNA finger printing.

CO-4. Understand Cryopreservation and Germplasm Conservation Definition and concept, techniques of cryopreservation, cold storage, long term and short-term storage, applications. Germplasm Conservation: Preservation of Cell, tissue, organ, whole organism. Concept of Gene Bank, DNA Bank, Seed Bank, Pollen Bank etc.

CO-5. Know Biotechnology and Society Biotechnology-Benefits, GM foods and its safety, Recombinant foods and religious beliefs, Recombinant therapeutic product for human health care. Patenting of biotechnological inventions and Intellectual property rights.

CO-5. Gain knowledge about Microbial Biotechnology: Biochemistry of fermentation, Microorganism used in fermentation, fermentable substrate, Ethanol fermentation methods, Distilleries producing alcohols. Commercial production: Alcoholic beverages, organic acids, citric acids. Advantages of fermentation.

Transgenic Plants as Bioreactors: Metabolic engineering of starch, cyclodextrins, fructans, Bioplastics, genetically engineered plants as protein factories, Production of therapeutic proteins from plants.

CO-6. To study Nano-biotechnology: Definition and concept, Applications of nanotechnology in agriculture

		(fertilizers and pesticides).
	BO 366: Botany Theory Paper 6	CO-1. Get idea about Introduction: Definition, Scope and objectives and History of Plant breeding in India.
	Plant Breeding and Seed Technology	CO-2. Understand Techniques and practices of plant breeding
		A. Plant Introduction: Definition, Types (Primary and Secondary), Procedure, Merits and Demerits, Important Achievements.
		B. Selection methods: Concept, Types of selections – mass selection, pure line selection and clonal selection. Advantage and disadvantages of selection, Achievements of selection breeding.
		C. Hybridization: Definition, Concept and Objectives, Precaution to be taken during hybridization, Types: Intervarietal and Distant, General procedure of hybridization, Methods of hybridization: Pdigree and bulk, Hybrid vigour and heterosis.
		CO-3. Know aboutAdvanced techniques in Plant breeding
		A. Mutation breeding: Definition and concept, Mutagens (Physical and Chemical), Mutants, Types of mutation (Spontaneous and Induced), Application of mutation breeding, Limitations of mutation breeding.
		B. Tissue Culture: Definition and concept, Totipotency, Application of tissue, embryo and anther culture in seed production.
		CO-4. To study Introduction to Seed Technology: Seed as a basic input in agriculture, Classes of seed I. Nucleus2. Breeder 3. Foundation 4. Certified Role of seed technology.
		CO-5. Get idea about Seed legislation, Introduction, Seed legislation in India (Seed Act).
		CO-6. Understand Seed Production, Introduction, National Seed Corporation (NSC) and its objectives, State Seed Corporation (SSC) and its objectives, General procedure for Seed Production, Location and Season, Land requirement, Importance of soil and water testing, Cultural practices, Isolation distance, Plant protection, Weed Control, Rouging, Harvesting, Threshing, Seed

			Processing.	
			CO-7. Know about Seed Certification: Definition, Objectives and Concept, Phases of Seed Certification, General procedure of seed certification, Field inspection, Duties of seed inspector.	
			CO-8. To study Seed Testing	
			A. Physical Purity Analysis: Definition of purity components, Physical Purity Work Board, Procedure	
			B. Moisture Testing: Concept, Air oven method, Digital Moisture Meter,	
			C. Germination testing:	
			Definition and objectives, Procedure and methods for germination testing (Paper, Sand and Soil), Seedling evaluation (Normal Seedlings, Abnormal Seedlings, Multigerm Seed Units and Non-germinated Seeds). 03	
			 CO-9. Gain knowledge about Seed Pathology at Entomology: Definition, Seed Borne pathogens, Fungi, Bacter Viruses, Influence of seed borne pathogens on see production, Common insect pest and its impact on see production. CO-10. Understand Seed Storage: Definition and Concept, Seed treatment, Management seed storage structures, Sanitization, Dehumidification Fumigation. 	
		BO 367: Botany Practical Paper I	CO-1. Determination of osmotic potential of plant cell sap by plasmolysis method.	
		Practical based on BO361 and BO362	CO-2. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.	
			CO-3. Demonstrate the activity of catalase and study the effect of pH and enzyme concentration.	
			CO-4. To study the effect of light intensity and bicarbonate concentration on O2 evolution in photosynthesis.	
			CO-5. Comparison of the rate of respiration in any two	

		parts of a plant.
		CO-6. Separation of amino acids by paper chromatography.
		CO-7. Demonstration experiments (any four)
		i). Bolting. ii). Effect of auxins on rooting. iii). Suction due to transpiration. iv). R.Q. v). Respiration in roots.
		CO-8. Estimation of total free amino acids by spectrophotometry.
		CO-9. Separation of amino acids by paper chromatography.
		CO-10. Estimation of soluble proteins by Lowery et. al. method.
		CO-11. Demonstration of Enzyme activity: Amylase /invertase /catalase.
		CO-12. Estimation of reducing sugars by DNSA method.
		CO-13. Estimation of Vitamin C (Ascorbic acid) from plants.
		CO-14. Qualitative tests for starch, lipids and proteins.
		CO-15. Determination of the iodine number of lipids using Hanus method.
	BO 368: Botany Practical Paper 2	CO-1. Preparation of any one culture media for isolation of plant pathogens.
	Practical based on BO363 and BO364	CO-2. Culture technique- Streak plate methods, pour plate methods, Spread plate methods.
		CO-3. Study of any two of fungal (Downy mildew of Grapes, Head smut of Jowar, Tikka diseases of Groundnut) diseases.
		CO-4. Study of any two of each bacterial and mycoplasma diseases.
		CO-5. Study of any two of each viral and non-parasitic diseases of plants.
		CO-6. Preparation of 1% Bordeaux mixture and Bordeaux paste 10%.

		CO-7. Preparation of Jivamruta.
		CO-8. Study of Koch's Postulates.
		CO-9. Study of Fungicides and Microbial pesticides.
		CO-9. Study of Geological time scale.
		CO-10. Study of types of Fossils:
		i) Coal ball ii) Rhynia vii) Lyginopteris iii) Pentoxylon iv) Nipaniophyllum v) Lepidodendron.
		CO-11. Demonstration of any three evidences of Organic Evolution.
		CO-12. Numerical Problems based on Allele frequency and Genotype frequency.
		CO-13. Numerical Problem based on Hardy-Weinberg Equilibrium.
		CO-14. Study of Sympatric and Allopatric speciation with suitable example.
		CO-15. Study of Isolation mechanism: Prezygotic & Postzygotic (Any one example from each).
		CO-16. Submission of Report on Visit to Paleobotany Laboratory/Museum/Fossil Garden.
	BO 369: Botany Practical Paper 3	CO-1. Preparation and sterilization of MS Medium and Callus Induction using leaf primordia.
	Practical based on BO365 and BO366	CO-2. Production of secondary metabolites in any suitable plant material.
		CO-3. Artificial seed production by Sodium Alginate method encapsulation (somatic embryogenesis).
		CO-4. Demonstration to Equipments used in genetic engineering like gene gun, PCR, gel doc, microcentrifuge, electrophoresis, micropipettes, incubator, shaker etc. (live/videos/photographs/visit to research labs).
		CO-5. Study of Transgenic plants- Arabidopsis thaliana as a model plant, Bt-Brinjal, Flr-svr Tomato, and other GM crops like soybean, maize, tobacco as a pharmaceutical, banana as a edible vaccine etc. (live/videos/photographs/visit to research labs).

		CO-6. Preparation of plant-based nano-particles.
		CO-7. Demonstration to Fermentation of fruit juice and wine production from grapes/pomegranate/jamun/ apple/ber (live/videos/photographs/visit to research labs).
		CO-8. Problems on genetic engineering (set of problems will be given on restriction enzymes, vectors etc.).
		CO-9. Demonstration of Hybridization Techniques (Emasculation, Hand Pollination, Bagging and Tagging) in cotton and tomato.
		CO-9. Effect of chemical mutagens on seed germination and seedling growth.
		CO-10. Study of pollen viability and floral morphology of crops.
		CO-11. To test seed moisture by hot air oven method.
		CO-12. To study germination methods (Paper, Sand and Soil).
		CO-13. Physical purity analysis of seed sample.
		CO-14. Visual examination of dry seeds for disease symptoms.
		CO-15. To study any one common seed insect pest w.r.t to their life cycle, way of infestation/damage, symptoms and control measures.
		CO-16. Visit to a Plant Breeding Research Centre/ Seed Industry and report submission.
		Note: Submission of minimum 10 seed samples along with their botanical names, family, variety etc. to the department at the time of final practical examination
Skill Enhancement course	BO 3610: Botany Theory Paper 7 Nursery and Gardening Management	CO-1. To study Nursery: definition, objectives and scope and building up of infrastructure for nursery, planning and seasonal activities - Planting - direct seeding and transplants. CO-2. Know Seed: Structure and types - Seed dormancy:
		causes and methods of breaking dormancy - Seed storage: Seed banks, factors affecting seed viability, genetic erosion –Seed production technology - seed

	testing and certification.
	CO-3. Understand Vegetative propagation: air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants- greenhouse - mist chamber, shed root, shade house and glass house.
	CO-4. Get idea about Gardening: definition, objectives and scope - different types of gardening -landscape and home gardening - parks and its components - plant materials and design -computer applications in landscaping - Gardening operations: soil laying, manuring, watering, management of pests and diseases and harvesting.
	CO-5. Understand Sowing/raising of seeds and seedlings - Transplanting of seedlings - Study of cultivation of different vegetables: cabbage, brinjal, lady's finger, onion, garlic, tomatoes, and carrots - Storage and marketing procedures.
BO 3611: Botany Theory Paper 8	CO-1. Know Introduction: 1.1 Introduction, Scope and importance of Biofertilizers
Biofertilizers	I.2 General account of the microbes used as Biofertilizers
	 CO-2. Understand Bacterial Biofertilizers 2.1. Isolation of Rhizobium, Identification, Mass multiplication, Carrier based inoculants. 2.2. Azospirillum isolation and mass multiplication, carrier-based inoculants and associative effect of different organisms 2.3. Azotobacter, classification and characteristics 2.4. Crop response to Azotobacter inoculums, Mass multiplication of Azotobacter 2.5. Applications of Azospirillum 2.6. Phosphate solubilizing Bacteria.
	 CO-3. Gain knowledge about Algal Biofertilizers: 3:1. Cyanobacteria (Blue Green Algae): Isolation of Anabaena from Azolla, Mass Multiplication of Anabaena 3.2. Azolla - Anabaena relationship 3.3. Biological Nitrogen fixation 3.4. Blue Green algae in a rice cultivation. 3.5. Applications of BGA.



Rayat Shikshan Sanstha's Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College Manchar, Tal. Ambegaon, Dist. Pune

DEPARTMENT OF BOTANY

Course Outcomes (CO) PG

Sr. No.	Class	Course	Course Outcomes (CO)
1	M. Sc. I Botany (Choice Based Credit System - CBCS Pattern) Semester I Core Compulsory Theory paper	BOUT 111: Botany Theory Paper 1-Plant Systematics I	The learner will be acquired with sound knowledge of 1. Know Systematics and Taxonomy of Algae and Fungi– Principles, Concept of species and hierarchical taxa, Classification of algae and fungi and commercial application of algae, fungi and bryophytes. 2. Understand Bryophytes with reference to distribution, distinguishing characters, morphology and anatomy of gametophyte and sporophytes of different orders.
		BOUT 112: Botany Theory Paper 2- Cell Biology and Evolution	 The learner will be acquired with sound knowledge of 1. Get idea about Universal features of cells, cell chemistry and biosynthesis, chemical organization of cells, biogenesis of cell organelles and chromosome. 2. Understand Cellular signaling, transport and trafficking. Cellular Processes like Cell cycle and its regulation, Phases of cell cycle, Method of study of cell cycle, programmed cell death, Cell-ECM and cell-cell interactions and Role of hormones. 3. Gain Knowledge about Genome instability and cell transformation. 4. Know Steps and preview of evolution, Origin of cells and cellular evolution, Molecular Evolution and mechanism.
		BOUT 113: Botany Theory Paper 3- Cytogenetics and Plant Breeding	 The learner will be acquired with sound knowledge of 1. Understand about Principles of Mendelian inheritance and Interaction of genes, Cytoplasmic inheritance, Quantitative inheritance, Linkage, Recombination and Crossing Over and mutation. 2. Get idea about Microbial & Phage Genetics, Karyotype and Chromosome Banding, Numerical alterations of chromosomes, Structural alterations of chromosomes and Model systems in Genetics. 3. Know Concept, Objectives, applications and various methods of plant breeding. 4. Gain knowledge about Plant Genetic Resources, Methods in plant breeding, Mutation Breeding.
	Choice Based optional paper	BODT 114: Botany Theory Paper 4- Pomoculture and	The learner will be acquired with sound knowledge of 1. Understand Pomoculture: Various types of Pomoculture, mass cultivation, methods of application and use of genetically engineered fruit plants for improvement

		Fruit Processing Technology	of Pomoculture. 2. Know Fruit Processing Technology: Fruit products, methods of fruit processing.
		BODP 114: Botany Practical Paper 4-based on BO 114	 To study Correlation between practical experiments with theory to improve the understanding. To study The learner will be acquired with sound knowledge of mass cultivation, methods of application and use of genetically engineered fruit plants for improvement of Pomoculture, Fruit products, methods of fruit processing.
	Core Compulsory practical paper	BOUP 115: Botany Practical Paper based on- BOUT 111, BOUT 112 and BOUT 113	 To study Morphological observations, documentation (description and illustrations) and classification of various algal and fungal members. Study of Morphological, anatomical and reproductive studies of the various members of bryophytes. To study Practically understanding of polytene chromosome, mitotic and meiotic cell division. How to isolate chloroplast, mitochondria and estimation of related biomolecules are practically studied. study of Karyotype analysis, Meiotic configuration, polygenic inheritance, population genetics, giant chromosome, Floral Biology and various fossils.
	M. Sc. I Botany (Choice Based Credit System - CBCS Pattern) Semester II Core Compulsory Theory paper	BOUT 121: Botany Theory Paper 1-Plant Systematics II	 The learner will be acquired with sound knowledge of 1. Understand Pteridophytes: Classification, stellar evolution, distribution, distinguishing characters, morphology and anatomy of sporophyte and gametophyte of various orders of pteridophytes. 2. Know Gymnosperms: Classification, Affinities with Pteridophytes and Angiosperms, Distribution, Economic aspects, General characters and morphology of various orders of gymnosperms. 3. Get idea about Angiosperms: Study of various plant families with respect to general characters, morphology, economic importance, affinities and classification.
		BOUT 122: Botany Theory Paper 2- Molecular Biology	 The learner will be acquired with sound knowledge of 1. Understand Techniques and Tools in Molecular Biology: Applications, Enzymes, minor and major equipment's and techniques are used in molecular biology. 2. Know DNA – Structure, Functions and Damage: Structure, forms, properties, packaging, replication, damage and repair of DNA. 3. Study of Gene structure and Function: Structure, Transcription, Translation, gene regulation, Transposable elements, Genomics and Proteomics
		BOUT 123: Botany Theory Paper 3- Biochemistry	 The learner will be acquired with sound knowledge of 1. Know Fundamental aspects of biochemistry, biomolecules like carbohydrates, lipids and nucleic acids. 2. Understand Protein biochemistry and nitrogen metabolism. 3. Get idea about Phytochemistry and Metablomics and phytochemical investigations.

	Choice Based optional paper	BODT 124: Botany Theory Paper 4- a. Floriculture and Nursery Management	The learner will be acquired with sound knowledge of 1. Understand Concept, definition, Scope and Importance of floriculture, global scenario, Pre-requisites of commercial floriculture, Harvesting and processing of flowers and Commercial production of flowers. 2. Know Nursery Management: Types of Nurseries, primary requirements, site preparation, Design and layout of nurseries, Producing plants from seed, Vegetatively and growing media.	
		BODP 124: Botany Practical paper 4- based on BODP 124	 The learner will be acquired with sound knowledge of Study of Correlation between practical experiments with theory to improve the understanding of theoretical knowledge. Study of Students are practically prepared for construction of different protective structures of green houses, special cultural practices and methods of post-harvest technology for cut flowers. Study of Students are motivated for preparation of project on cut flower, preparation of bed, method of seed germination, growing media, grafting, budding, air layering and cutting methods. 	
	Core Compulsory practical paper	BOUP 125: Botany Practical paper based on BOUT 121, BOUT 122 and BOUT 123	 The learner will be acquired with sound practical knowledge of Study of Studies of different plant families of dicotyledonae and monocotyledonae, artificial keys and different forms of fossils. Study of Isolation and quantification of plant genomic DNA and effect of temperature and alkali on DNA. Study of Separation of seed storage proteins of legumes by SDS-PAGE. Study of Electrophoretic separation of plasmid isoforms restriction digestion study of plasmid DNA Study of instruments or equipment's used in Molecular Biology techniques. Study of Thin layer chromatography, spectrophotometry and Effect of pH and enzyme concentration on enzyme. Study of Estimation of proteins by Lowry and Bradford Method 	
2	M. Sc. II Botany (Choice Based Credit System - CBCS Pattern) Semester I Core Compulsory Theory paper	BOUT 231: Botany Theory Paper 1- Computational Botany	 The learner will be acquired with sound knowledge of 1. Get idea about Basic Biostatistics, Introduction to Statistics, Correlation and regression. 2. Understand Experimental Statistics: Statistics using R, SPSS and Excel : Introduction , features, installation, starting and ending of the sessions, R commands and case sensitivity. SPPS Software, Excel, Testing of Hypothesis 3. Know Scientific Communication: Importance, Different modes, Research paper writing, Thesis writing, IPR, patent submissions 4. To study Bio-analytical techniques & Bioinformatics: Making solutions, pH measurements and preparation of buffers, measuring concentrations using spectrophotometry, Bioinformatics, Data Retrieval tools. 	

		BOUT 232: Botany Theory Paper 2- Developmental Botany	 The learner will be acquired with sound knowledge of Gain knowledge about Basic concepts of Plant development: Potency, commitment, specification, induction, Polarity & Symmetry, Difference between Plant and Animal development, Factors for development-intrinsic and extrinsic, Juvenility -Characteristics, Transition to Adult phase. understand Embryology: Reproductive structure in plant, Gametophyte development, Fertilization, Development of embryo in dicots and monocot, Development of Endosperm, Polyembryony, Apomixis. Know Physiological & Molecular Basis of Plant Development: Physiology of plant development, Molecular and Cellular Events. gain idea about Molecular and Cellular Events, Inflorescence development, Flower development, Mutants in Developments, Genetic and Epigenetic Mechanisms Underlying Vernalization, Radial and Axial Pattern of development, Process of Senescence.
		BOUT 233: Botany Theory Paper 3- Plant Physiology-	 The learner will be acquired with sound knowledge of 1. Understand Plant Nutrition: Soil, Essential elements, Mechanism of absorption of mineral elements, Active and passive transport, Merits and demerits of use of natural and chemical fertilizers, Properties of water, Mechanism of opening and closing of stomata. 2. Know Photosynthesis: Photosystem I and II, Organization of Photosynthetic electron transport system, Photo-oxidation of water, Fixation of CO2: Calvin (C3), Fixation of CO2: Calvin (C4), CAM pathway. 3. Get idea about Respiration and lipid metabolism: Schematic presentation of Glycolysis, TCA cycle and PPP, Organization of respiratory electron transport system, Mechanism of NADPH and NADH oxidation, Cyanide resistance pathway, Fatty acid biosynthesis, Synthesis of membrane lipids, Catabolism of storage lipids, Significance of lipids. 4. Know Solute transport, Growth and development: Seed dormancy, Growth, Physiology of flowering, Physiological organization phloem element, Plant growth regulators, Stress physiology: Schematic presentation of secondary metabolite synthesis pathways.
	Choice Based optional paper	BODT 234: Botany Theory Paper 4 - Seed science BODP 234:	The learner will be acquired with sound knowledge of 1. Understand Introduction, Scope, Importance and Definition of Seed Technology, Seed, Seed Morphology, Seed Dormancy and Seed Germination, Genetic Purity. 2. Know Quality testing, Seed Production, Seed Testing, The learner will be acquired with sound practical
		Botany Practical Paper based on BODT 234	knowledge ofCorrelation between practical experiments with theory to improve the understanding of theoretical knowledge.Students are practically prepared for collecting different seeds, breaking seed dormancy and its germination,

			physical purity test and Biochemical tests.3. Students are motivated for preparation of project on seed bank.
	Core Compulsory practical paper	BOUP 235: Botany Practical Paper based on BOUT 231, BOUT 232, BOUT 233	 The learner will be acquired with sound practical knowledge of 1. Correlation between practical experiments with theory to improve the understanding of theoretical knowledge. 2. Students are practically prepared for, Measurement of central tendency, Determination of regression lines, Calculation of correlation coefficient 3. Drawing a simple random sample, Chi-square test for goodness of fit, 4. Use of SPPS/Excel 5. Students also practically prepared for In-Vitro Germination of Spore/Pollen, Dissection & Isolation of Developing Embryo, Endosperm, 6. Microsporogenesis and Development of Male Gametophyte, Megasporogenesis and Development of Female Gametophyte. 7. Preparation of standard solutions, Detection of amino acids/sugars, determine the chlorophyll a/chlorophyll b. Estimation of soluble proteins by Lowry method. 8. Determination of activity of nitrate reductase.
	M. Sc. II Botany (Choice Based Credit System - CBCS Pattern) Semester II Core Compulsory Theory paper	BOUT 241: Botany Theory Paper 1- Botanical Techniques	 The learner will be acquired with sound knowledge of 1. Understand Microscopic Techniques: Image formation (properties of light), Lens, Optical microscopy, Dissection, maceration, squash, peeling and whole mount, Microtomy, Histochemical and cytochemical techniques, Micrometry and camera lucida. 2. Know Chromatography techniques: Chromatography techniques, Electrophoretic techniques. 3. Get idea about Spectroscopic techniques, Radioactive techniques. 4. To study Centrifugation techniques, Electrochemical techniques, Immunological techniques, Bioinformatics, Herbarium Techniques
		BOUT 242: Botany Theory Paper 2- Advanced Ecology	 The learner will be acquired with sound knowledge of 1. Know Levels of species diversity and its measurement, Basis of Ecosystem classification, Aquatic Ecology, Ecosystem Stability, Biomes, Agro-ecological zones of India, Forest types of India. 2. Understand Methods in field ecology, Biodiversity and its conservation, Concepts of gene pool, Environmental Biotechnology, Environmental issues. 3. Get knowledge about Plant relations (eco-physiology) with climatic factors, Plant-plant interaction, concept of allelopathy, Ecological/Environmental Laws in India. 4. Understand Environmental Impact Assessment, EIA Guidelines; Impact Assessment Methodologies, Procedure for reviewing EIA of developmental projects, Human impact on ecosystem and its consequences, Bio-indicators

			of environmental degradation, Concept of carrying capacity, Biomass carbon sequestration.
	Choice Based optional paper	BODT 243: Botany Theory Paper 3- Advanced Plant Physiology	The learner will be acquired with sound knowledge of 1. Know Photosynthesis and Respiration : 2. Understand Post-Harvest and Stress physiology: Post harvest physiology-ripening of fruits, storage of vegetables and flowers. Stress Physiology, Case studies for improvement of stress tolerance by conventional and recombinant DNA technology, Mechanism of action of herbicides, fungicides and bactericides.
		BODP 243: Botany Practical paper based on BODT 243 Advanced Plant Physiology	 The learner will be acquired with sound practical knowledge of 1. Correlation between practical experiments with theory to improve the understanding of theoretical knowledge. 2. Students are practically prepared for development of skills to Estimation of chlorophylls and carotenoids, Separation of pigment, Effects of auxins and cytokinin's or gibberellins on growth. 3. Screening of cultivars for biotic and abiotic stress tolerance, Estimation of ascorbic acid, extraction and estimation of enzyme activity. 3. Students are motivated for Estimation of total amino acid in germinating and non-germinating seed.
		BODT 244: Botany Theory Paper 4- Plant Tissue culture Technology	The learner will be acquired with sound knowledge of1. In vitro culture2. In vitro production of secondary metabolites and genetic transformation.
		BODP 244: Botany Practical Paper based on BODT 244 Or PG Dissertation	 The learner will be acquired with sound practical knowledge of 1. Correlation between practical experiments with theory to improve the understanding of theoretical knowledge. 2. Students are practically prepared for development of skills in handling of Laboratory instruments, sterilization techniques. 3. Preparation and sterilization of MS- medium, Study of different growth regulators. 4. Study of invitro production of haploid, isolation of protoplast, 5. Study of production of secondary metabolites, 6. Visit to any Commercial tissue culture laboratory and Ex situ Germplasm Bank.
	Core Compulsory practical paper	BOUP 245: Botany Practical paper based on BOUT 241 and BOUT 242	 The learner will be acquired with sound practical knowledge of 1. Correlation between practical experiments with theory to improve the understanding of theoretical knowledge. 2. Development of skills in students regarding handling of Micrometry, Maceration technique. Electrical conductivity and pH measurements. 3. Separation of leaf pigments by paper chromatography and TLC.

	 To equipped the students with skills related to laboratory as well as field-based studies To develop skill in Microtomy- Processing, double staining, sectioning. Cytochemical analysis- Nucleus, Golgi bodies,
	Mitochondria.
	7. Remote sensing techniques for vegetation/ plant
	diversity assessment,
	8. Comparison of stomatal index and pollen fertility,
	community coefficients, two ecological variables using correlation and regression analysis,
	9. To determine percent soil organic carbon and organic
	matter in soils of cropland, grassland and forest.
	10. To make the students aware about conservation and
	sustainable use of plants, visit to different types of
	ecosystems to understand the species composition and diversity.

Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce And Hutatma Babu Genu Science College, Manchar

DEPARTMENT OF BIOTECHNOLOGY

Courses offered-

> B. Sc Biotechnology

Sr.	Code	Course	Course Outcomes
No •			
1.	BBt - 101 & BBt - 201	Fundamentals of Chemistry I & II	 CO-1: To know in detail about Kinetic Theory of Gases; Liquids and Chemical kinetics CO-2: To learn the basic concept, terms and equations of Atomic Structure; Chemical Periodicity and Acids and Bases
			CO-3: To learn about the Fundamentals of Organic Chemistry; Stereochemistry; Types, Mechanism and Examples of Nucleophilic Substitution Reaction and Elimination Reaction
			CO-4: To understand detail about Chemical thermodynamics, Chemical equilibrium, Solutions, Phase Equilibrium and Solids.
2.	BBt - 102	Fundamentals of Physics	CO-1: To understand the basic laws and explore the fundamental concepts of physics \Box
			CO-2: To understand the concepts and significance of the various physical phenomena.

			CO-3: To carry out experiments to understand the laws and concepts of Physics. CO-4: To apply the theories learnt and the skills acquired to solve real time problems.
3.	BBt - 103 & BBt - 201	Biochemistry I & II	CO-1: Understand biochemistry at the atomic level, draw molecules and reaction mechanisms perfectly.
			classifications, structure of proteins and types of proteins.
			CO-3: Learn the molecular structures of 20 amino acids, differentiating essential and non-essential amino acids, biologically important modified amino acids and their functions.
			CO-4: Recognize thes tructural levels of organization of proteins,3D structure of proteins, its functions, denaturation (hemoglobin, myoglobin etc.).
			CO-5: Learn how amino acids and proteins are metabolized, emphasizing the role of few intermediates of their metabolism, monitoring the deficiency and abundance disorders of amino acid metabolisms and the role of enzymes in the regulation of the pathways
			CO-6: Describe what happens: - when lipids are metabolized, cholesterol, prostaglandins etc. are synthesized, emphasizing the genetic defects of lipid metabolism
4.	BBt - 104	Biophysics	CO-1: Students can clear the concept ofMembraneStructure & dynamics,Membranepotential,Osmosis,

			Surface tension, □ Active & Passive transport □ Membrane energetics etc. CO-2: Students will understand The principle, methodology □ Applications of various analytical techniques like Chromatography, □ Electrophoresis □ Spectroscopy.
5.	BBt - 105 & BBt - 204	Animal Sciences I & II	 CO-1: Students will able to apply concepts of breeding, physiology, nutrition, herd-health, economics and management into practical and profitable animal production programs. CO-2: Students will understand the role of nutrition in animal production. CO-3: Students will be able to explain the mechanisms and role of reproductive physiology in livestock production
6.	BBt - 106 & BBt - 205	Plant Sciences I & II	CO-1:After completion of the course the students are familiar with various physiological aspects involved in the plant development. CO-2: Also the role of enzymes in it and mechanism of photosynthesis, respiration, nitrogen and lipid metabolism. CO-3: The students are able to isolate starch, pectine and various nutritive products from the plants.
7.	BBt - 107 & BBt - 206	Microbiology I & II	CO-1: After successful completion of this course students are expected to be able to Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures, Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the

			structural similarities and differences among various physiological groups of bacteria/archaea CO-2: Know various Culture media and their applications and also understand various physical and chemical means of sterilization
			CO-3: Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
			CO-4: Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively Comprehend the various methods for identification of unknown microorganisms
8.	BBt - 108 & BBt - 207	Biomathematics And Biostatistics I & II	CO-1: The student learn to calculate Mean Median Mode.CO-2: The student learn to calculate measures of dispersion and their applications in data analysis.
			CO-3: Familiarising with data interpretation in statistics; ANOVA, Correlation and Regression analysis.
9.	BBt - 208	Computers In Biology	CO-1: Comprehensive study of various topics including Data representation methods, measures of central tendency, variance
			CO-2: Practical knowledge of application of correlation and regression analysis, test of significance: F and t tests, Chi square test etc.
			CO-3: Study on sigma plotter, null hypothesis, Bioinformatic methods, Basic idea of computer languages
			CO-4: Familiarization with biological databases, sequence, structure and strain

			database, Secondary and sequence analysis of DNA, RNA and proteins
10.	BBt - 301 &	Cell biology	CO-1: Study of cell theory, Cell
	BBt - 401		organelles, Ultrastructure, Roles of cell organelles. Exhaustive study of Cell Signaling pathways, secondary messengers etc
			CO-2:Understanding of Developmental biology: Stem cell and cancer, Differentiation in plant tissue
			CO-3: Familiarization with methods of cell-study, various forms of Microscopy, staining for microscopy etc.
11.	BBt - 302 &	Molecular Biology	CO-1: Understanding of Genome
	BBt - 402		organization, Development of basic concepts in DNA/RNA structure , Replication, Repair & Recombination.
			CO-2: Knowledge of transcription and translation in prokaryotic and eukaryotic system.
			CO-3: Development of concepts of Oncogenesis, oncogenes and tumor suppressor genes.
			CO-4: Hands on training on DNA & RNA isolation by different techniques; plasmid isolation, transformation, Electrophoresis, quality check of Nucleic acids, restriction digestion, PCR, RFLP etc
10	DD: 202		
12.	ввt - <i>3</i> 03	Genetics	this course student should be able to study History and scope of Genetics Understanding the pre mendelian genetic

		 concepts CO-2: To study the laws and concepts of Mendelian inheritance. Principles of deviation from Mendelian inheritance with examples. Concepts of multiple alleles with examples. CO-3: Understanding the mechanism of sex determination in different organisms.
BBt - 304	Metabolism	 CO-1: The student in the course learn the biochemical aspects of metabolic pathways. CO-2: They also learn the application of microbial cells in bioremediation and mineral recovery CO-3: At the end of the course, the students will be able to appreciate the aspects of microbial metabolism and their application in industries
BBt - 305	Enviornmental Biotechnology	 CO-1: Theoretical knowledge of Environment; Basic concepts; Resources; Eco system: plants, animals, microbes; Ecosystem management; Pollution, Renewable resources; Sustainability; Microbiology of degradation and decay. CO-1: Study of role of biotechnological techniques in environment protection. Waste water collection; control and management; Waste water treatment; Sewage treatment through chemical, microbial and biotech techniques CO-2: Concept building in alternate energy sources: Biomass as source of energy; Bioreactors; Rural biotechnology; Biocomposting; Biofertilizers; Vermiculture; Organic farming; Bio-mineralization; Biofuel etc

13.	BBt - 306	Bio Analyticsl Techniques	 CO-1: Concept building in various topics including: Spectroscopy, chromatography, electrophoresis, centrifugation and their different variants CO-2: Practical knowledge of Chromatographic techniques, Spectroscopy techniques, protein isolation/purificationusing different techniques ,quantitative and qualitative estimations of biomolecules CO-3: Development of understanding on Radioactivity, Radioisotopes and their uses in biology, measurement of radioactivity etc. CO-4: Theoretical basic concept building in Protein crystallization; Enzyme and cell immobilization techniques
	BBt - 403	Immunology	CO-1: Students will be abla to explain the immunological termsCO-2: Students will be able to explain the immune system.CO-3: Students Will be able to discuss immune response mechanisms.
14.	BBt - 404	Animal Development	CO-1: The student will gain knowledge onbasic concepts in development.CO-2: The student will explain the process of gametogenesis, fertilization and embryonic development.CO-3: Students able to explain the developmental process that leads to the development and differentiation of the body.

			CO-4: Explain different developmental stages in vertebrates
15.	BBt - 405	Plant Development	CO-1: Student will develop the understanding of growth, development and reproduction in plants as well as understand the physiological and metabolic changes happening along with the environmental impact.
16.	BBt - 406	Microbial biotechnology	CO-1: Identification of different types of food, Dairy product spoilages & causative Agents CO-2: Familiarization with the concept
			of Waste Water Tretment Plant
			CO-3: Basic concept building related to Scope and importance of microbiology as applied to environment and industry, Petroleum and mining microbiology, Biopesticides and Microbiology of paints, films, pharmaceuticals etc
			CO-4: Familiarization with the concept of Environmental quality; Biodegradation of waste and pollutants; (i) solid waste disposal, sanitary, landfills and composting (ii) Treatment of liquid waste, sewage treatment, (iii) treatment and safety of water supply etc.
17.	BBt -501	Industrial Microbiology	CO-1: Theoretical knowledge of microbial diversity & systematics, Microbial growth and physiology; Study of size, shape and growth pattern, nutrition type of microbes.
			CO-2: Experimental knowledge of Sterilization, disinfection, safety in microbiological laboratory.
			CO-3: Preparation of media, Isolation

			 and maintenance of organisms by plating, Streaking and Serial dilution methods, Storage of microorganisms, Gram Staining and enumeration of microorganisms. CO-4: Familiarization of assays related to antibiotics production and demonstration of antibiotic resistance CO-5: Understanding fermentation process & production of industrially important products
18.	BBt -502	R DNA Technology	 CO-1: Major events in the development of rDNA technology. Introduction of rDNA into bacterial cells. Selection of transformants and recombinants – lac selection. CO-2: Learning tools and techniques in rDNA technology- DNA manipulative enzymes. CO-3: Acquire skills on techniques of construction of recombinant DNA - Cloning vectors and isolation of gene of interest. CO-4: Construction of genomic DNA library and cDNA library
19.	BBt -503 & BBt -504	Plant Tissue Culture Animal Tissue Culture	 CO-1: Learning important milestones in the plant tissue culture And Animal Tissue Culture CO-2: Understanding the concepts and principles of Plant tissue culture. CO-3: Learning the techniques of sterilization and monitoring method of sterilization. CO-4: Learning different pathways of plant regeneration under in vitro
			conditions - organogenesis and somatic embryogenesis.
-----	----------------------	---------------------------------	--
20.	BBt -505 BBt -603	Applied Biotechnology	 CO-1: This is an interdisciplinary and emerging area The students are taught the basics of nanotechnology and their applications. CO-2: The course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology
21.	BBt -506	Biodiversity And Systematics	CO-1: Know the role of conservation, diversity of species, genetics, community, and landscape in marine, freshwater, andterrestrial habitats.
22.	BBt -601	Enzyme And Enzyme Technology	 CO-1: Upon successful completion of this course, the student will be able to Understand on the kingdoms of biomolecules, Bioenergetics principals that are the prerequisites and consequences of physiological phenomenon for further manipulations. CO-2: The student will be able to Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms CO-3: The student will be able to Apply biochemical calculation for enzyme kinetics The student will be able to Compare methods for production, purification, characterization and immobilization of enzymes

23.	BBt -602	Agricultural Biotechnology	CO-1: This course teaches the students approaches to manipulate and improve plant yield, throws light on transgenic plants \Box
			CO-2: They are introduced to the concept of utilizing plants for production of vaccines and production of biofertilizers
			CO-3: This students will be able to understand the relationship between science and society and will be able to give justification for biotechnological manipulation of plants for human use
	BBt -604	Food And Farmaceutical Biotechnology	CO-1: The learner will gain basic knowledge of food and its microbiological aspects in term of quality and spoilage activity along with structural composition, nutrient value and biological value and their mechanisms
			CO-2: Learners would have acquired basic knowledge of food properties like intrinsic and extrinsic parameter and its significance of spoilage mechanism in food.
			CO-3: To understand the methods of preservation by food additives
24.	BBt -605	Bioinformatics	CO-1: Students will developed firm base for hardwares, softwares, networking, processing of computers.
			CO-2: They are able to understand the designing and function of nvarious databases and bioinformatic resourses.
			CO-3: They are able to select specific

			softwares and tolls to solve certain biological problems with respect to Nucleotides and Proteins.
25.	BBt -606	Biosaftey and IPR	CO-1: Students Able to understand the methods of biosafety CO-2: Students Able to understand the concepts of Patent, Copyright, Tredmarks, Trade secret, Geographical Indication etc.
26.	BBt -607 & BBt -608	Project Formulation	 CO-1: Research on various topics as per the expertise and facilities available in the department (and with collaborators), including hands on training on various advanced molecular and analytical techniques An overall study on the concerned plant/animal/microbial system addressing any of relevant and pursuable scientific problems. CO-2: Familiarization with good laboratory practices, data presentation, thesis writing etc. CO-3: Prepare professional work reports and presentations.
27.	BBt -507	Industrial Intrenship	 CO-1: Participate in the projects in industries during his or her industrial training. CO-2: Describe use of advanced tools and techniques encountered during industrial training and visit. CO-3: Interact with industrial personnel and follow Biotechnology practices and discipline prescribed in industry. CO-3: Develop awareness about general workplace behavior and build

s.
work reports

Rayat Shikshan Sanstha's Annasaheb Awate Arts, Commerce & Hutatma Babu Genu Science College, Manchar

DEPARTMENT OF CHEMISTRY

Course Outcomes

F.Y.B.Sc. (Chemistry)

Sr.	Class	Course	Course Outcomes
No.			
	F. Y.	CH-101 : Physical	1. The students are expected to understand the fundamentals,
	Semester I	Chemistry	principles, and recent developments in the
			thermodynamics.
			2. It is expected to inspire and boost interest of the students
			towards chemistry as the main subject.
			3. To familiarize with current and recent developments in
			Chemistry.
			4. To create foundation for research and development in
			Chemistry.
		CH-102:Organic	1. The student are expected to understand the fundamentals,
		chemistry	principles and recent development in the subject area
			2. It is expected to inspire and boost interest of student
			toword chemistry as the main subject
			3. To familiarize with current and recent development in
			4 To arout foundation for reasonab and development in
			4. To create foundation for research and development in chemistry
		CH_103 ·	1 Importance of chemical safety and I ab safety while
		Chemistry	nerforming experiments in laboratory
		Practical –I	2 Determination of thermochemical parameters and related
1			concepts
			3. Techniques of pH measurements
			4. Preparation of buffer solutions
	F. Y.	CH-201:	1. Various theories and principles applied to revel atomic
	Semester II	Inorganic	structure.
		Chemistry	2. Discuss electronic configuration of an atom and anomalous
			electronic configurations.
			3. Explain characteristics of ionic bond, types of ions, energy
			consideration in ionic bonding, lattice
			and solvation energy and their importance in the context of
			stability and solubility of ionic
			compounds
		CH 202	1 Students will know shout beside of a statistic to be side
		CH-202:	1. Students will know about basics of analytical chemistry,
		Chamistry	some techniques of analysis and able to do calculations
			1 Inorgania Estimations using volumetric analysis
		Chemistry	2 Synthesis of Inorganic compounds
		Practical –II	3 Analysis of commercial products
			4. Purification of organic compounds
	S. Y.	CH -301:	1. Define / Explain concept of kinetics, terms used, rate laws.
	Semester I	Physical and	molecularity, order.
		Analytical	2. Discuss factors influencing adsorption, its characteristics.
2		Chemistry	differentiates types as physisorption and Chemisorption,
			Classification of Adsorption Isotherms, to derive
			isotherms.

		3.	Define, explain and compare meaning of accuracy and
			precision.
		4.	2. Perform calculations involved in volumetric analysis.
	CH-302:	1.	Define terms related to molecular orbital theory (AO, MO,
	Inorganic and		sigma bond, pi bond, bond order, magnetic property of
	Organic		molecules, etc).
	Chemistry	2.	Explain Werner's theory of coordination compounds.
	2		Differentiate between primary and secondary valency.
			Correlate coordination number and structure of complex
			ion.
		3	Identify and draw the structures aromatic hydrocarbons
		5.	from their names or from structure name can be assigned
	CH-303 Practical	1	Verify theoretical principles experimentally
	Chemistry III	2	Interpret the experimental data on the basis of theoretical
	Chemisu y-m	∠.	principles
		2	Complete theory to experiments. Understond/weife
		э.	Correlate theory to experiments. Understand/verify
			theoretical principles by experiment observations; explain
C V			practical output / data with the help of theory.
5. 1.	CH-401:Physical		1. Discuss meaning of phase, component and degree of
Semester II	and Analytical		freedom.
	Chemistry	2.	Discuss / explain thermodynamic aspects of Ideal
			solutions-Gibbs free energy change, Volume change,
			Enthalpy change and entropy change of mixing of Ideal
			solution.
		3.	Explain / discuss conductometric titrations.
		4	Explain / define different terms in Colorimetry such as
			radiant power transmittance absorbance molar
			Lamberts Law, Beer's Law, molar absorptivity
			Lamoents Law, Beer's Law, moral absorptivity
	CH-402 ·	1	Isomerism in coordination complexes 2 Explain different
	Inorganic and	1.	types of isomerism in coordination complexes
	Organic	2	Apply principles of VBT to explain bonding in coordination
	Chamistry	2.	compound of different geometries 2 Correlate no of
	Chemisuy		unpaired electrons and orbitals used for bonding 2. Identify
			(avalage discussion and other orbital complexes 4
			/ explain / discuss liner and outer orbital complexes. 4.
		2	Explain / discuss infination of $\nabla B I$.
		3.	Explain principle of CF1. 2. Apply crystal field theory to
			different type of complexes (1d, Oh, Sq. PI complexes) 3.
			Explain: 1) strong field and weak field ligand approach in
			Oh complexes 11) Magnetic properties of coordination
			compounds on the basis of weak and strong ligand field
			ligand concept. iii) Origin of colour of coordination
			complex. 4. Calculate field stabilization energy and
			magnetic moment for various complexes.
		4.	Identify and draw the structures aldehydes and ketones from
			their names or from structure name can be assigned. 2.
			Explain / discuss synthesis of aldehydes and ketones. 3.
			Write / discuss the mechanism reactions aldehydes and
			ketones. 4. Explain /Discuss important reactions of
			aldehydes and ketones.
		5.	Identify and draw the structures carboxylic acids and their
			derivatives from their names or from structure name can be
			assigned. 2. Explain / discuss synthesis of carboxylic acids

		CH-403: Practical Chemistry-IV	 and their derivatives. 3. Write / discuss the mechanism reactions carboxylic acids and their derivatives. 6. Identify and draw the structures amines from their names or from structure name can be assigned. 2. Explain / discuss synthesis of carboxylic amines. 3. Write / discuss the mechanism reactions carboxylic amines. 1. Understand systematic methods of identification of substance by chemical methods. 2. Write balanced equation for all the chemical reactions performed in the laboratory. 3. Perform organic and inorganic synthesis and able to follow the progress of the chemical reaction.
	T. Y. Semester I	CH-501	 Difference between thermal and photochemical processes. photochemical laws: Grothus - Draper law, Stark-Einstein law Quantum yield and reasons for high and low quantum yield Dipole moment and its experimental determination by temperature variation method. Electromagnetic spectrum, Nature of wave and its characteristics such as wavelength, wave number, frequency and velocity. Energy level diagram
		CH-502: Analytical Chemistry- I	 Define basic terms in gravimetry, spectrophotometry, qualitative analysis and parameters in instrumental analysis. Such as: Gravimetry, precipitation, solubility product, ionic product, common ion effect, precipitating agent, washing of ppt., drying and ignition of ppt., linearity range, detection limit, precision, accuracy, Sensitivity, Selectivity, Robustness and Ruggedness, electromagnetic radiations, spectrophotometry, Beers law, absorbance, transmittance, molar absorptivity, monochromator, wavelength of maximum absorbance. Explain different principles involved in the gravimetry, spectrophotometry, parameters in instrumental analysis, qualitative analysis.
3		CH-503: Physical Chemistry Practical - I CH-504: Inorganic Chemistry - I	 To determine the specific refractivity's of the given liquids A and B and their mixture and hence determine the percentage composition their mixture C. To titrate Cu2+ ions with EDTA photometrically. Explain electroneutrality principle and different types of pi bonding. To understand about inert and labile complexes and stability of complexes in aqueous solutions To know trends in periodic properties of these elements w.r.t. size of atom and ions, reactivity, catalytic activity, oxidation state, complex formation ability, color, magnetic properties, non-stoichiometry, density, melting point,
		CH-505 Industrial Chemistry	 boiling point. 1) The students are expected to learn; Importance of chemical industry, Meaning of the terms involved, Comparison between batch and continuous process ,Knowledge of various industrial aspects. 2) The students are expected to learn, Concept of basic chemicals, Their uses and manufacturing process, They should also know the physico-chemical principals involved in manufacturing process. 3) The students are expected to learn.

			_
		 3)Sugar Industry: The students are expected to learn Importance of sugar industry, Manufacture of direct iii. Consumption (plantation white) sugar with flow diagram.Cane juice extraction by various methods, Clarification by processes like carbonation, vi. Sulphitation, Phosphatation, etc. Concentration of juice by using multiple effect evaporator system, Crystallization of sucrose by using vacuum pan by processes like carbonation, Sulphitation, vii. Phosphatation, etc. Concentration of juice by using multiple effect evaporator system, Crystallization of sucrose by using vacuum pan. Fermentation Industry- The students are expected to learn Importance, Basic requirement of fermentation process, Manufacturing of ethyl alcohol by using molasses and fruit juice. 4) The students are expected to learn, Different types of soap products, Chemistry of soap, Raw materials required for soap manufacture, Meaning of the term's Surfactants, Types of surfactants,Raw materials for detergents,Detergent builders, additives,Washing action of soap and detergents. 5) The students are expected to learn Dyes - Students should know about,Dyes: introduction,Dye intermediates, Structural features of a dye;Classification of dyes, Synthesis, Structures, properties and applications of dyes Pigments: Students should know about Introduction, Classification and general properties of pigment, Production processes of zinc oxide and iron oxide. 	5.
	CH-506	1 Prenaration of inorganic complexes and spot tests for meta	1
	Inorganic	ions and ligands	.1
	Chemistry	2 Qualitative and confirmatory tests of inorganic toxicants of	f
	Practical - I	any four ions	L
	CH-507: Organic	1. Define and classify polynuclear and hetreonuclear	
	Chemistry - I	aromatic hydrocarbons.	
	-	2. Synthetic applications ethyl acetoacetate and malonic ester	1
		3. To write the mechanism of some named rearrangement	
		reactions and their applications	
	CH-508DSEC-III:	1. Introduction to molecular logic of life: The student will	
	CH-508:	understanding of Cell types, Difference between a bacteria	ıl
	Chemistry of	cell, Plant cell and animal cell. Biological composition and	ł
	Biomolecules	organization of cell membrane, structure and function of	
		various cell organelles of plant and animal cell. Concepts	
		of biomolecules, Bonds that link monomeric units to form	
		2 Carbohydrates: The student will understand the types of	
		carbohydrates and their biochemical significance in living	
		organisms structure of carbohydrates and reactions of	
		carbohydrates with Glucose as example. Properties of	
		carbohydrates.	
	CH-509: Organic	1. Perform the quantitative chemical analysis of binary	
	Chemistry	mixture, explain principles behind it.	
	Practical-I	2. Understand the techniques involving drying and	
		recrystallization by various method.	
		3. Synthesis of various organic compounds through greener	
		approach.	

	CH-510 (A) Introduction of Medicinal Chemistry	Upon completion of the course the student shall be able to understand, 1. The basics of medicinal chemistry, biophysical properties, overview of basic concepts of traditional systems of medicine.
		2. Over view of the overall process of drug discovery, and the role played by medicinal chemistry in this process.
		3. Biological activity parameters and importance of stereochemistry of drugs and receptors.
		4. Knowledge of mechanism of action of drugs belonging to the classes of infectious and non-infectious diseases.
		5. Enhancement of practical skills.
	CH-511: Skills Enhancing Course-II	 Importance and conservation of environment. Organic and inorganic pollutants Water quality parameters
Т. Ү.	CH-601	1. Electrochemical cells: Explanation of Daniell cell,
Semester II		Conventions to represent electrochemical cells
		2. Thermodynamic conditions of reversible cell, Explanations
		of reversible and irreversible electrochemical cell with suitable
		3. Weiss and Millers Indices, determination of Miller Indices
		4. Bravais lattices, space groups, seven crystal systems and
		fourteen Bravais lattices
		5. The Group Displacement Law, Radioactive Disintegration
	CH-602	1. Meaning of the terms-Solution, electrolytes, nonelectrolytes
		and colligative properties
		2. Lowering of vapour pressure of solvent in solution
		3. Applying rate laws for solid state reactions
		5. phenomena of photoconductivity
	CH-603	1. To determine the PKa value of given monobasic weak acid
		by potentiometric titration.
		2. Determination of Pka of given weak acid by pH metry
		titration with strong base 3 To determine the molecular weight of a given polymer by
		turbidometry
		4. Analysis of crystal structure from X-ray diffraction spectra
		of any two compounds
	CH-604 : Inorganic	1. To understand M-C bond and to define organometallic
	Chemistry -II	2. Understand the phenomenon of catalysis, its basic
		principles and terminologies.
		3. Understand the role of metals in non-enzymatic processes.
	CH-605:	1. Student will learn the concept of acid base and their
	Chemistry -III	2. Be able to solve simple problems based on Pauling's
		univalent radii and crystal radii.
		3. Different Zeolite Framework Types and their classification
	CH-606:	1. Estimation of Na by flame photometry by calibration curve
	Inorganic	method.
	Practical-II	and analysis by qualitative analysis /conductometry.

		2	Solvent free microwave assisted one not synthesis of
		5.	pthalocynin conner (II) complex
	CIL 607. Organia	1	Students will learn the principle of mass spectroscopy its
	Chomistry II	1.	instrumentation and nature of mass spectrum
	Chemisu y-m	2	Students will understand the minerals of LW spectroscopy
		۷.	students will understand the principle of UV spectroscopy
			and the nature of 0 v spectrum. They will learn types of
		2	electronic excitations.
		3.	Students will understand the principle of IR spectroscopy,
			types of vibrations and the nature of IR spectrum.
	CH-608: Organic	1.	Chemistry of reactive intermediates (carbocations,
	Chemistry-III	_	carbanions, free radicals, carbenes, nitrenes, benzynes etc
	[Credit -2, 36 L]	2.	Introduction, Isolation, Classification. Citral- structure
	Synthetic Organic		determination using chemical and spectral methods,
	Chemistry		Synthesis of Citral by Barbier and Bouveault Synthesis.
	CH-609: Organic	1.	Determination of functional group of organic compound
	Chemistry		from given IR spectra.
	Practical-II	2.	Estimation of glucose
		3.	Caffeine from tea leaves
	CH610(Chemistry	1.	Know the different components and properties of soil.
	of Soil And	2.	Know classification of soil on the basis of pH.
	Agrochemicals)	3.	Identify the problematic soil and recommend method for
			their reclamation.
		4.	Know the different plant nutrients required for plants and
			their functions.
		5.	Know the role of various fertilizers and manures required
			for plant growth.
		6.	Know the various methods and their techniques in analysis
			of soil.
		7.	Know importance of manures as compared to chemical
			fertilizers.
		8.	Know various techniques to protect the plants.
		9.	Have the knowledge of various pesticides, insecticides.
		1.	fungicides and herbicides.
	CH-611(A):	1.	Explain different principles involved in the analyses using
	Analytical		solvent extraction, basics of instrumental chromatography
	Chemistry-II		HPLC GC and atomic spectroscopic techniques
		2	Perform quantitative calculations depending upon
		2.	equations students has studied in the theory Furthermore
			student should able to solve problems on the basis of
			theory
		3	Discuss / Describe procedure for different types analyses
		5.	included in the syllabus
		1	Salact particular method of analysis if analyte complete
		4.	scient particular method of analysis if analyte sample is
1 1		1	

M.SC. PART I (CHEMISTRY):

Sr. No		Course	Outcomes
1		CHP-110 Physical Chemistry	 *Realize the terms ionic strength, activity coefficient, DHO equation. *Know the eign function, eign value, operator and postulates of quantum mechanics. *Learn two and three dimensional box, mechanics of particle. * Understand thead sorption of gases by solid type of isotherms * Recognized the Fricke and cerricsulphate Dosimeter. * Learn parent-daughter relationship, application of radioactivity, NAA, IDA, Effect of radiation and units of radiation.
2	M.Sc. Part I Organic Chemistry	CHI-130 Inorganic Chemistry	 *Determine and Learn about Dipole moment and bond order of the inorganic molecule. *Learn about geometry and shape of the molecule. *Known the preparation and properties of transition metal carbonyls * To understand the 18 electron rule and its application. * Find out the point group of inorganic molecules. * Learn molecular orbital and its orientation. *learn concept of symmetry elements in molecules.
3	Semester-1 (Theory)	CHO-150 Organic Chemistry	 *Learn SN1, SN2 and SNi Mechanism and stereochemistry. *Learn classical and non-classical carbocation, NGP bypi and sigma bonds. *Solve th elimination problems. *Distinguish between type of addition, elimination and substitution reaction. Learn E and Z nomenclature in C, N, S, P containing compound, Stereo chemical principal enantiomeric relationship R and S
4		CHA-190 General Chemistry	 *study the importance of safety and security, responsibility types of hazards and risk in chemical laboratory. *Understand the use of personal protective and other safety equipments, handling of chemical inlaboratory. *Underst and the route of exploser for toxic chemicals. *Learn good laboratory practices and it sapplications.
5	M.Sc. Part I Organic Chemistry. Semester-I Practical's	CH-P-1 Physical Chemistry Practical's	*Calculate molar and normal solution of various concentrations. *determine specific rotations and percentage of to optically active substances by polorimetrically. *Study the energy of activation and second order reaction. *study the stability of complex ion and stranded free energy change and equilibrium constant bypotentiometry. Find out the acidity, Basicity and PKa Value on pH meter.
6		CH-I-1 Inorganic Chemistry practical's	*Study the gravimetric and volumetric analysis of ore sand alloy. *Prepare a various inorganic complexes and determine its %purity. *Preparation of non material. *To understand the chromatographic techniques.
7		CH-O-1 Organic Chemistry practical's	*perform the ternarymixtures. *Preparation of organic compounds, their purifications and run TLC. * Determination of physical constant: Melting point,Boiling point. * Different separation techniques.

Sr. No.		Course	Outcomes
1		CHP-210 Physical	*Learn the thermodynamic description of exact, inexact differential and state function
		Chemistry	*Know the qualitative properties of solution, the depression in
			*Know the statistical thermodynamics and various partition
			function. *Study the steady state approximation michaelis- menten
			mechanism, lindemann-hinshelwood mechanism, chain reaction,
			*Learn the molecular spectroscopy, R. Raman, Electronic and Mossbauer and its application
2	M.Sc.	CHI-230	*Understand the mechanism in transition metal complexes,
	Part I	Inorganic	Born Haber cycle to calculate lattices energy.
	Organic	Chemistry	*Learn the use of catalyst, radius ratio rule of coordination number $3 4$
	Chemistry.		*Study the structure of atom. Hunds rule, term symbol.
	Semester-		calculation of microstate and selection rule.
	II (I neory)		*Understand the metal complexes in biological system.
3		CHO-250	*Studied the various name reaction with examples.
		reaction	*Learn the mechanism of rearrangement reaction, use
		synthetic	problems
		Órganic	*Understand the factors affecting UV-absorption spectra,
		Chemistry	Interpret IR-spectra on basic values of IR-frequencies.
		Spectroscopy	*Discuss the problem of UV, IR and NMR.
4		CHA-290	*Study the instrumentation, sample injection system, columns for
		General	HPLC and GC, Solvent treatment system and choice of mobile
		Chemistry	pnase. *Learn instrumentation of mass spectrometry
			fragmentation, structure determination.
			*Solve mean and standard deviation problems.
			*Understand the accuracy and precision and classification error.
			*Learn distillation, solvent extraction, crystallization, and
5	M Sc	CH-P-1	*Calculate molar and normal solution of various concentrations.
5	Part I	Physical	*Determine specific rotations and percentage of to optically
	Organic	Chemistry	active substances by polorimetrically.
	Chemistry.	Practical's	*Study the energy of activation and second order reaction.
	Semester-II		*Study the stability of complex for and stranded free energy change and equilibrium constant by
	(Practical's)		potentiometry.
			Find out the acidity, Basicity and PKa Value on pH meter.
6		CH-I-1	*Study the gravimetric and volumetric analysis of ores and alloy.
		Inorganic	*Prepare a various in organic complexes and determine its %
		Chemistry	Purity. *Preparation of nonmaterial
		practical's	*To understand the chromatographic techniques.
7		CH-O-1	*Perform the ternary mixtures.
		Organic	*Preparation of organic compounds, their purifications and run
		Chemistry Practical's	1LU. * Determination of physical constant: Melting point Roiling point
		i factical s	* Different separation techniques.

M.SC. PART II (ORGANIC CHEMISTRY):

Sr. No.		Course	Outcomes
1	M.Sc. Part- II Organic Chemistry Semester-	CHO-350 Organic reaction mechanism CHO-351 Spectroscopic methods in structure determination.	 *Study of carbanion-formation, stability and related name reaction, enamines and its applications. *Understand the NGP. *Learn the carbines and nitrenes. *Study of free radicals: generation of radicals, Nucleophilic electrophilic radicals, inter and intramolecular C-C bond formation via mercuric hydride. *Study of oxidative coupling and SNA rreaction. *Study of oxidative coupling and SNA rreaction. *Study of near protons bonded to carbon and other nuclei. *Study of ¹³C NMR spectroscopy: FT- NMR, type of ¹³C NMR spectra, proton decoupled, off resonance, APT, INEPT, DEPT, Chemical shift, nuclear and heteronuclear coupling constant *2D NMR techniques: COSY, homo and hetero nuclear 2D resorts spectroscopy,NOESY and the applications *Study of mass spectrometry: Instrumentation, various methods of is prior of the spectro.
	III (Theory)		fragmentations of different Functional groups.
3		CHO-352 Organic stereochemistry	*Study of stereochemistry of six member ring. *Learn the stereochemistry of rings other than six members. *Understand fused bridge and Caged rings. *Learn resolution of racemic modification, stereochemistry of organic compound using NMR. *Determine geometrical isomerism and stereochemistry of olefins.
4		CHO-353 Photochemistry, Pericyclic reaction and heterocyclic chemistry.	 *Study of photochemistry: Carbonyl compounds, alkenes, dienes, polyenes and aromatic compounds. *Study photo rearrangement Barton reaction, application of photochemical reaction. * Learn Pericyclic reaction: Electro cyclic, Cycloaddition, Ene Reaction, analysis by correlation diagram, FMO approach and ATS concept. *Study of heterocyclic chemistry: Five and six member heterocyclic with one or two heteroatoms. *Understand condensed five and six member's heterocyclic. *Study the synthesis, reactivity, aromatic character and importance of heterocyclic compounds.
5	M.Sc. Part- II Organic Chemistry Semester - III (Practical's)	CHO-354: Practical-I Solvent Free Organic Synthesis	* The students should perform any 24 Syntheses from the given list. * Students should acquire pre-experiment (Reading MSDS, purification of reactants and reagents, mechanism, stoichiometry etc) and post- experiment skills (work-up, isolation and purification of products, physical constants characterization using any spectroscopic methods etc.)

Sr. No.		Course	Outcomes
1		CHO-450 Chemistry of Natural Product	*Understanding and planning of total synthesis while maintaining the stereochemistry. A case study: Longifolene, Hirsutellone B, Ribisins A and B, Vannusals and Pinnaic acid.
2		CHO-451 Advance Synthetic Organic Chemistry	*Study of transition metal complexes inorganic synthesis. * Learn C=C formation reaction, multi compound reaction, ring formation reaction. *Study of sharpless azides Cycloaddition, use of boron and silicon in organicsynthesis.
3	M.Sc. Part-II Organic Chemistry Semester- IV (Theory)	CHO-452 Carbohydrate and chiral approach, chiral drugs and medicinal chemistry. CHO-453 Designing	 *Study of carbohydrates: Introduction of sugar, structure of triose tetrosa, panctose, hexoes, stereochemistry of glucose. *Understand the chiral approach, concept of chiral templates, and utilization of the basic concept for reterosynthetic strategy. *Study of chiral drug. *Learn medicinal chemistry, the action and discovery. *Study the structure activity and drug targets. *Study of antimicrobial drugs, antibacterial, antifungal, antiviral, antimalarial etc. *Study the design of organic synthesis, protection deprotation of hydroxyl, katonas andaldabyda
5	M.Sc. Part-II Organic Chemistry	organic synthesis and asymmetric synthesis. CHO-453: Practical-III: Select ANY TWO Section I,	 *Learn reterosynthesis. *Understand the principle and application of asymmetric synthesis. *Study of cram's rule, felkin-Anh rule, Cram's chelate model asymmetric synthesis using chiral reagent. * Understand and employ concept of type determination and separation * Meticulously record physical constants * Perform micro scale chemical elemental analysis * Perform qualitative estimation of functional groups * Recrystallize /distill the separated compounds
6	Semester- IV (Practical's)	II and III CHO-454: Practical-II: Convergent and Divergent Organic Syntheses	 Extend these skills to organic synthesis * Students should acquire pre-experiment (Reading MSDS, purification of reactants and reagents, mechanism, stoichiometry etc) and post-experiment skills (work-up, isolation and purification of products, physical constants characterization using any spectroscopic methods etc.)

M. SC. PART II (ANALYTICAL CHEMISTRY):

Sr.	Class	Course	Outcome	
No		course		
1.	M.Sc. II Analytical	CHA-390 Electrochemical	1. Define various terms in electrochemistry and thermogravimetry.	
	Chemistry	and Thermo -	2. Explain instrumentation in electrochemistry and thermogravimetry	
	III	Methods of	3. describe basic principles of electrochemistry and thermogravimetry	
	(Theory)	Analysis	4. Explain /Describe applications of electrochemistry and thermogravimetry in industry and in analytical laboratory.	
			5. Apply / select particular method of analysis for sample to be analysed.	
			6. Solve numerical problems on electrochemistry and thermogravimetry.	
			7. Interpret polarogram, cyclic voltammogram, pulse polarogram thermogram differential thermogram and DSC.	
			thermogram. 8 Differentiate among the various methods of electrochemistry	
			and thermogravimetry.	
2.	M.Sc. II	CHA-391	1. Define / understand various terms in analytical extraction and	
	Analytical	Analytical	method development and validation.	
	Chemistry	Method	2. Explain instrumentations and methodology in analytical	
	Semister-	Development	Development extraction.	
	III	and Extraction	method development and validation.	
	(Theory)	Techniques	4. Explain /Describe applications analytical extraction and	
			method development and validation in industry and in analytical	
			laboratory.5. Apply / select particular method of analysis for sample to be	
			analysed.6. Solve numerical problems on analytical extraction and method	
			development and validation.	
			7. Develop analytical method for analysis of given sample. Apply statistical treatment to the analytical data. Select appropriate	
			parameters for the development of analytical method	
2	M Co II		 b. Differentiate among the methods of analytical extraction. Define (understand various terms in abromatography (CC and 	
5.	M.SC. II Analytical	CHA-392	HPLC) and mass spectroscopy.	
	Chemistry	vitcal Advanced nistry Chromatographi ister- c Methods of Analysis ory)	2. Explain instrumentations in chromatography (GC and HPLC)	
	Semister-		and mass spectroscopy.	
	III		3. Explain / describe i) basic principles of chromatography (GC	
	(Theory)		and HPLC) and mass spectroscopy. 11) separation in GC / HPLC	
			detectors.	
			4. Explain /Describe applications chromatography (GC and	
			HPLC) in industry and in analytical laboratory.	
			5. Apply / select particular method / instrumental parameters for analysis for sample GC / HPLC.	
			6. Solve numerical problems on chromatography (GC and	
			HPLC) and mass spectroscopy.	
			8. Differentiate among the chromatography (GC and HPLC)	

			methods of analysis.
4.	M.Sc. II Analytical Chemistry Semister- III (Theory)	CHA-393 A) Bioanalytical Chemistry	 Define / understand various terms in Electrophoresis, capillary electrophoresis, HPTLC, Body fluid analysis, ELISA, RIA. Explain instrumentations in in Electrophoresis, capillary electrophoresis, HPTLC, Body fluid analysis, ELISA, RIA. Explain / describe i) basic principles of chromatography (GC and HPLC) and mass spectroscopy. ii) Separation in GC / HPLC column. iii) Functioning and construction of GC / HPLC/ MS detectors. Explain /Describe applications chromatography (GC and HPLC) in industry and in analytical laboratory. Apply / select particular method / instrumental parameters for analysis for sample GC / HPLC. Solve numerical problems on chromatography (GC and HPLC) and mass spectroscopy. Integrate GC and HPLC chromatogram, Mass spectrum Differentiate among the chromatography (GC and HPLC) methods of analysis.
5.	M.Sc. II Analytical Chemistry Semister- III (Practical)	CHA-394 CCPP3: Practical I: Basics of Instrumental Methods of Chemical Analysis	 Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals, instruments, etc safely in laboratory. Define / understand various terms involved practical methods of quantitative analysis. Explain instrumentations of colorimeter, spectrophotometer, photoflurometer, TGA, HPLC, GC, Flame-photometer, CV, AAS, etc. Explain / describe basic principles of chromatography different instrumental methods of analysis. Able to handle particular instrument according to SOP. Design / modify and validate new analytical method for chemical analysis of particular sample. Apply / select particular method / instrumental parameters for analysis of given sample. Give mathematical treatment to analytical data and able to interpret the results accurately. Verify theoretical principle practically or apply theory to explain practical observations. To conclude the results able to take the decision regarding quality of sample.
6.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-490: Advanced Analytical Spectroscopic Techniques	 Define / understand various terms in atomic absorption, atomic emission, fluorescence, ESR and electron spectroscopy. Explain instrumentation of atomic absorption, atomic emission, ICPAES, ICPAES-MS, fluorescence, ESR and electron spectroscopy. To describe basic principles of atomic absorption, atomic emission, ICPAES, ICPAESMS, fluorescence, ESR and electron spectroscopy. Select appropriate methods for sample treatment in AAS / AES, ICPAES, ICPAES-MS. Explain advantages of ICPAES-MS over AES spectroscopy, fluorescence spectroscopy. Solve numerical problems on analysis all these spectroscopic methods. Interpret ESR spectra, super hyperfine splitting and g value in

			ESR, and parameters affecting it.
			8. Calculate theoretical parameters from ESR data and
			characterize compound.
			9. Solve problems based on atomic absorption, atomic emission,
			ICPAES, ICPAES-MS, fluorescence, ESR and electron
			spectroscopy.
7.	M.Sc. II	CHA-491:	1. Define / understand various terms in pharmaceutical raw
	Analytical	Chemical	material and finished product analysis.
	Chemistry	Methods of	2. Explain various pharmaceutical dosage forms and types of raw
	Somistor	Pharmaceuticals	materials used.
	Semister-	Analysis	3. To describe basic principles of methods of pharmaceutical
			analysis according to IP.
	(Theory)		4. Explain importance particular test in pharmaceutical raw
			material and finished product analysis.
			5. Perform and explain importance of limit tests, identification
			tests and micobiological limit test of raw materials and finished
			products.
			6. Solve numerical problems on analysis pharmaceutical raw
			material and finished product analysis.
			7. Interpret IR spectra, HPLC chromatogram, UV-Visible spectra
			of pharmaceutical materials.
			8. To perform total analysis of pharmaceutical raw material and
			finished product analysis according to IP / BP / USP.
			9. Standardize analytical instruments according IP /BP/ USP.
			10. Take a decision on the basis of analytical results regarding
			quality of raw materials so that material can be accepted for
			production or rejected.
8.	M.Sc. II	CHA-492: B)	1. Define / understand various terms in soil analysis, pesticide
8.	M.Sc. II Analytical	CHA-492: B) Analytical	1. Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis.
8.	M.Sc. II Analytical Chemistry	CHA-492: B) Analytical Chemistry of	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis,
8.	M.Sc. II Analytical Chemistry Semister-	CHA-492: B) Analytical Chemistry of agriculture, Polymon and	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis
8.	M.Sc. II Analytical Chemistry Semister- IV	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis detergent analysis and polymer
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Fxplain importance of soil analysis pesticide residue analysis
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue,
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue,
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A:	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II Analytical	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A: Optional	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results. Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals,
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II Analytical Chemistry	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A: Optional Analytical	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results. Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals, instruments, etc safely in laboratory.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II Analytical Chemistry Semister-	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A: Optional Analytical Chemistry	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results. Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals, instruments, etc safely in laboratory. Define / understand various terms involved practical methods
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II Analytical Chemistry Semister- IV	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A: Optional Analytical Chemistry Practical OR	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results. Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals, instruments, etc safely in laboratory. Define / understand various terms involved practical methods of quantitative analysis.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II Analytical Chemistry Semister- IV	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A: Optional Analytical Chemistry Practical OR CHA-493-B:	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results. Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals, instruments, etc safely in laboratory. Define / understand various terms involved practical methods of quantitative analysis.
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II Analytical Chemistry Semister- IV (Practical)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A: Optional Analytical Chemistry Practical OR CHA-493-B: Project	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results. Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals, instruments, etc safely in laboratory. Define / understand various terms involved practical methods of quantitative analysis. To analyse organic and inorganic materials using appropriate chemical / instrumental methods
8.	M.Sc. II Analytical Chemistry Semister- IV (Theory) M.Sc. II Analytical Chemistry Semister- IV (Practical)	CHA-492: B) Analytical Chemistry of agriculture, Polymer and Detergents CHA-493-A: Optional Analytical Chemistry Practical OR CHA-493-B: Project	 Define / understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain / describe techniques / methods of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. To describe basic principles techniques / methodssoil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Explain importance of soil analysis, pesticide residue analysis, detergent analysis and polymer analysis. Choose suitable method / techniques to characterize quality of soli polymer and detergent. Describe / explain results of analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Solve numerical problems on analysis soil, pesticide residue, detergent and polymer. Draw conclusion regarding soil, detergent and polymer quality from analytical results. Maintain proper record of analytical data in notebook. Observer personal safety in laboratory and able handle all chemicals, instruments, etc safely in laboratory. Define / understand various terms involved practical methods of quantitative analysis. To analyse organic and inorganic materials using appropriate chemical / instrumental methods Explain / describe basic principles of chemical / instrumental methods used for analysis.

			according to SOP
			4 Perform analysis of sample with described procedure. Able to
			handle analytical instruments
			5 Apply / select particular method / instrumental parameters for
			analysis of given sample
			6 Maintain appropriate reaction conditions as described in
			o. Maintain appropriate reaction conditions as described in
			7. The market market is a lastice and lastice for articular second former forme
			7. To perform 1) selective analysis of particular component from
			sample. 11) Analysis at trace level from sample.
			8. To conclude the results able to take the decision regarding
			quality of sample.
			9. To perform calculations and interpret the results.
		CHA-493-B:	1. Maintain proper record of analytical data in note book for
		Project	research purpose.
			2. Perform review of literature related to the topic of project work
			and design the problem for project work. 3. Decide and describe
			methodology for problem to solve proposed problem in the form
			of project. Decide and perform application of research work.
			4. To design experiment for research work. Collect the resources,
			design small equipment, etc. for completion of research work.
			5. Collect experimental data (raw data) and analyse the data in
			the perspective of problem. Present data in graphical forms for the
			conclusive results.
			6. Use computer as a tool for result analysis, presentation and
			writing the project.
			7. To obtain concrete conclusion from the results on the basis of
			reported theory / research work and analytical results.
			8. To perform report writing, scientifically.
			9. To write research project / paper in scientific manner
10	M.Sc. II	CHA-494:	1. Maintain proper record of analytical data in notebook. Observer
10	Analytical	Practical II:	personal safety in laboratory and able handle all chemicals,
•	Chemistry	Applied	instruments, etc safely in laboratory.
	Somistor	Analytical	2. Define / understand various terms involved practical methods
	Semister-	Chemistry	of quantitative analysis.
	IV		3. To analyse organic and inorganic materials using appropriate
			chemical / instrumental methods
	(Practical)		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
			6 Apply / select particular method / instrumental parameters for
			analysis of given sample
			7 Maintain appropriate reaction conditions as described in
			recedures
			8 To perform i) selective analysis of particular component from
			sample ii) Analysis at trace level from sample
			9. To conclude the results able to take the decision recording
			auality of sample
			10 To perform calculations and interpret the results
			10. To perform calculations and interpret the results.

Class: FYBSc

Course Title	Basics of Applied Electronics	
CODE	EL- 111	
CO No.	Course Outcomes	
CO-1	To identify different parameters/functions/specifications of components used in electronic circuits	
CO-2	To solve problems based on network theorems.	
CO-3	To perform simulations using simulator for analyzing network performance	

Course Title	Electronic Devices and Circuits	
CODE	EL- 112	
CO No.	Course Outcomes	
CO-1	To analyze performance parameters based on study of characteristics of electronic	
	devices like diode, transistors etc	
CO-2	To choose proper electronic devices as per the need of application	
CO-3	To perform simulations for designing and analyzing diode/transistor circuits	
CO-4	To build and test the circuits like street light controller using electronic devices	

Course Title	ELECTRONICS LAB IA	
CODE	EL- 113	
CO No.	Course Outcomes	
CO-1	To identify different components and devices as well as their types	
CO-2	To understand basic parameters associated with each device	
CO-3	To know operation of different instruments used in the laboratory	
CO-4	To connect circuit and do require performance analysis	
CO-5	To compare simulated and actual results of given particular experiment	

Course Title	Fundamentals of Digital Electronics
CODE	EL- 121
CO No.	Course Outcomes
CO-1	To solve problems based on interconversion of number systems
CO-2	To reduce the expression using Boolean theorems
CO-3	To reduce expressions using K maps in SOP and POS forms
CO-4	To understand how to use flip flops to build modulus counter
CO-5	To familiarize with applications of counters like ring counter or event counter

1

Course Title	Analog and Digital Device applications	
CODE	EL- 122	
CO No.	Course Outcomes	
CO-1	To know basics of operational amplifier	
CO-2	To compare performance parameters of opamp ICs available in market	
CO-3	To understand basic application circuits of opamp	
CO-4	To basics of timer IC 555 and its applications	
CO-5	To understand data converters and their performance parameters.	

Course Title	ELECTRONICS LAB IB	
CODE	EL- 123	
CO No.	Course Outcomes	
CO-1	To connect opamp circuits and analyze the output	
CO-2	To build application circuits of opamp	
CO-3	To design the output frequency of IC 555 as a stable/monostable multivibrator	
CO-4	To compare simulated and actual results of given circuit	

Class: SYBSc

Course Title	Communication Electronics
CODE	EL- 231
CO No.	Course Outcomes
CO-1	Understand different blocks in communication systems, types of noise in communication systems and its different parameters
CO-2	Understand need of modulation, modulation process and amplitude modulation and demodulation methods
CO-3	Analyze generation of FM Modulation and demodulation methods and comparison between amplitude and frequency modulation
CO-4	Identify different radio receivers and their performance parameters.
CO-5	Solve problems based on AM and FM performance parameters
CO-6	Compare pulse modulation techniques such as PAM, PPM, PWM and compare TDM and FDM techniques used in communication
CO-7	Understand need of sampling and sampling theorem as well as know about performance parameters of digital communication
CO-8	Analyze difference between ASK, FSK, PSK as well as PCM and its applications

Course Title	Digital Circuit Design
CODE	EL- 232
CO No.	Course Outcomes
CO-1	Distinguish between different logic families based on their performance parameters
CO-2	Analyze basic combinational logic circuits for simple applications
CO-3	Design combinational logic circuits using K maps for identified applications
CO-4	Design Sequential logic circuits using state diagram, excitation table for identified applications
CO-5	Understand and compare different types of ADC and their performance parameters using data sheets/manuals
CO-6	Understand and compare different types of DAC and their performance parameters using data sheets/manuals

Course Title	Practical Course
CODE	EL- 233
CO No.	Course Outcomes
CO-1	Describe and explain the techniques of generation of AM/ FM and demodulation
CO-2	Design FSK generation using standard IC XR 2206 referring data manuals
CO-3	Describe and explain the TDM/ FDM generation technique
CO-4	Demonstrate PPM/PWM/PAM and PCM techniques using standard circuits in data manuals
CO-5	Demonstrate PPM/PWM/PAM and PCM techniques using standard circuits in data manuals

Course Title	Analog and Digital Device applications
CODE	EL- 241
CO No.	Course Outcomes
CO-1	Design single/multistage amplifier using transistor and analyze their frequency
	response base on gain-bandwidth product due to coupling /bypass capacitors
CO-2	Classify and compare different power amplifiers
CO-3	Understand and design push pull amplifier and need of heat sinks
CO-4	Distinguish between Opamp Feedback circuits based on their configurations
CO-5	Analyze the effect of negative and positive feedback on characteristics of Opamp.
CO-6	Understand and analyze the need of positive feedback in oscillator circuits
CO-7	Design, develop and build circuits for identified applications

Course Title	Microcontroller and Python Programming
CODE	EL- 242
CO No.	Course Outcomes
CO-1	Identify the features and architectural details of microcontroller(arduiono)
CO-2	Write code/program using open-source programming language(ardiuno) for basic identified applications
CO-3	Understand programming basics of python programming language
CO-4	Design, build and implement applications using ardiuno and python
CO-5	Understand special features of python programming language such as importing modules, directory, tupules

Course Title	ELECTRONICS LAB IB
CODE	EL- 243
CO No.	Course Outcomes
CO-1	Describe and explain the design procedure of different types of active filters and analyze its frequency response
CO-2	Demonstrate positive feedback for oscillator circuits using standard ICs
CO-3	Design practical circuits for identified applications
CO-4	Develop working setup and write programs using programming techniques of Arduino
CO-6	Demonstrate and explain interfacing hardware to arduino microcontroller
CO-7	Solve problems using programming techniques of python

Class: TYBSc

CourseTitle	Digital Design using VERILOG
CODE	EL 351
CO No.	Course Outcomes
CO-1	Know and understand structure of HDL and Verilog.
CO-2	Understand different modeling styles in Verilog.
CO-3	Use Verilog effectively for simulation, verification and synthesis of digital system
CO-4	Understand basics of programmable logic devices.

CourseTitle	Microcontroller Architecture and Programming
CODE	EL 352
CO No.	Course Outcomes
CO-1	Understand the basics of microcontroller.
CO-2	Acquire basic programming skills in C language.
CO-3	Understand and acquire basic programming skills for AVR microcontroller

CourseTitle	Analog circuit Design and Applications
CODE	EL 353
CO No.	Course Outcomes
CO-1	Understand basics of analog circuit design.
CO-2	Analyze waveform generators required for testing different circuits.
CO-3	Build application circuits using specialized ICs.
CO-4	Design analog systems using available ICs.

CourseTitle	Nanoelectronics
CODE	EL 354
CO No.	Course Outcomes
CO-1	Understand basic concepts of nano electronic devices and nano technology
CO-2	Understand the electron transport mechanism in nanostructures.
CO-3	Understand techniques of characterization of nanostructures.
CO-4	Understand different devices constructed using nanotechnology.

CourseTitle	Signals and Systems
CODE	EL 355
CO No.	Course Outcomes

CO-1	Know basics of electronic signals.
CO-2	Know different types of systems.
CO-3	Analyze systems using Laplace and Fourier analysis.
CO-4	Understand digital signal processing system

CourseTitle	Optics and Fiber Optic Communication
CODE	EL 356
CO No.	Course Outcomes
CO-1	To acquire Knowledge of optical fiber communication system.
CO-2	To understand different parameters of optical fibers.
CO-3	To learn essential optical components of Fiber Optic Communication.
CO-4	To analyze and integrate fiber optical network components in variety of networking schemes.

CourseTitle	Practical Course I
CODE	EL 357
CO No.	Course Outcomes
CO-1	Analyze different design and test procedures for analog circuits and systems
CO-2	Measure different parameters of optical fiber communication systems
CO-3	Understand importance of product design and entrepreneurship
CO-4	Develop electronic systems for given application.

CourseTitle	Practical Course II
CODE	EL 358
CO No.	Course Outcomes
CO-1	Develop and simulate design digital systems using Verilog.
CO-2	Design and develop AVR microcontroller-based systems.
CO-3	Understand different nanoelectronics devices.
CO-4	Inculcate basic skills required for design and development of embedded Systems.

CourseTitle	Practical Course III(Project)
CODE	EL 359
CO No.	Course Outcomes

CO-1	Understand basic methodology of selection of topic for project.
CO-2	Understand how to do literature review for selected topic for project.
CO-3	Apply the knowledge for design and development of the selected project.
CO-4	Use different software and hardware for testing, validation and verification of circuits for successful outcome of project.
CO-5	Understand documentation process in the form of presentation and project Report.
CO-6	Understand process of systematic development of electronic system and Development of skills for successful outcome

CourseTitle	SEC1: Electronic Design Automation Tools
CODE	ELSEC 351
CO No.	Course Outcomes
CO-1	Design the electronics circuits using EDA software tools.
CO-2	Simulate various analog and digital circuits using EDA software tools
CO-3	Plot various waveforms.
CO-4	Simulate basic electronic system blocks

CourseTitle	SEC2: Internet of Things and Applications
CODE	ELSEC 352
CO No.	Course Outcomes
CO-1	Know the basic building blocks of IoT
CO-2	Know IoT protocols
CO-3	Understand how to Design and Develop IoT based system through case studies.

CourseTitle	Modern Communication Systems
CODE	EL 361
CO No.	Course Outcomes
CO-1	Understand the digital modulation techniques.
CO-2	Understand different types of pulse modulation techniques.
CO-3	Describe the evolution and importance of Mobile communication and cellular communication.
CO-4	Know the basics of satellite communication systems

CourseTitle	Embedded System Design using Microcontrollers
CODE	EL 362
CO No.	Course Outcomes

CO-1	Understand features and architecture of PIC microcontroller
CO-2	Demonstrate how to interface PIC microcontroller with different peripherals
CO-3	Understand features and architecture of ARM microcontroller
CO-4	Demonstrate embedded system using given microcontroller

CourseTitle	Industrial Electronics
CODE	EL 363
CO No.	Course Outcomes
CO-1	Understand basics of semiconductor power devices.
CO-2	Analyze basic power electronics circuits and demonstrate applications.
CO-3	Understand basics of motor control
CO-4	Understand basics of Electric Vehicle systems

CourseTitle	Manufacturing Processes for Electronics
CODE	EL 364
CO No.	Course Outcomes
CO-1	Understand basics of Passive Electronic Component Manufacturing Processes
CO-2	Understand process involved in PCB manufacture and Modern Circuit Assembly
CO-3	Know about the Semiconductor Device and IC Fabrication Process.

CourseTitle	Process Control Systems	
CODE	EL 365	
CO No.	Course Outcomes	
CO-1	Familiar with different types of sensors and related systems	
CO-2	Know different types of measurement systems	
CO-3	Understand control parameters in process automation	
CO-4	Understand different types of process control systems and their characteristics.	

CourseTitle	Sensors and Systems	
CODE	EL 366	
CO No.	Course Outcomes	
CO-1	Understand basic principles and types of different sensors	
CO-2	Understand basic principles and types of actuators	
CO-3	Know about signal conditioning systems for sensors.	

CourseTitle	Practical Course I
CODE	EL 367
CO No.	Course Outcomes

8

CO-1	Demonstrate power electronic circuits.
CO-2	Understand process involved in PCB manufacture and Modern Circuit Assembly
CO-3	Know about the Semiconductor Device and IC Fabrication Process.

CourseTitle	Practical Course II	
CODE	EL 368	
CO No.	Course Outcomes	
CO-1	Design embedded systems using PIC microcontroller	
CO-2	Design embedded systems using ARM microcontroller	
CO-3	Demonstrate PLC SCADA using ladder programming	
CO-4	Design and develop sensor systems for different applications	

CourseTitle	Practical Course III		
CODE	EL 369		
CO No.	Course Outcomes		
CO-1	Understand basic methodology of selection of topic for project.		
CO-2	Understand how to do literature review for selected topic for project,		
CO-3	Apply the knowledge for design and development of the selected project.		
CO-4	Use different software and hardware for testing, validation and verification of circuits for successful outcome of project		
CO-5	Understand documentation process in the form of presentation and project Report		
CO-6	Understand process of systematic development of electronic system and Development of s kills for successful outcome		

CourseTitle	Design of Printed Circuit Boards	
CODE	ELSEC 361	
CO No.	Course Outcomes	
CO-1	Understand basics of PCB.	
CO-2	Know about the PCB design technology.	
CO-3	Know about different soldering techniques.	

CourseTitle	Mobile Application Development
CODE	ELSEC 362
CO No.	Course Outcomes
CO-1	Understand basics of Mobile application development.
CO-2	Develop ability to work in android development environment.
CO-3	Know about the Semiconductor Device and IC Fabrication Process.

Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College, Manchar

Department of Mathematics

Course Outcomes of Offered Courses:

Sr.No.	Course	Course Outcomes
1 1	F.Y.B.ScAlgebra and Analytical Geometry	 Course Outcomes Upon successful completion of this course the student will be able to: Solve results involving divisibility and greatest common divisors; Solve systems of linear equations Apply Euler-Fermat's Theorem to prove relations involving prime numbers; Polynomial addition, subtraction, division, multiplication, roots of polynomials. Transformation, translation and reflection:
2	F.Y.B.Sc Calculus I and Calculus II	 To find nature of general conics. Find equation of spheres, cylinders and cones Upon successful completion of this course the student will be able to:
		 Prove simple identities and inequalities Be able to calculate limits Be able to calculate limits at infinity Be able to discuss the continuity Be able to calculate limits in

			indeterminate forms by a repeated use
			of L'Hospital's rule
		•	Be able to use derivatives to find
			intervals on which the given function is
			increasing or decreasing
		٠	Understand the concept of Differential
			Equation
		•	Be able to use Differential Equation to
			find Orthogonal Trajectories.
3	S.Y.B.Sc. (Sem III)	Upon su	uccessful completion of this course the
	Calculus of several variables	student	will be able to:
		٠	Compute domain and range of functions
		٠	Draw level curves of functions
		٠	Find limits and continuity of functions
		٠	Find partial derivatives
		٠	Find higher derivatives
		٠	Compute chain rule in differentiation
		٠	Define functions of several variables
			and their limits
		•	Calculate the partial derivatives of
			functions of several variables
		•	Apply the chain rule for functions of
			several variables
		٠	Calculate the gradients and directional
			derivatives of functions of several
			variables
		٠	Solve problems involving tangent
			planes and normal lines
		•	Determine the extrema of functions of
			several variables
		•	Use the Lagrange multiplier method to
			find extrema of functions with
			constrains.

4	S.Y.B.Sc. (Sem III)	On successful completion of this course unit
	Numerical methods and its Applications	students will be able to:
		• Find errors
		• To rounding off numbers n significant
		digits, to n decimal places.
		• To find Solution of Algebraic and
		Transcendental Equations.
		• Use Interpolation to fit tabular data in
		algebraic equation.
		• Fit straight line, second degree
		polynomial from tabular data.
		• Find area under the curve by using
		Numerical Integration.
		• Find solution of first order ordinary
		differential equations.
5	S.Y.B.Sc. (Sem IV)	On successful completion of this course unit
	Linear Algebra	students will be able to:
		• Understand the basic ideas of vector
		algebra: linear dependence and
		independence and spanning;
		• Know how to find the row space,
		column space and null space of a
		matrix, and be familiar with the
		concepts of dimension of a subspace
		and the rank and nullity of a matrix, and
		to understand the relationship of these
		concepts to associated systems of linear
		equations;
		• Be familiar with the notion of a linear
		transformation and its matrix;
		• Find the Gram-Schmidt
		orthogonalization of a matrix.

6	S.Y.B.Sc. (Sem IV)	On successful completion of this course unit
	Vector Calculus	students will be able to:
		• Find limit and continuity of vector
		valued functions
		• Find derivatives of vector valued
		functions
		• Find integrals of vector valued
		functions
		• Find arc length along a space curve
		• Find line integral of scalar functions
		• Find line integrals of vector fields
		• Find work done and flow
		• Study divergence theorem, stokes
		theorem
		• Find surface integrals
7	T.Y.B.Sc. (Sem V)	The course will enable the students to:
	Metric space	• understand the introductory concepts
		of metric spaces
		• correlate these concepts to their
		counter parts in modern analysis by
		studying examples
		• learn to analyze mappings between
		spaces
		• attain background for advanced
		courses in real analysis, functional
		analysis, and topology.
		• appreciate the abstractness of the
		concepts such as open balls, closed
		balls, compactness, connectedness etc.
		beyond their geometrical
		imaginations.

8	T.Y.B.Sc. (Sem V)	By the end of the course, students will be able
		to:
	Real Analysis I	• learn the basic facts in logic and set
		theory
		• learn to define sequence in terms of
		functions from N to a subset of R and
		to understand several properties of the
		real line
		• recognize bounded, convergent,
		divergent, Cauchy and monotonic
		sequences and to calculate their limit
		superior, limit inferior, and the limit
		of a bounded sequence
		• use the ratio, root, alternating series
		and limit comparison tests for
		convergence and absolute
		convergence of an infinite series of
		real numbers
9	T.Y.B.Sc. (Sem V)	On completion of this unit successful students
		will be able to:
	Group theory	• recognize the mathematical objects
		that are groups, and classify them as
		abelian, cyclic and permutation
		groups
		• analyze consequences of Lagrange's
		theorem
		• learn about structure preserving maps
		between groups and their
		consequences
		• explain the significance of the notion
		of cosets, normal subgroups, and
		factor groups

10	T.Y.B.Sc. (Sem V)	On completion of this unit successful students
		will be able to:
	Ordinary Differential equation	• understand the genesis of ordinary
		differential equations.
		• learn various techniques of getting
		exact solutions of solvable first order
		differential equations and linear
		differential equations of higher order.
		• 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.
11	T.Y.B.Sc. (Sem V)	The course will enable the students to:
		• Analyze and solve linear
	Operations research	programming models of real-life
		situations.
		• 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.
		• The relationships between the primal
		and dual problems and their solutions
		with applications to transportation,
		assignment and two-person zero-sum
12	TVDSc (Sem V)	game problem.
12		will be able to:
	Number theory	• some of the open problems related to
		prime numbers
		about number theoretic functions and

		modular arithmetic.
		• the Law of Quadratic Reciprocity and
		other methods to classify numbers as
		primitive roots, quadratic residues,
		and quadratic non-residues.
13	T.Y.B.Sc (Sem VI)	Upon successful completion Complex Analysis,
	Complex analysis	a student will be able to:
		• Understand the significance of
		differentiability of complex functions
		leading to the understanding of
		Cauchy-Riemann equations.
		• Evaluate the contour integrals and
		understand the role of Cauchy-
		Goursat theorem and the Cauchy
		integral formula.
		• 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.
		• Represent functions as Taylor, power
		and Laurent series, classify
		singularities and poles, find residues
		and evaluate complex integrals using
		the residue theorem.
14	T.Y.B.Sc (Sem VI)	Upon successful completion of this course,
	Real Analysis II	students will be able to
		• some of the families and properties of
		Riemann integrable functions, and the
		applications of the fundamental
		theorems of integration.
		• beta and gamma functions and their

		properties.
		• recognize the difference between
		pointwise and uniform convergence of
		a sequence of functions.
		• illustrate the effect of uniform
		convergence on the limit function
		with respect to continuity,
		differentiability, and integrability.
15	T.Y.B.Sc (Sem VI)	The course will enable the students to:
	Ring theory	• The fundamental concept of Rings,
		Fields, subrings, integral domains and
		the corresponding morphisms.
		• Learn in detail about polynomial
		rings, fundamental properties of finite
		field extensions, and classification of
		finite fields.
		• Appreciate the significance of unique
		factorization in rings and integral
		domains.
16	T.Y.B.Sc (Sem VI)	Upon successful completion of this course,
	Partial differential equation	students will be able
		• formulate, classify and transform
		partial differential equations into
		canonical form.
		• solve linear partial differential
		equations using various methods and
		apply these methods in solving some
		physical problems.
		• solve Laplace equations using various
		analytical methods demonstrate
		uniqueness of solutions of certain
		kinds of these equations.

17	T.Y.B.Sc (Sem VI)	Upon successful completion of this course,	
	Optimization techniques	students will be able to	
		• understand fundamentals of Network	
		Analysis using CPM and PERT.	
		• solve a sequencing Problem for	
		various jobs and machines.	
10	T V D C - (Com VI)	I have an accepted according of this course	
18	1. Y.B.Sc (Sem VI)	opon successful completion of this course,	
	Computational geometry	students should	
		• construct algorithms for simple	
		geometrical problems.	
		• characterize invariance properties of	
		Euclidean geometry by groups of	
		transformations.	
		• describe and construct basic geometric	
		shapes and concepts by computational	
		means.	
19	Programming in Python	At the end of the course:	
		• The student will be able to explain	
		basic principles of Python	
		programming language.	
		• The student will implement object	
		oriented concepts.	
		• 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.
20	LaTeX for Scientific Writing	After st	tudying this course the student will be
		able to:	:
		•	Write a simple LaTeX input document
			based on the article class.
		•	Turn the input document into pdf with
			the pdflatex program.
		•	Format Words, Lines, and Paragraphs.
		•	Understand how to present data using
			tables.
		•	typeset mathematical formulas, use
			nested list, tabular and array
			environments.
		•	import figures and pictures that are
			stored in external files.

F.Y.B.Sc. Physics

Course: Mechanics and Properties of Matter

After successfully completing this course, the student will be able to:

- CO1: Demonstrate an intermediate knowledge of Newton's Laws and the equations of motion.
- CO2: Analyse the forces on the object and apply them in calculations of the motion of simple systems using the free body diagram.
- CO3: Determine whether using conservation of energy or conservation of momentum would be more appropriate for solving a dynamics problem.
- CO4: Apply the concepts of elasticity to real world problems.
- CO5: List fundamental forces in nature, applications and factors affecting surface tension.
- CO6: Define and conceptualize different laws of fluid mechanics and related quantities like steady, turbulent flow and concept of Reynolds number.
- CO7: Demonstrate different applications of Bernoulli's theorem, laws of elasticity, surface tension.

Course: Physics principles & applications.

After successfully completing this course, the student will be able to:

- CO1: Define absorption, spontaneous emission and stimulated emission process and describe Laser action describe different atomic models in order to understand atomic structure.
- CO2: Classify different types of bonding & their properties.

CO3: Draw electromagnetic spectrum showing different regions and analyze Vibrational & rotational spectra of diatomic molecule.

- CO4: Study the properties of Laser and its applications.
- CO5: Quote essential principles of operation of radar system and develop the radar for any given frequency.
- CO6: Describe principle and construction of solar cell & to calculate efficiency and fill factor of solar cell.

Course: Heat and Thermodynamics

CO1: Define laws of thermodynamics, entropy, thermodynamic processes etc.

- CO2: Carnot engine, concept of entropy.
- CO3: Derive expression for efficiency of heat engine (Otto cycle, Diesel cycle, Carnot cycle), latent heat equation, adiabatic relations for perfect gas, work done during isothermal and adiabatic change.
- CO4: Compare reversible and irreversible processes, adiabatic and isothermal process.
- CO5: Illustrate that work is a path dependent function using PV diagram and to solve entropy for reversible and irreversible process.
- CO6: Apply first law of thermodynamics to solve problems.
- CO7: Categorize thermometers and state its applications.

Course: Electricity and Magnetism

After successfully completing this course, the student will be able to:

- CO1: Define the basic terms such as electric field, electric potential, magnetic intensity, magnetic induction, magnetic susceptibility and electric and magnetic flux.
- CO2: State and conceptualise basic laws in electromagnetic.

CO3: Explain the superposition principle, gauss's law in dielectrics and relation between three electric vectors.

- CO4: Solve numerical problems using Coulombs Law ,Gauss's law, Biot-Savart's law,Ampere circuital law and principle of superposition.
- CO5: Determine the electric field and potential due to an electric dipole and different types of charge distribution.
- CO6: Determine magnetic induction due to various current distributions.
- CO7: Derive the relation between three magnetic vectors and compare different types of magnetic material.
- CO8: Describe soft and hard magnets on the basis of hysteresis loop.

Course: Physics Practical

After successfully completing this course, the student will be able to:

- CO1: Demonstrate an ability to collect data through observation.
- CO2: Acquire technical and manipulative skills in using laboratory equipment, tools and materials.
- CO3: Experimentation and interpreting data.
- CO4: Demonstrate an understanding of laboratory procedures including safety, and scientific methods.
- CO5: Demonstrate a deeper understanding of abstract concepts and theories gained by experiencing and visualizing them as authentic phenomena.
- CO6: Acquire the complementary skills of collaborative learning and teamwork in laboratory settings.

S.Y.B.Sc Physics

PH211 Mathematical Methods in Physics I

After successful completion of the course the student will be able to:

- CO1: Define the basic operations in complex numbers.
- CO2: Explain graphical representation of complex numbers and calculate roots of complex numbers.
- CO3: Solve partial differential equations in Physics.
- CO4: Discuss vector algebra required in Physics.
- CO5: Define and calculate the gradient, divergence and curl of a field.

CO6: Define order, degree and homogeneity of ordinary differential equation.

CO7: Explain singular points of ordinary differential equation.

CO8: Develop problem-solving skills of identifying strategies to solve unfamiliar problem.

PH212 Electronics

After successful completion of the course the student will be able to:

CO1: Define various laws, theorems and basic terms in electronics.

- CO2: Calculate power, voltage or current across or through the particular component of a given circuit using circuit theorems; and able to design a circuit for transistor biasing, rectifier.
- CO3: Describe construction and working of transistor and its applications in current and voltage amplification using different configurations.
- CO4: Describe DC load line and bias point. List, explain, and design and analyze the different biasing circuits.
- CO5: Explain real and ideal characteristics of operational amplifier and calculate gain in different modes.
- CO6: Describe different applications of operational amplifier.
- CO7: Design rectifier circuits, unregulated and regulated power supply.
- CO8: Illustrate data from one number system to another and apply Boolean algebra to design logic circuits.

PHY221 Oscillations, Waves and Sound

After successful completion of the course the student will be able to:

- CO1: Define periodic and oscillatory motion.
- CO2: Setup and solve differential equations of motion for simple harmonic, damped, and forced oscillators.
- CO3: Describe oscillatory motion with graphs and equations, and use these descriptions to solve problems of oscillatory motion.

CO4: Discuss phenomenon of resonance and apply in different applications.

CO5: Set and solve differential equation for wave motion for longitudinal and transverse waves.

CO6: Calculate the phase velocity, energy and intensity of simple harmonic waves.

- CO7: Discuss the Doppler effect, and predict in qualitative terms the frequency change that will occur for relative motion between source and observer or listener.
- CO8: Explain in qualitative terms how frequency, amplitude, and wave shape affect the pitch, intensity, and quality of tones produced by musical instruments.

Course:PHY222 Optics

After successful completion of the course the student will be able to:

- CO1: Describe the geometrical formation of images by thin lenses, lens equation and lens makers formula using fundamental laws of geometrical optics.
- CO2: Use mathematical analysis to calculate properties of image, formed by combination of lenses and applies theory of optics to calculate the cardinal points of an optical system and design optical devices.
- CO3: Describe optical aberrations produced in image by lenses and methods of their removal.
- CO4: Describe the construction and operation of optical devices, including, eyepieces, compound microscope, grating, polarisers etc.
- CO5: Use mathematical analysis to find bright and dark fringes in an interference pattern of thin and wedge shaped film and find a wavelength of light using newton's rings.
- CO6: Interpret a diffraction pattern to determine resolution of an optical system and grating.
- CO7: Demonstrate an ability to solve problems using 'paraxial' opticsbased formulae, numerical calculations and graphical drawings.
- CO8: Geometrical determination of polarization of light and concept and determine a polarization state of light by interpreting polarizer.

PH223: PRACTICAL COURSE

After completing this practical course student will be able to

- CO1: Use various instruments and equipment.
- CO2: Design experiments to test a hypothesis and/or determine the value of an unknown quantity.
- CO3: Describe the methodology of science and the relationship between observation and theory.

CO4: Set up experimental equipment to implement an experimental approach.

CO5: Analyse data, plot appropriate graphs and reach conclusions from your data analysis.

CO6: Work in a group to plan, implement and report on a project/experiment.

CO7: Keep a well-maintained and instructive laboratory logbook.

CO8: Express their knowledge and ideas through oral and written language.

T.Y. B.Sc. Physics

PH-331:Mathematical Methods of Physics

After successful completion of the course the student will be able to:

CO 1: Define and generate a general equation for gradient ,divergence ,curl &laplacian in an orthogonal curvilinear coordinate system & their applications in physics.

CO 2: Interpret relative motion, Galilean & Lorentz transformation equations. CO 3: Define proper time ,minkowskis space ,Time dilation , length contraction CO 4: Describe Michelson Morley experiment & its negative result.

CO 5: Convert commonly occurring partial differential equations in physics into ODE's

- CO 6: Illustrate the problems on Frobenius method of series solution and to differentiate point of expansion of given differential equations.
- CO 7: Evaluate &plot Legendre polynomials, Hermite polynomials ,Bessel function of first kind.
- CO 8: List the most important special functions in physics and to solve different properties related to special functions.

PH-332:Solid State Physics

After successful completion of the course the student will be able to:

CO1: Define crystal structure to develop it in 2D as well as 3D and to determine Indices

for 'Directions' and 'Planes' in a crystal structure.

- CO2: Give original examples of crystal structures and to analyze them with packing fraction, coordination number, number of atoms per unit cell etc.
- CO3: Derive Bragg Diffraction condition in direct lattice and to relate it in reciprocal lattice using Ewald construction.
- CO4: Classify the crystal structure by XRD diffraction and to simplify formula for inter- planer distance.

CO5: Illustrate various experimental techniques for characterisation of material. CO6: Apply free electron theory to restate thermal and electrical properties.

CO7: Explain superconductivity and Meissner effect.

CO8: Define magnetic properties of material and to derive susceptibility formula for different magnetic materials using Lange vein theory.

PH-333:Classical Mechanics:

After successfully completing this course, the student will be able to:

- CO1: Solve advanced problems involving the dynamic motion of classical mechanical systems with an intermediate knowledge of Newton's laws of motion.
- CO2: Apply the concept of Centre of mass and mechanics of system of particles and conservation of energy, linear and angular momentum to solve dynamics problems.
- CO3: Demonstrate an intermediate knowledge of central-force motion and the concept of converting two body problems to single body problem and apply advanced methods to complex central-force motion problems.
- CO4: Demonstrate an intermediate knowledge of concept of laboratory frame and center of mass frame and their use to calculate results of scattering experiments.
- CO5: Apply the concept scattering to get important information regarding the nature of interaction between atomic and subatomic particles through experiments.
- CO6: Derive Lagrange and Hamilton's equations, and represent the equations of motion for simple mechanical systems such as: the Atwood's machine, Simple pendulum using these formulations of classical mechanics.
- CO7: Acquire working knowledge of the methods of Hamiltonian Dynamics and compute the Hamilton equations of motion for mechanical systems.
- CO8: Use calculus of variations to find the Euler-Lagrange equations and canonical transformations to find the constants of motion according to the Hamilton Jacobi theory.
- CO9: Use Poisson brackets to find derivatives in phase space.

PH-334:Atomicand Molecular Physics

After successful completion of the course the student will be able to:

- CO1: Derive the formulae for total energy of an atom so that energy level diagram can be drawn and also able to obtain the expression for spin orbit interaction energy.
 - CO2: State laws, postulates in atomic and molecular Physics and able to compare various models of atomic structure.
 - CO3: Calculate quantum state of electrons in an atom, spectral notation and electronic configuration of atom.
 - CO4: Obtain formulae for Zeeman shift, wavelength of emitted Xrays, Raman shift, rotational and vibrational energy for diatomic molecule and apply it.
 - CO5: Explain origin of line spectra and able to compare continuous spectra, characteristic spectra and can differentiate between rotational, vibrational and electronic spectra.

CO6: Explain application of Duane and Hunt's rule, Moseley's law and its

importance, applications of X-rays, Raman effect and Auger effect.

- CO7: Draw and explain X-ray spectra, spectrum with and without magnetic field (Zeeman effect),Raman spectra and molecular spectra using quantum treatment.
- CO8: Explain experimental arrangement to produce X-ray,, to observe

Raman effect and Zeeman effect.

PH-335:Computational Physics

After successful completion of the course the student will be able to:

- CO1: Define types of programming languages and their uses.
- CO2: Gain basic competency with a widely used C-language for both general and scientific programming.

CO3: Define operators and expression in C-programming and navigate commands.

- CO4: Explain control statements and loops as well as capable of writing C-program to solve problems.
- CO5: Describe arrays and pointers and apply them in C program.
- CO6: Critically present different numerical methods to solve different types of physical and technical problems.
- CO7: Implement numerical algorithms into C-program and visualize the results of the computations.

CO8: Demonstrate the ability to estimate the errors in the use of numerical methods.

PH-336B:Material science

After successful completion of the course the student will be able to:

- CO1: Define and outline the rules of solubility, deformation in metals, basic concepts in phase diagram, molecular phases and the concept of smart materials.
- CO2: Explain the imperfections in solids, mechanism of plastic deformation by slip, properties of ceramic materials, the importance and objective of phase diagram.
- CO3: Calculate and solve problems on stress and strain of materials, CRSS of single phase metals, weight in percentage of compositions using lever rule.

CO4: List the defects in solids, diffusion mechanisms and types of phase diagram.

- CO5: Classify between elastic deformation and plastic deformation, linear polymers and cross linked polymers.
- CO6: Derive the CRSS of metals and the lever rule for phase diagrams.
- CO7: Discuss the types of smart materials, properties of smart materials and their applications.

CO8: Summarize the concept of polymers and the process of polymerization.

PH-341:Electrodynamics.

After successful completion of the course the student will be able to:

- CO1: Define the Biot-savart law, Amperes law, Coulombs law, Electric field, Electric susceptibility, Magnetic field &Faradays law.
- CO2: Explain method of electrical images, equation of continuity, Magnetic vector potential, B.H curve, Maxwell's equation &wave equations.
- CO3: Solve numerical problem on coulombs force, magnetic induction, magnetic permeability and induced voltage, magnitude of electric & magnetic vectors.

CO4: Determine work done by charges, total charge, force on the wire in different symmetry.

CO5: Summarize pointing vector, polarization, reflection &refraction. CO6: Apply Biot Savart law in different symmetry problem.

CO7: List the applications of Amperes law, Biot Savart law, Poynting theorem. CO8: Elaborate magnetic properties of the material.

PH-342:Quantum Mechanics

After successful completion of the course the student will be able to:

CO1: Outline the historical aspects of development of quantum mechanics. CO2: Explain the differences between classical and quantum mechanics. CO3: Describe matter waves, wave function and uncertainty principle.

CO4: Describe Schrodinger's equation and its steady state form.

CO5: Solve Schrodinger's steady state equation for simple potentials to obtain eigen functions and eigen values.

CO6: Apply Schrodinger's steady state equation for spherically symmetric potentials

Obtain eigen functions and eigen values.

CO7: Interpret quantum numbers in atomic system. CO8: Discuss operator algebra in quantum mechanics.

PH-343:Thermodynamics and Statistical Physics

After successful completion of the course the student will be able to:

- CO1: Describe transport phenomena and compute coefficient of thermal conductivity, viscosity and diffusion in terms of mean free path.
- CO2: Define and discuss the concepts and roles of thermodynamic functions from the view point of statistical mechanics.
- CO3: Derive Binomial distribution and Gaussian probability distribution using random walk problem and calculate mean values for a statistical system.

CO4: Discuss the concepts of microstate and macro state, basic postulates and behaviour of density of states for model system and calculate the number of microstates for different statistical systems.

CO5: Differentiate thermal, mechanical and general interaction between statistical system

CO6: Derive and compare Maxwell Boltzmann, Bose-Einstein and Fermi-Dirac distributions; state where they are applicable and explain the connection between

Classical and Quantum Statistics.

- CO7: Derive probability distribution formula for micro canonical, canonical ensemble and calculate mean values in canonical ensemble.
- CO8: Discuss applications for canonical ensemble.

PH-344:NuclearPhysics

After successful completion of the course the student will be able to:

- CO1: Define threshold voltage, dead time and recovery time in GM counter, threshold energy, nuclear fission, nuclear fusion, critical size, critical mass.
- CO2: Determine the basic properties of nucleus.
- CO3: Classify nuclear radiations, elementary particles and nuclear states, nuclear detectors.
- CO4: Compose baryons and mesons with Quark model.
- CO5: Derive expression for energy of ions and frequency of RF signal in cyclotron, Q- value equation, threshold energy, decay constant.
- CO6: Estimate binding energy from fission.
- CO7: Justify nuclear reactions using conservation laws.
- CO8: Explain the different processes by which energetic particles interact with matter, kinematics of various reactors and decay processes.

PH-345ElectronicsII

After successful completion of the course the student will be able to:

- CO1: Define and state the meaning of terms such as amplification, voltage gain, line and load regulation, flip-flop, counters, register, distortion, multiplexer, de-multiplexer, etc.
- CO2: Draw and explain characteristics of various types of FET's and various types ofdiode and construct a circuit using these components according to application.
- CO3: Draw and explain block diagram of IC 723, IC555, OPAMP.
- CO4: Compare various types of semiconductor diode (LED, photodiode, etc.) types of multivibrator, types of power amplifier and types of three pin regulators (78XX,79XX, etc.) on the basis of working principle and application.
- CO5: Design and construct a circuit for amplifier, a-stable, monostable and bi stable multivibrator using IC555, low voltage and high voltage regulator using IC723, various types of flip-flop and counters.
- CO6: Use OPAMP (IC723) as an adder, subs tractor, differentiator, integrator and comparator.

- CO7: Represent POS and SOP expression on K-map and design of hall adder, full adder, half subs tractor, full subs tractor using K-map.
 - CO8: Explain applications of LED, photodiode, veractor, power amplifiers, FET, UJT, counters, registers and solve the problems such as write the output for given circuit, design the circuit from given data.

PH-346K:Laser

After successful completion of the course the student will be able to:

- CO1: Explain the interaction of radiation with matter, Quantum behaviour of light, thermal equilibrium and population inversion.
- CO2: Illustrate the absorption, spontaneous and stimulated emission with appropriate diagrams.
- CO3: Derive the Einstein's relation, conditions for large stimulated emission and light amplification.

CO4: Distinguish between ordinary light and laser light. CO5: Define the characteristics of laser light.

CO6: Classify between lifetime broadening, collision and Doppler broadening. CO7: List the types of lasers.

CO8: Discuss the applications of lasers in various fields.

Physics Practical-I

After successful completion of the course the student will be able to:

- CO1: Describe the underlying theory of experiments in the course.
- CO2: Perform derivations of theoretical models of relevance for the experiments in the course.
- CO3: Follow instructions to perform laboratory experiments in Optics, Thermodynamics, Mechanics, Modern Physics, Electronics and Electromagnetics.
- CO4: Document their results, using correct procedures and protocols.
- CO5: Perform a quantitative analysis of experimental data including the use of computational and statistical methods where relevant.
- CO6: Interpret relationships in graphed data and develop an intuition for alternative plotting methods and communicate results from laboratory experiments, orally or in a written laboratory report.

- CO8: Derive conclusions from the analysis of own data.
- CO9: Assess the language used to describe physics experiments and how it can alter perceptions of the method and results

Physics Practical-II

After successful completion of the course the student will be able to:

- CO1: Describe the underlying theory of experiments in the course.
- CO2: Perform derivations of theoretical models of relevance for the experiments in the course.
- CO3: Follow instructions to perform laboratory experiments in Optics, Thermodynamics, Mechanics, Modern Physics, Electronics and Electromagnetics.
- CO4: Document their results, using correct procedures and protocols.
- CO5: Perform a quantitative analysis of experimental data including the use of computational and statistical methods where relevant.
- CO6: Interpret relationships in graphed data and develop an intuition for alternative plotting methods and communicate results from laboratory experiments, orally or in a written laboratory report.
- CO7: Calculate permissible standard error in any physics experiment
- CO8: Derive conclusions from the analysis of own data.
- CO9: Assess the language used to describe physics experiments and how it can alter perceptions of the method and results

Physics Practical-III: Project

After successful completion of the course the student will be able to

- CO1: Design and test hypothesis.
- CO2: Describe the underlying theory of experiments in the course.
- CO3: Perform derivations of theoretical models of relevance for the experiments in the course.
- CO4: Document their results, using correct procedures and protocols.

- CO5: Perform a quantitative analysis of experimental data including the use of computational and statistical methods where relevant.
 - CO6: Interpret relationships in graphed data and develop an intuition for alternative plotting methods and communicate results from laboratory experiments, orally or in a written laboratory report.
 - CO7: Write a project report with literature review.
 - CO8: Defend the outcome of project work in scientific manner.

M. Sc. Physics Part I

PHYUT501: Classical Mechanics

After successfully completing this course, the student will be able to:

CO1: Formulate the Lagrange's and Hamilton's equation of motion for different systems. CO2: Choose an appropriate set of generalised coordinates to describe the system.

CO3: Classify and handle the problem related to motion in non-inertial and inertial frames. CO4: Solve problems on poisons brackets and canonical transformations.

CO5: Apply Variational Principle to real physical problem.

CO6: Explain the concept of symmetry and Galilean Invariance. CO7: Define generalized momenta and cyclic coordinates.

CO8: Recall Poisson's and Lagrange identities.

PHYUT502:Electronics

After successfully completing this course, the student will be able to:

- CO1: Recall basic knowledge of electronics.
- CO2: Define Astable, monostablemultivibrator, Op-amp, voltage regulators, Boolean identities and expression, counter and shift register, basics of digital and binary conversions.
- CO3: Discuss IC 555, types of voltage regulators, types of counters and shift registers and types of ADC and DAC.
- CO4: Perform working of ICs (IC 555 in astable and monostable mode, IC78xx/IC79xx and ICLM317 of 3 pin regulators, IC 7490,IC 7495, VCO IC 566, PLL IC 565)

CO5: Apply the working of according to their

applications. CO6: Designs and performs ICs.

CO7: Assemble the ICs

CO8: Communicate, demonstrate and write effectively the needs in industrial fields.

PHYUT503:Mathematical Methods in Physics

After successfully completing this course, the student will be able to:

- CO1: Generate Legendre, Hermite, Laguerre polynomials and Bessel functions of first kind.
- CO2: Determine Laplace transform of standard functions.

CO3: Classify methods to obtain Laplace transform and inverse Laplace transform. CO4: Illustrate the examples of vector spaces.

CO5: Solve problems on Fourier series, Fourier transform and Fourier integral.

- CO6: Solve problems on linear dependence and linear independence by using different methods.
- CO7: Explain orthogonality of Legendre, Hermite, Laguerre polynomials and Bessel functions of first kind.
- CO8: Define Hermitian, Orthogonal and Unitary matrices.

PHYUT504:Atomic and MolecularPphysics

After successfully completing this course, the student will be able to:

CO1: Recite atomic structure, quantum number Calculate the ground state, apply Hund's

rule. Diagram the fine and hyperfine structure

CO2: Explain Zeeman effect Solve problems on Zeeman effect for different materials in

Zeeman effect

CO3: Identify different regions of spectra & Summarize types of spectra with regions

- CO4: Classify different molecular spectra & analyse band structure
- CO5: Determine dissociation energy and dissociation product for explanation of ESR & NMR

CO6: Predict the band head position in rotational fine structure to solve problems on ESR

&NMR.

CO7: Define X-ray diffraction, Explain SC, FCC, BCC HCP structure and calculate atomic structure factor of SC, FCC, BCC, HCP and diamond structure.

CO8: Explain different modes of vibration. Simplify atomic scattering factor. Relate

Acoustic & optical modes of vibration

PHYUT505:Experimental techniques in Physics-I

After successfully completing this course, the student will be able to:

CO1: Define signals, vacuum, vacuum measurement units, gas transport phenomenon. CO2: Classify signals and systems as discrete/continuous, linear/non-linear, causal/noncausal, time-variant/invariant, etc., errors in signals and pipe flows, vacuum pumps. CO3: Interpret signals with correlation function of random processes.

CO4: Explain need of vacuum and gas transport properties.

- CO5: Solve problems based on kinetic theory of gases and the application of the momentum and energy equations as well as various parameters of fluid mechanics
- C06: Convert vacuum measurement units from one unit to another unit.
- CO7: Describe different vacuum gauges and vacuum pumps with their working principle, range of measurement, advantages and drawbacks.
- CO8: Apply vacuum principles in preparation of thin and thick film.

PHYUT506:Physics Lab-I

After successfully completing this course, the student will be able to:

- CO1: Explain and analyse Frank-Hertz experiment and the obtained data
- CO2: Compare the observed value of the skin depth experiment with the theoretical t value and determine the sources of error.

CO3: Summarise the theory of GM tube and list characteristics of radio activity. CO4: Determine the Lande's g factor by using Electron spin resonance experiment. CO5: Illustrate the electromagnetic damping using ballistic galvanometer.

- CO6: Show the iodine spectrum and analyse it.
- CO7: Show steady interference pattern using etalon and determine the spacing between two plates of etalon.
- CO8: Explain the basics of determination of resistivity of a thin film by using four probe method.

PHYUT601:Electrodynamics

After studying this course the student will be able to,

CO1: Define electric charge, charge density (λ , σ , ρ).

CO2: Apply the laws of electromagnetism and Maxwell's equations in different forms

and different media

- CO3: Explain the fundamental concepts of special relativity and their physical consequences, such as the Lorentz transformation, invariant quantities, the metric, and fourvectors and more general tensors, as well as their use in covariant formulations of physical laws.
- CO4: Discuss origin of Maxwell's equations in magnetic and dielectric media and understand transport of energy and Poynting vector.
- CO5: Calculate the magnetic forces that act on moving charges and the magnetic fields, due to currents (Biot-Savart and Ampere laws)
- CO6: Solve multipole expansions of electrostatic fields.
- CO7: Analyze propagation, reflection and transmission of plane waves

CO8: Evaluate radiation energy losses by passage through the matter.

PHYUT602:Solid State Physics

After successfully completing this course, the student will be able to:

CO1: Calculate thermal and electrical properties in the freeelectron model - know

> Bloch's theorem and what energy bands are

- CO2: Apply the free electron theory to solids to describe electronic behaviour& explain the origin of energy bands, and how they influence electronic behaviour.
- CO3: discuss basic models of magnetism &Explain the classical, Langevin& quantum theory of Para magnetism.

CO4: Compare the magnetic properties of rare earth ions & iron group ion with graphical representation

CO5: Explain Wises theory, saturation magnetism with temperature dependence. CO6: Understand the anti-ferromagnetism, Neel temperature & susceptibility.

- CO7: Distinguish between perfect conduction and perfect diamagnetism, and give a qualitative description of the Meissner effect & explain how observation of a persistent current can be used to estimate an upper limit on the resistivity of a superconductor, and perform calculations related to such estimates
- CO8: Show how the London equations and Maxwell's equations lead to the prediction of the Meissner effect.

PHYUT603:Quantum Mechanics

After successfully completing this course, the student will be able to:

CO1: Recall the main aspects of the historical development of quantum mechanics by replacing the classical mechanics and able to discuss wave properties of matter.

CO2: Understand Schrodinger's equation, uncertainty principle, representation of states,

relation between quantum mechanics and linear algebra.

- CO3: Solve Schrodinger's equation in one to three dimensions, Eigen function of operator, uncertainties as well as their physical interpretations.
- CO4: Solve problems by applying Dirac notations.
- CO5: Simplify angular momentum and spin, their rules for quantization and additions, Clebsch-Gorden coefficients in simple cases.
- CO6: Explain Zeeman Effect, spin- orbit coupling.

CO7: Solve Schrodinger equation using various approximation methods.

CO8: Develop an understanding of both analytic and numerical methods and solution are important in quantum mechanics.

PHYUT604:LASERS

After successfully completing this course, the student will be able to:

- CO1: Explain the interaction of radiation with matter, Gaussian beam and their properties.
- CO2: Illustrate the absorption, spontaneous and stimulated emission with appropriate diagrams.

CO3: Derive the Einstein's coefficients, gparameters of laser cavity. CO4: Distinguish between ordinary light and laser light.

CO5: Analyse the merits and demerits of three and four level laser system. CO6: List the characteristics of laser light.

CO7: Categorise the different types of lasers.

CO8: Discuss the applications of lasers in various fields

PHYUT605:Experimental Techniques in Physics-II

After studying this course the student will be able to,

- CO1: List of required characterization techniques for fundamental research in material science and nanotechnology.
- CO2: Identify the crystal structure, crystalline nature of any material by using X-ray diffraction technique.
- CO3: Provide phase transition, absorption, chemical changes as temperature changes by using thermal analysis methods.
- CO4: Make use of spectroscopic analysis for identification of materials i.e. which type of material is present by analysing their UV-Vis, IR, FTIR, DRS spectroscopies.

CO5: Study morphology, topography of any material by using SEM, TEM, and FESEM. CO6: Find various applications like industrial, biomedical etc. by using magnetic

characterization.

CO7: Apply the knowledge of characterization techniques for research.

CO8: Compile the information of characterization together to confirm the proposal in research work.

PHYUT606:Physics Lab-II

After successfully completing this course, the student will be able to:

CO1: Make use of analog and digital multi meters, various types of power supply, CRO, Function generator.

CO2: Classify between AC and DC voltage and current. CO3: Identify passive and active electronic components.

CO4: Design various types of electronic circuits professionally and mounting of

electronic components on bread board and PC – cum – soldering method. CO5: Explain the Kirchhoff's voltage and current law and verify it.

CO6: Distinguish between the active filters.

CO7: Experiment with CRO to find the amplitude, peak. time interval. CO8: Defend the results obtained in the experimental work.

M.Sc. Physics Part II

PHYUT701:Statistical Mechanics

After successfully completing this course, the student will be able to:

- CO1: Define basics of thermodynamics, states of the system, statistical ensemble, partition function, and equipartition theorem, postulates of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac distributions and discuss black body radiation.
- CO2: Describe specification of state of system, types of ensembles, Gibb's paradox.
- CO3: Calculate phase space trajectory, mean energy of the system, simple application of equipartition theorem and solve Einstein derivation of Plank's law, Bose condensation, and specific heat of fermions.
- CO4: Criticize state of system classically, categorized between types of ensembles, classify distribution of particles by

Maxwell-Boltzmann, Bose-Einstein and Fermi Dirac statistic, analyse Einstein and Debye model of solids.

- CO5: Determine density of states, mean energy by using types of ensembles, Fermi energy and mean energy at absolute zero, compare mean values of velocities by using Maxwell Boltzmann distribution.
- CO6: Develop some problems dealing with statistical ensemble and Fermi energy, to solve some examples on particles by using particle distribution statistics.

CO7: Demonstrate understanding of various aspects of statistical mechanics.

CO8: Communicate, write, and make effective presentation on industrial needs of thermodynamics and statistical mechanics.

PHYDT702: Physics of Thin Films

After successfully completing this course, the student will be able to:

- CO1: Recognize the various aspects of different thin film deposition, fundamental properties and various measurement techniques
- CO2: Relate effect of various deposition parameters to growth of thin films and their typical uses for applications.
- CO3: Discuss the differences and similarities between techniques and fundamental properties of thin film deposition.

CO4: Asses the relation between deposition technique, film structure and film properties.

CO5: Analyse effect of film growth on properties.

CO6: Evaluate and use models for nucleating and growth of thin films.

CO7: Motivate selection of deposition techniques for various applications.

CO8: Design novel thin film material synthesis by modified growth technique.

PHYUT703:Physics of Semiconductor Devices

After successfully completing this course, the student will be able to:

- CO1: Recognize the physical characteristics such as electronic structures, optical and transport properties of semiconductors and IV characteristics of semiconductor devices.
- CO2: Discuss the transport and optical properties of semiconductors.
- CO3: Relate the electronic structures of semiconductors to their atomic and crystal characteristics.

CO4: Relate to fundamental physics process with device characteristics.

- CO5: Apply fundamental principles and processes to operational semiconductor devices and their uses.
- CO6: Analyse and model some semiconductor properties, processes and device characteristics using equations.
- CO7: Evaluate and analyse device characteristics in terms of the material properties and structural parameters.

CO8: Design junction device and calculate its various junction parameters.

PHYDT704:Electronic Instrumentation-I

After successfully completing this course, the student will be able to:

- CO1: Explain functional description of instrumentations and methods of correction of unwanted inputs.
- CO2: Demonstrate the errors in measurements. Explain the sources of errors. Calculate the first order instrumentation step, ramp and frequency response.
- CO3: Define the transducer and types of transducer.

CO4: Classify different types of transducer and select transducer for application.

CO5: Remember basic op-amp and its applications and explain instrumentation amplifier.

CO6: Compare different types of data converters.

CO7: Explain working of LED AND LCD display system and give original applications of display system. Explain working of printer.

CO8: Explain microprocessor based instruments and basic idea of process control.

PHYUP705:Computational Physics

After successfully completing this course, the student will be able to:

CO1: Recall the theory of all the programmes to be performed.

CO2: Draw the algorithm and flowchart chart of the concepts discussed.

CO3: Design the flow chart using the theory and the derivation of the concepts.

CO4: Estimate the required value by running the programme on turbo C.

CO5: Interpret the value obtained on turbo C and manually.

CO6: Illustrate the motion of pendulum, oscillations and miller indices on turbo C

CO7: Determine kinetic, potential energy, binding energy etc. by designing programs.

CO8: Diagram the results of program using graphics in C

PHYDP706:Special Lab-I

After successfully completing this course, the student will be able to:

- CO1: Develop skills in using laboratory apparatus and equipment.
- CO2: analyse and interpret the theoretical and experimental data.
- CO3: Classify between the binary ladders.
- CO4: Discuss the theories of the performed experiments.

CO5: Recall the binary coding and will be able to design the analog and digital counters

- CO6: Explain the working principle of spin coating, spray pyrolysis and electro-deposition.
- CO7: Illustrate the characteristics of temperature vs resistance in determining the temperature coefficient of resistance.
- CO8: Apply the concepts learned in various fields.

PHYUT801:NuclearPhysics

After studying this course the student will be able to,

CO1: Classify elementary particles and nuclear states in terms of their quantum numbers.

CO2: Describe the role of S-O coupling in the shell structure of atomic nuclei and predict the properties of nuclear ground and excited states based on the shell model.

- CO3: Describe the properties of strong and weak interactions.
- CO4: Explain the different processes by which ionising radiation interacts with matter and the construction and applications of detectors for radioactivity.
- CO5: Determine the basic properties of nucleus.

CO6: Calculate the kinematics of various reactions and decay processes.

CO7: Analyse production and decay reactions for fundamental particles by applying conservation principles.

CO8: Evaluating: Evaluate radiation energy losses by passage through the matter.

PHYUT802: Material Science

After studying this course the student will be able to,

- CO1: Define laws of thermodynamics, thermodynamic functions, solubility deformation in metals, phase diagram, molecular phases, diffusion, and solid solution.
- CO2: Discuss Defects in the material and classify them.

- CO3: Explain the imperfections in solids, the concept of phase & phase diagram, Construction and identification of phase diagrams and reactions, mechanism of plastic deformation by slip, properties of ceramic materials,
- CO4: Solve problems on Phase rule, weight in percentage of compositions using lever rule, diffusion, CRSS of single phase metals, thermodynamic problems.
- CO5: Analyse phase diagrams.
- CO6: Classify defects in solids, solid solutions, phase diagrams.
- CO7: Derive chemical equilibrium, thermodynamic properties of solutions, Henry's law, Vegard's law, diffusion coefficient.

CO8: Apply Gibb's phase rule for unary and binary phase diagram, diffusion phenomenon to explain decarburization of steel.

PHYDT803:Nanomaterials

After studying this course the student will be able to,

CO1: Define quantum size effect.

CO2: Explain Surface & Interface effects, Surface energy & Surface curvature.

- CO3: Explain the quantum confinement effect on properties of various types of inorganic nanoparticles, one-dimensional nanostructures (nanotubes, nanorods, nanowires).
- CO4: Give a basic introduction to chemical and physical principles in the synthesis of inorganic nanostructured materials.
- CO5: Cover appropriate synthesis techniques and characterization of different quantum nanostructures of desired size, shape and surface properties.
- CO6: Qualitatively describe how the nanoparticle size can affect the morphology, crystal structure, reactivity, and electrical properties.
- CO7: Provide the influence of dimensionality of the nanomaterials on properties and their future applications in various technologically important devices.

CO8: Defend different applications of nano materials.

PHYDT804:Electronic Instrumentation-II

At the completion of this course, students will be able to:

- CO1: Understand the basic principles & importance of process control in industrial process plants; Specify the required instrumentation and final elements to ensure that welltuned control is achieved; Understand the use of block diagrams & the mathematical basis for the design of control systems;
- CO2: Understand working of PLC, I/O modules of PLC, Programming languages and instructions of PLC
- CO3: Explain Process Characteristics.
- CO4: Apply different controller modes.
- CO5: Handle different types of controller like electronic controller.
- CO6: Understand the concept of digital control system.
- CO7: Ability to create a model prediction based upon new input and validate the output data.
- CO8: Familiarize the student in introducing and exploring MATLAB software &To enable the student on how to approach for solving problems

PHYDP805:Special Lab-II

After successfully completing this course, the student will be able to:

- CO1: Recall the theory of nanomaterials
- CO2: Discuss different methods of preparation of nanomaterials.

CO3: Apply different methods to prepare nano particles and analyze them.

CO4: Calculate particle size and determine crystal structure using Xray results. CO5: Design electronic circuits using Operational amplifiers.

CO6: Discuss different transducers.

- CO7: Interpret the results of data through experimentation and graph
- CO8: Defend the results obtained in the experimentation.

PHYUP806:Project

After successful completion of the course the student will be able to

CO1: Design hypothesis for their work to be carried out.

CO2: Describe the underlying theory of experiments in the project work.

- CO3: Perform derivations of theoretical models of relevance for the experiments in the project.
- CO5: Perform a quantitative analysis of experimental data including the use of computational and statistical methods where relevant.

CO4: Document their results, using correct procedures and protocols.

- CO6: Interpret relationships in graphed data and develop an intuition for alternative plotting methods and communicate results from project work, orally or in a written laboratory report.
- CO7: Write a project report with literature review.
- CO8: Defend the outcome of project work in scientific manner.

Rayat Shikshan Sanstha's Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College Manchar, Tal. Ambegaon, Dist Pune

DEPARTMENT OF ZOOLOGY

COURSE OUTCOMES

CLASS: F.Y.B.Sc.

SEMESTER: I

Course/ Paper: Animal Diversity I

CO	Statement
CO1	To understand the Animal diversity around us.
CO2	To understand the underlying principles of classification of animals.
CO3	To understand the terminology needed in classification.
CO4	To understand the differences and similarities in the various aspects of classification.
CO5	To classify invertebrates and to be able to understand the possible group of the invertebrate observed in nature.to understand our role as a caretaker and promoter of life.

Course/ Paper: Animal Ecology		
CO	Statement	
CO1	The learners will be able to identify and critically evaluate their own beliefs, values and actions in relation to professional and societal standards of ethics and its impact on ecosystem and biosphere due to the dynamics in population.	
CO2	To understand anticipate, analyse and evaluate natural resource issues and act on a lifestyle that conserves nature.	
CO3	The Learner understands and appreciates the diversity of ecosystems and applies beyond the syllabi to understand the local lifestyle and problems of the community	
CO4	The learner will be able to link the intricacies of food chains, food webs and link it with human life for its betterment and for non-exploitation of the biotic and abiotic components	
CO5	The working in nature to save environment will help development of leadership skills to promote betterment of environment	

CO_FYBSc_Zoology_wef2019-20

COURSE OUTCOMES

Class : F.Y.B.Sc.

Semester: II

Paper: Animal Diversity II		
CO	Statement	
CO1	To understand the Animal diversity around us.	
CO2	To understand the underlying principles of classification of animals.	
CO3	To understand the terminology needed in classification	
CO4	To understand the differences and similarities in the various aspects of classification	
CO5	To classify invertebrates and to be able to understand the possible group of the invertebrate observed in nature to understand our role as a caretaker and promoter of life.	

Paper: Cell Biology		
CO	Statement	
CO1	The learner will understand the importance of cell as a structural and functional unit of life.	
CO2	The learner understands and compares between the prokaryotic and eukaryotic system and extrapolates the life to the aspect of development.	
CO3	The dynamism of bio membranes indicates the dynamism of life. Its working mechanism and precision are responsible for our performance in life.	
CO4	The cellular mechanisms and its functioning depend on endo-membranes and structures. They are best studied with microscopy.	

Rayat Shikshan Sanstha's Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College Manchar, Tal. Ambegaon, Dist Pune

DEPARTMENT OF ZOOLOGY

COURSE OUTCOMES

CLASS: SYBSc

SEMESTER: III

Paper: Animal Diversity III		
CO	Statement	
CO1	To understand the origin and advancement of higher vertebrates (tetrapoda).	
CO2	To understand general characters of different groups of higher vertebrates.	
CO3	To classify vertebrates and to become able to understand the possible group of vertebrates observed in nature.	
CO4	To understand different behaviours and adaptations in higher vertebrates	
CO5	To understand affinities among different groups of higher vertebrates.	

Paper: Applied Zoology I		
CO	Statement	
CO1	To understand the basic life cycle of the honeybees, beekeeping tools and equipments.	
CO2	To learn for managing beehives for honey production and pollination.	
CO3	To understand the basic information about fishery, cultural and harvesting methods of fishes.	
CO4	To understand fish preservation techniques.	
CO5	To understand the biology, varieties of silkworms and the basic techniques of silk production and harvesting of cocoons	
CO6	To learn the different silkworm species and their host plants.	
CO7	To study types of agricultural pests and Major insect pests of agricultural importance.	

Paper: Animal Diversity IV		
СО	Statement	
CO1	To understand Salient features of class Reptilia with one example (name only) – Chelone, Calotes.	
CO2	To understand Venomous and Non-venomous snakes – Cobra, Russell's viper, Rat snake, Grass snake	
CO3	To understand Snake venom, symptoms, effect and cure of snake bite, first aid treatment of snakebite	
CO4	To understand Flight adaptations in birds.	
CO5	To understand Types of Beaks and feet in birds.	

Paper: Applied Zoology II		
CO	Statement	
CO1	To illustrate Life cycle, Colony organization and Division of labour.	
CO2	To understand Bee behavior and communication (Round Dance and Wag- Tail Dance).	
CO3	To understand Bee keeping equipment's	
CO4	To understand Bee keeping and seasonal management.	
CO5	To understand 'Bee products (composition and uses)	

Rayat Shikshan Sanstha's Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College Manchar, Tal. Ambegaon, Dist Pune

DEPARTMENT OF ZOOLOGY

COURSE OUTCOMES

CLASS: TYBSc

SEMESTER: V

Paper: Pest Management		
CO	Statement	
CO1	Explain why identification of the pest is the first step in developing an effective pest control strategy	
CO2	Explain the differences between continuous pests, sporadic pests, and potential pests.	
CO3	Explain what is meant by prevention, suppression, and eradication of pests.	
CO4	Describe "thresholds" and why they are an important consideration in developing a pest control strategy	
CO5	Describe "monitoring" as it relates to pest control and explain why it is important to pest control strategy.	
CO6	Know and how to develop an IPM program.	

Paper: Histology		
CO	Statement	
CO1	To understand the histological aspects of mammalian organs.	
CO2	To study the important features of different types of tissues in organ system	
CO3	To understand the classification of various types of basic tissues.	
CO4	To study structure & functions of various tissues in organ system.	
CO5	To understand histological structure of various glands and its functions	
CO7	To describe pituitary, thyroid and adrenal gland	
Paper: Biological Chemistry		
-----------------------------	---	
CO	Statement	
CO1	To understand the basic concepts and significance of biochemistry.	
CO2	To understand the basic concepts pH and Buffers	
CO3	To understand the chemical structures of carbohydrate, and their biological and clinical significance	
CO4	To understand the structure and importance of proteins and lipids	
CO5	. To understand the variations in enzyme activity and kinetics	

Paper: Genetics	
CO	Statement
CO1	Students will be taught Mendelian genetics, their principles and gene interaction.
CO2	They learn about chromosomal aberrations and structure of chromosomes
CO3	The student will gain a basic understanding on human genetics and hereditary.
CO4	The paper helps in highlighting the scope and significance of genetics by imbibing the principles of hereditary genetic transmission and interactions of gene with environment.
CO5	It also helps students to learn the molecular aspects of genetics disorders and mutations.
CO6	It helps the students to appreciate the concepts of gene and relationship between genotype and phenotype.

Paper: Developmental Biology	
CO	Statement
CO1	To explain the fundamentals of developmental biology.
CO2	To discuss the various theories of developmental biology.
CO3	To illustrate the process of gametogenesis and fertilization.
CO4	To discuss the types of cleavage.
CO5	To discuss the embryology of chick.

Paper: Parasitology	
CO	Statement
CO1	To understand the basic terminologies in parasitology.
CO2	To understand the concepts of animal association with examples.
CO3	To understand the morphology and life cycle of common parasites (Protists and Platyhelminthes).
CO4	To understand the phenomenon of Host-parasite relationship.
CO5	Explain the importance of arthropod vectors with examples.

COURSE OUTCOMES

CLASS: TYBSc

SEMESTER: VI

Paper: Medical & Forensic Zoology	
CO	Statement
CO1	To understand the scope, need and History of Forensic Science.
CO2	To understand the role of different institutes & allied institutes of Forensic Science.
CO3	To understand the various branches of Forensic Sciences from Life Sciences.
CO4	To understand human physiology, post mortal investigations.
CO5	To understand knowledge of handling different types of evidences and their examinations

Paper: Animal Physiology	
CO	Statement
CO1	To acquaint students with the principles and basic facts of Animal Physiology and with some of the laboratory techniques and equipment used in the attainment of physiological data. The importance will be on mammalian.
CO2	The course will focus on organ-system physiology,
CO3	The laboratory module of the course is designed to support the topics discussed in theory lecture, as well as to acquaint students with some of the laboratory techniques and equipment used in the gaining of physiological facts.
CO4	Where appropriate, basic chemical and physical laws will be reviewed in order to enhance and to promote student understanding.
CO5	Furthermore, emphasis will be placed on nutritive, circulatory, respiratory, excretory, muscular, nervous, reproductive and endocrine physiology

Paper: Molecular Biology	
CO	Statement
CO1	The course aims to provide students with an introduction of the underlying
	molecular mechanisms of various biological processes in cells and
CO2	To understand the Structure of DNA and RNA, DNA and RNA as genetic
	materia
CO3	To understand the Central Dogma of Molecular Biology
CO4	To understand the concept of gene regulation
CO5	To understand the DNA Damage and Repair
CO6	The course aims to develop basic understanding of structure-function relationships of nucleic acids and proteins

Paper: Entomology	
СО	Statement
CO1	To understand the scope of Entomology and general characters of Insects
CO2	To study the morphology and anatomy of Insects
CO3	To learn the concept of social organization in Insects.
CO4	To understand metamorphosis in Insects.
CO5	To study the economically important insects and Pest management of harmful
	insects.

Paper: Techniques in Biology	
CO	Statement
CO1	To Understand Methods of tissue fixation: Chemical fixation and physical fixation.
CO2	To Understand Procurement of tissue and importance of fixation of tissues.
CO3	To Understand Dehydration, clearing, impregnation, embedding and block making.
CO4	To Understand Types of microtomes.
CO5	To Understand Section cutting: steps and precautions, common faults in section cutting, reasons & remedies
CO6	To Understand Mounting and spreading of ribbons

Paper: Evolutionary Biology	
СО	Statement
CO1	To provide comprehensive overview of Concept of Evolution.
CO2	To explain Origin of Life especially Prokaryotes as well as Eukaryotes in detail.
CO3	To explore salient features of various theories of evolution comprising of Lamarckism, Darwinism and Neo-Darwinism.
CO4	To impart detailed understanding of Analogy, Homology, Paleontological Evidences, Embryological Evidences and Molecular Phylogeny.
CO5	To provide adequate information about Geological Time Scale and Neutral Theory of Molecular Evolution.
CO6	To develop comprehensive knowledge regarding various Sources of Variations and their role in evolution

Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College Manchar, Tal. Ambegaon, Dist Pune

DEPARTMENT OF BBA(CA) COURSE OUTCOMES (2019 Pattern)

CLASS: F.Y. BBA(CA)

SEMESTER: I

Course Title	Business Communication
CODE	CA - 101
CO No.	Course Outcomes
CO-1	To understand what is the role of communication in personal and business world
CO-2	To understand system and communication and their utility
CO-3	To develop proficiency in how to write business letters and othercommunications
CO-4	Apply the managerial functions in different business setup

Course Title	Principles of Management
CODE	CA - 102
CO No.	Course Outcomes
CO-1	Interpret and design the different forms of organization
CO-2	Demonstrate social responsibility and ethical issues involved inbusiness situations and organizations
CO-3	Integrate management principles in real time situations
CO-4	Apply the managerial functions in different business setup

Course Title	C Programming
CODE	CA - 103
CO No.	Course Outcomes
CO-1	To understand the concept of Procedural Programming
CO-2	To acquire basic programming skills using C Programming Language
CO-3	Students will Improve logical thinking through practical knowledge of C Programming
CO-4	By learning the basic programming constructs they can easily switch over to any other language in future.

Course Title	Database Management System
CODE	CA - 104
CO No.	Course Outcomes
CO-1	To understand role and importance File Structures and Organization
CO-2	To develop skills related with Database basic Concepts.
CO-3	To Develop right understanding of various Data models
CO-4	To Understand the Programming in SQL and Implementation

Course	Statistics
Title	Stausues
CODE	CA - 105
CO No.	Course Outcomes
CO-1	To understand role and importance of statistics in various businesssituations
CO-2	To develop skills related with basic statistical technique



CO-3

Course Title	Organization Behavior & Human Resource Management
CODE	CA - 201
CO No.	Course Outcomes
CO-1	To understand basic concept of HRM & OB
CO-2	To know the major trends in HRM & OB
CO-3	To make aware students about traditional & modern methods of procurement & development in organization
CO-4	To make aware students about on the job & Off the JobTraining methods

Course Title	Financial Accounting
CODE	CA - 202
CO No.	Course Outcomes
CO-1	To develop right understanding regarding role and importance of monetary and financial transactions in business
CO-2	To cultivate right approach towards classifications of different transactions and their implications
CO-3	To develop proficiency preparation of basic financial as to how towrite basis accounting statement - Trading and P&L

Course Title	Business Mathematics
CODE	CA - 203
CO No.	Course Outcomes
CO-1	To understand role and importance of Mathematics in variousbusiness situations and while developing software's.

CO-2	To develop skills related with basic mathematical technique
------	---

Course Title	Relational database management System.
CODE	CA - 204
CO No.	Course Outcomes
CO-1	Enables students to understand relational database concepts.
CO-2	Enables students to understand transaction management concepts indatabase system
CO-3	Enables student to write PL/SQL programs that use: procedure, function, package, cursor and trigger
CO-4	To Understand SQL/PLSQL the programming languageof oracle

Course Title	Web Technology HTML-JS-CSS
CODE	CA - 205
CO No.	Course Outcomes
CO-1	To know & understand concepts of internet programming.
CO-2	To understand how to develop web based applications using JavaScript

Course Title	Digital Marketing
CODE	CA-301
CO No.	Course Outcomes
CO-1	The aim of this syllabus is to give knowledge about using digitalmarketing in and as business.
CO-2	To make SWOT analysis, SEO optimization and use of variousdigital marketing tools.
CO-3	To understand Case study and Exercise on various terms
CO-4	To understand Digital marketing for business purpose

Course Title	Data Structure
CODE	CA-302
CO No.	Course Outcomes
CO-1	To understand the concept of ADT's
CO-2	To learn linear data structures – lists, stacks, and queues
CO-3	To understand sorting, searching and hashing algorithms
CO-4	To apply Tree and Graph structures

Course Title	Software Engineering
CODE	CA-303
CO No.	Course Outcomes
CO-1	To understand system concepts.
CO-2	To understand Software Engineering concepts.
CO-3	To understand the applications of Software Engineering concepts and Design in Software development

Course Title	Angular - JS
CODE	CA-304
CO No.	Course Outcomes
CO-1	By the end of this course, the students should be able toUnderstand Client Side MVC and SPA
CO-2	Explore AngularJS Component
CO-3	Develop an AngularJS Single Page Application
CO-4	Create and bind controllers with Javascript

Course Title	Big Data
CODE	CA-305
CO No.	Course Outcomes
CO-1	To enable learners to develop expert knowledge and analyticalskills in current and developing areas of analysis statistics, and machine learning
CO-2	To enable the learner to identify, develop and apply detailed analytical, creative, problem solving skills.
CO-3	Provide the learner with a comprehensive platform for career development, innovation and further study.

Course Title	Networking
CODE	CA-401
CO No.	Course Outcomes
CO-1	To gain knowledge about Computer Networks concepts.
CO-2	To know about working of networking models, addresses, transmission medias and connectivity devices.
CO-3	To acquire information about network security and cryptography.

Course Title	Object Oriented Concepts Through CPP
CODE	CA-402
CO No.	Course Outcomes
CO-1	Acquire an understanding of basic object-oriented concepts and the issues involved in effective class design.

	Enable students to write programs using C++ features like
CO-2	operator overloading, constructor and destructor, inheritance, polymorphism and
	exception handling.

Course Title	Operating System
CODE	CA-403
CO No.	Course Outcomes
CO-1	To know the services provided by Operating System
CO-2	To know the scheduling concept
CO-3	To understand design issues related to memory management and various related algorithms.
CO-4	To understand design issues related to File management and various related algorithms

Course Title	Node.JS
CODE	CA-404
CO No.	Course Outcomes
CO-1	Understand the JavaScript and technical concept behind Node.js
CO-2	Structure a Node application in modules
CO-3	Build a web server in Node and understand how it really works
CO-4	Connect to a SQL or Mongo database in Node

CLASS: T.Y.BBA(CA)

SEMESTER: V

Course Title	Cyber Security
CODE	CA-501
CO No.	Course Outcomes
CO-1	To understand the fundamentals of cyber security.
CO-2	To understand various categories of Cybercrime, Cyber-attacks onmobile, tools and techniques used in Cybercrime and case studies.
CO-3	To have an overview of the Cyber laws and concepts of Cyber forensics.

Course Title	Object Oriented Software Engineering
CODE	CA-502
CO No.	Course Outcomes
CO-1	To understand the fundamentals of object modeling
CO-2	To understand and differentiate Unified Process from otherapproaches.
CO-3	To design with static UML diagrams.
CO-4	To design with the UML dynamic and implementation diagrams.

Course Title	Core Java
CODE	CA-503
CO No.	Course Outcomes
CO-1	To introduce the object oriented programming concepts.
CO-2	To understand object oriented programming concepts, and apply themin solving problems.
CO-3	To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
CO-4	To introduce the implementation of packages and interfaces

Course Title	Python
CODE	CA-504
CO No.	Course Outcomes
CO-1	Define and demonstrate the use of built-in data structures "lists" and "dictionary".
CO-2	Design and implement a program to solve a real world problem.
CO-3	Design and implement GUI application and how to handle exceptions and files.

Course Title	Recent Trends in IT
CODE	CA-601
CO No.	Course Outcomes
CO-1	To discuss the basic concepts AI.
CO-2	To apply basic, intermediate and advanced techniques to minethe data.
СО-3	To provide an overview of the concept of Spark programming.

Course Title	Software Testing
CODE	CA-602
CO No.	Course Outcomes
CO-1	Students will be introduced to testing tools.
CO-2	Students will acquire Knowledge of Basic SQA.
CO-3	Students will be able to design basic Test Cases.

Course Title	Advanced Java
CODE	CA-603
CO No.	Course Outcomes
CO-1	Students will know the concepts of JDBC Programming.
CO-2	Students will know the concepts of Multithreading and SocketProgramming.
CO-3	Students will know the concepts of Spring and Hibernate.
CO-4	Students will develop the project by using JSP and JDBC.

Course Title	Dot Net Framework
CODE	CA-604
CO No.	Course Outcomes
CO-1	To know the concept of software testing.
CO-2	To understand how to test bugs in software.
CO-3	To develop programming logic.

Course: FSC- 11:	Food Chemistry
CO	Statement
CO1	Have sufficient knowledge of food chemistry to control reactions in foods.
CO2	Know the major chemical reactions that limit shelf life of foods.
CO3	Use the laboratory techniques common to basic and applied food chemistry.
CO4	Know the principles behind analytical techniques associated with food.

Course: FSC-12: Food Microbiology		
CO	Statement	
CO1	Describe the characteristics of foodborne, waterborne and spoilage	
	microorganisms.	
CO2	Methods for their isolation, detection and identification.	
CO3	Explain why microbiological quality control programmes are necessary in food production	

Course: FSC- 13: Cereal, Legumes and oilseed processing	
CO	Statement
CO1	An ability to apply the knowledge of underlying chemistry, properties and
	effects of processing on food components
CO2	An ability to use the techniques, skills, and modern tools necessary Oilseed
	processing operations
CO3	Demonstrate knowledge and understanding of technology and management principles, manage projects like dal mill, Oilseed processing plants

CLASS: FY B.Voc.

SEMESTER: II

Course:FG- 21: Business Communication Skill	
Statement	
Effective business communications.	
Research approaches and information collection.	
Developing and delivering effective presentations.	
Skills that maximize team effectiveness.	

Course: FG- 22: Fundamentals of Food Process. Engg.	
CO	Statement
CO1	Skills acquired with the principles of handling and processing food and
	agricultural products.
CO2	To Emphasis on to the principles of operation of equipment used in the processing industry and the response of biological materials to these operations
CO3	To Emphasis the various properties of the raw material used in food processing, different processing technologies required in transforming them into quality food products and material handling equipment involved in food processing operations.

Course: FG- 23: Food Additives and Preservatives	
CO	Statement
CO1	Explain the mechanisms of spoilage and deterioration of foods and raw
	materials: microbial, chemical, physical, biochemical, etc.
CO2	Explain the basic principles of food preservation processes: heating, chilling,
	freezing, control of water activity, acidification, chemical preservatives,
	packaging, etc
CO3	Distinguish between preservation methods appropriate for "natural" foods.

Course: FSC- 21: Fruit and Veg. Processing	
CO	Statement
CO1	Identify the spoilage in fruits and vegetables and state the reason for the
	spoilage following safety precautions.
CO2	Identify and select fresh fruits and vegetables with the help of checklist.
CO3	Identify spices and food additives by visual inspection.
CO4	Prepare and pack perishables for storage and then store under refrigerated
	conditions with safety precautions.
CO5	Prepare fruit juices with juice extracting machines with safety precautions
	and preserve fruit juices with addition of preservatives and determine the
	acidity and TSS content.

Course: FSC- 22: Food Packaging	
CO	Statement
CO1	The role, function and selection of packaging materials.
CO2	The physical and chemical properties of the packaging materials used for
	foods in relation to polymer processing, food properties and processing.
CO3	Principles and practices for the testing of packaging materials and package
	designs.
CO4	The principles of design and technology used to produce laminated
	packaging materials, active and smart packaging, and edible films.
CO5	Preservation, packaging and shelf life testing for a selection of foods.

Course: FSC- 23: Industrial Training	
CO	Statement
CO1	Explore career alternatives prior to graduation.
CO2	Integrate theory and practice.
CO3	Assess interests and abilities in their field of study.
CO4	Learn to appreciate work and its function in the economy.
CO5	Develop work habits and attitudes necessary for job success

CLASS: SY B.Voc.

SEMESTER: III

Course: FG- 31: Fundamentals of Financial accounting I	
CO	Statement
CO1	State the uses and users of accounting information;
CO2	Explain and apply accounting concepts, principles and conventions;
CO3	Record basic accounting transactions and prepare annual financial statements
CO4	Analyses, interpret and communicate the information contained in basic financial statements and explain the limitations of such statements

Course: FG- 32: Food Biochemistry	
CO	Statement
CO1	Identification of cell compartments and macromolecules in foods as well as
	their roles in biochemical process,
CO2	Biochemical process in ATP generating and role of foods,
CO3	Basic genetics in relation with food biotechnology.

Course: FG- 33: Snack Food Technology	
CO	Statement
CO1	An ability to apply knowledge for production of safe food and shelf-life
	extension of snack food products
CO2	An ability to identify, formulates, and solves food science and technology
	problems related to snack food.
CO3	An ability to extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data

Course: FG- 34: Environmental Science	
CO	Statement
CO1	In Environmental Studies major will be able to recognize the physical, chemical, and biological components of the earth's systems and show how they function.
CO2	An Environmental Studies major will be able to apply lessons from various courses through field experiences. These experiences will allow students to develop a better sense of not only individual organisms live.
CO3	Students will also see how natural systems and human-designed systems work together as well as in conflict with each other.

Course: FSC- 31: Spices and Plantation Crops	
CO	Statement
CO1	To impart knowledge on the principles of horticulture propagation and
	production techniques of tropical, sub tropical, temperate vegetable and
	spice crops.
CO2	Students will get to know about different processing techniques of fruits and vegetable crops and they make value added products like Masalas, Curry powder, Oils and Oleoresins etc.

Course: FSC- 32: H	Bakery and Confectionary
СО	Statement
CO1	Define and use the basic terminology and techniques of the professional
	baker and pastry chef;
CO2	Demonstrate proficiency in advanced techniques for specific baking & pastry
	applications;
CO3	Demonstrate the importance of local and seasonal products in professional
	baking;
CO4	Demonstrate station organization, purchasing, storage, menu writing, and
	sanitation principles as they apply to food handling;
CO5	Demonstrate responsibility and team skills for the food service industry;
CO6	Determine and appraise career opportunities within the baking industry.

Course: FSC- 33: Industrial Training	
СО	Statement
CO1	1. Explore career alternatives prior to graduation.
CO2	2. Integrate theory and practice.
CO3	3. Assess interests and abilities in their field of study.
CO4	4. Learn to appreciate work and its function in the economy.
CO5	Develop work habits and attitudes necessary for job success.

CLASS: SY B.Voc.

SEMESTER: IV

Course: FG- 41: FG- 41: Fundamentals of Financial accounting II	
CO	Statement
CO1	State the uses and users of accounting information
CO2	Explain and apply accounting concepts, principles and conventions
CO3	Record basic accounting transactions and prepare annual financial statements;
	and
CO4	Analyses, interpret and communicate the information contained in basic financial statements and explain the limitations of such statements.

Course: FG- 42: Plant Hygiene and Sanitation	
CO	Statement
CO1	Define and use correctly all of the key words printed in bold.
CO2	Describe the public health importance and objectives of food hygiene.
CO3	Describe the essential functions of food.
CO4	Outline the principle aspects of a food control system and explain why food
	control is important.

Course: FG- 43: Food Laws and Regulations	
CO	Statement
CO1	Become familiar with government statutes and regulations that contribute to
	a safe, nutritious, and wholesome food supply.
CO2	Understand how technological, social and political forces interact in the
	development of food law and regulation
CO3	Understand the differences and similarities between international and
	domestic food law and regulation.
CO3	Participate in an international network of legal, regulatory and scientific
	professionals regarding on food law issues.

Course: FSC- 41: Meat, Fish and Poultry Processing	
CO	Statement
CO1	Understand the importance of dairy and fishery industry, the techniques that
	can be used for preservation of fish and manufacturing of various value
	added fish products.
CO2	Understand the need and importance of livestock, egg and poultry industry
	Understand the structure, composition and nutritional quality of animal
	products.
CO3	Understand the of concept and methods of processing and preservation of
	animal foods.
CO4	Understand the technology behind preparation of various animal food products and byproduct utilization.

Course: FSC- 42: Dairy Technology	
CO	Statement
CO1	Understand the various properties and composition of milk and the
	technology of manufacturing of various products like butter, ghee, flavored
	milk, yoghurt, dahi, shrikhand, ice cream, cheese, channa, paneer, condensed
	milk and milk powder.
CO2	Understand market milk industry stages of milk processing and working of a few dairy equipments

Course: FSC- 43: Industrial Training	
CO	Statement
CO1	Explore career alternatives prior to graduation.
CO2	Integrate theory and practice.
CO3	Assess interests and abilities in their field of study.
CO4	Learn to appreciate work and its function in the economy.

CLASS: TY B.Voc.

SEMESTER: V

Course: FG- 51: Entrepreneurship Development	
CO	Statement
CO1	To impart basic accounting knowledge as applicable to business.
CO2	To develop right understanding regarding role and importance of monetary and financial transaction in business.

Course: FG- 52: Food Plant Design and Layout	
CO	Statement
CO1	To acquaint the students with the plant layout operation which is required by
	all industries
CO2	To check their comparative factors as equipment position raw material
	handling and end product delivery.

Course: FG- 53: Snack Food Technology	
СО	Statement
CO1	Introduce students to methods of frying, baking, drying, heat processing,

	flaking, blending, coating & chipping.
CO2	Inform students on technical mechanism of extrusion.
CO3	Introduce students to various types of traditional and industrial snacks food.

Course: FSC- 51: Industrial Microbiology	
СО	Statement
CO1	To learn about industrial microbiology and its Fermentation process
CO2	To give the students broad theoretical and practical skills in industrial microbiology.
CO3	This course covers the principles of various processes associated with the production and recovery of different bio-products derived from microorganisms.

Course: FSC- 52: B	Severage Technology
СО	Statement
CO1	In this Course the students will be exposed to the knowledge of beverage
	types and manufacturing process involved in different beverage
	manufacturing industries.

Course: FSC- 53: Industrial Training	
СО	Statement
CO1	1. Explore career alternatives prior to graduation.
CO2	2. Integrate theory and practice.
CO3	3. Assess interests and abilities in their field of study. Learn to appreciate
	work and its function in the economy

CLASS: TY B.Voc.

SEMESTER: VI

Course: FG- 61: Business Management	
CO	Statement
CO1	To impart basic Business knowledge as applicable to business.
CO2	To develop right understanding regarding role and importance of
	management features in business
CO3	Introduce students to various types of traditional and industrial snacks food.

Course: FG- 62: Waste management and Utilization	
CO	Statement
CO1	To acquaint the students with the major source of living i.e. water, its
	treatment, analysis and how to make it potable. Waste management and new
	product development.

Course: FG- 63: Design and Development of New Product	
СО	Statement
CO1	To know the role of government rules and regulation in food business.
CO2	To familiar with global marketing with respect to food laws and regulations.
CO3	To implement various government policies for the growth of food business.

Course: FSC- 61: Food Quality control and Assurance	
CO	Statement
CO1	To learn about physical and chemical contaminants in foods.
CO2	To develop an understanding and methodologies of instrumental techniques
	in food analysis used for objective methods of food quality parameters.

Course: FSC- 62: Mini Project and Marketing	
CO	Statement
CO1	1. To design and develop new product.
CO2	2. To develop marketing ability.
CO3	3. To develop the ability to undertake problem identification,
-----	--
	formulation and solution.
CO4	4. To apply their knowledge of basic science and engineering
	fundamentals in their project work.
CO5	5. Develop understanding of various field activities in which students
	are going to play a role as food technologists after completing
	diploma.
CO6	6. Develop understanding of subject based knowledge given in the class
	room in the context of its application at work places.

PO, PSO, CO_OF FOOD PROCESSING AND QUALITY MANAGEMENT

Rayat Shikshan Sansth's

Annasaheb Awate Arts Commence & Hutama Babu Genu Science College, Manchar

Department Of B.Voc. (Accounting & Taxation)

COURCE OUTCOME

F.Y.B. Voc.

SEMESTER I

101-Introduction to Functional English

Course Outcomes:

1 Recognize various elements of English Language

2 Demonstrate appropriate Body language.

3. Equipped with communication competencies required in various group discussions, meetings, etc. at workplace.

102-Basics of Financial Accounting

Course Outcomes:

1. Describe the basic accounting terminology & concepts of

Financial Accounting

2. Prepare final accounts of trading and non-trading company.

103- Indian Taxation System

Course Outcomes

1. Understand the concepts & Terminology of Taxation

2. Understand the difference between Indirect Taxation in terms of SGST, CGST & IGST Syllabus: Unit Number Contents.

104-Macro Economics

Course Outcomes

1. Define various concepts about the macro economics.

2. Understand the relationship between the Macroeconomic and Accounting and Taxation.

105-Lab in Tally-1

Course Outcomes

- 1. Understand various concepts and utilities of Tally.
- 2. Demonstrate the skills to work in accounting using the Tally.

106-Lab in GST-Levy and Collection

Course Objectives

- 1. To acquaint students with basic concepts of GST
- 2. To enable to student to acquire hands on skills on GST.

SEMESTER II

201-Micro Economics

Course Outcomes:

- 1. Understand the basic concepts of Micro Economics.
- 2. Explain the relationship between micro economics and Business

202-Cost and Management Accounting

Course Outcomes:

1. Define the basic concepts of Cost and Management Accounting.

2. Acquired skills on concept of Cost Accounting, Methods of Cost Accounting, Construction of Cost Sheet, Concept of Break Even Analysis, Material, Lab our and Syllabuses: head costing.

203-Basics of Direct Taxation

Course Outcomes:

1. Understand the basic concepts of Direct Taxation

2. Acquired skills on calculation and computation of Direct Taxes Syllabus: Unit Number Contents Number.

204-Indirect Taxation

Course Outcomes:

- 1. Define the basic concepts of Indirect Taxation
- 2. Acquired skills on calculation and computation of Indirect Taxes

205-Lab in Tally-II

Course Outcomes:

- 1. Understand the Business concept of Tally
- 2. Develop skills to start and manage business using Tally

206-Lab in GST-Provisions and Procedures

Course Outcomes:

- 1. Define & explain the basic concepts of GST
- 2. Acquired hands on skills on GST.

S. Y. B. Voc.

SEMESTER III

301-State Goods and Services Tax (SGST)

Course Outcomes:

1. Understand the fundamental concepts & practical aspects of collection & tax levy.

2. Understand & apply know ledge of SGST that will ease out the in traction with GST Authorities & even generate self- employment.

302-Business Math's & Statistics

Course Outcomes:

1. Demonstrate the ability to deal with the quantitative III Management.

2. Apply the statistical functions by the use of various quantitative techniques used in Business.

303-Risk Management

Course Outcomes:

1. Analyze & identify existing & potential risk that would affect the business.

2. Quantify the Risk for developing precautionary measures as well as mitigate them.

304-Payroll & Inventory - Accounting & Management

Course Outcomes:

1. Handle, manages, and creates pays lips, salaries, and deductions of the employees.

2. Understand how to use basic concepts, strategies and techniques to analyze a variety of inventory systems and make optimal decisions for the improvement of these system s& Inventory Management.

305-Practical in Payroll & Inventory-Accounting & Management

Course Outcomes:

- 1. Demonstrate the practical aspects of Payroll accounting
- 2. Understand the practical aspects of Inventory Management techniques.

306-Lab in Excel

Course Outcomes:

- 1. Create and use basics spreadsheets
- 2. Apply different form Ulsan shortcuts for entering and analyzing data.

SEMISTER IV

401-Advanced Direct Tax

Course Outcomes:

- 1. Understand the basic concepts in Income Tax Act, 1961.
- 2. Calculate Gross Total Income and Tax Liability of an Individual.

402-Central Goods & Service Tax (CGST)

Course Outcomes:

- 1. Understand the importance of CGST
- 2. Illustrate how the filing & refund of CGST is done.

403-Financial Reporting

Course Outcomes:

1. Acquired knowledge in preparation of financial statements in accordance with statutory requirements.

2. Understand the financial statements in detail.

404-Business Law

Course Outcomes:

1. Define the general business law & to help become more informed sensitive and effective business leaders.

2. Developed an understanding off fundamental legal issues pertaining to the business world to enhance the inability to manage businesses effectively.

405-Lab in Income Tax

Course Outcomes:

- 1. Explain student with different types of forms for filing Taxes.
- 2. Make use of the online filling of various forms and Returns.

406-Lab in TDS&TCS

Course Outcomes:

- 1. Make use of the know ledge in payment of tax & Filing of returns.
- 2. Understand the various forms required & create ledgers for TDS.

T. Y. B. Voc.

SEMISTER V

501-Business ethics and Corporate Governance

Course Outcomes:

1. The course wills Enable students to gain knowledge about corporate governance audits relevance in the business environment.

2. The course will help students understand the legislative frame work of corporate governance in India

3. Students will have understanding of importance of ethical practices in business and its relevance Syllabuses:

502-Indian Financial System

Course Outcomes:

1. The course will acquaint students with basic concepts of Indian Financial System

2. The courses will enable to student to various structure and functioning of Indian Financial System

3. Students will understand the regulator structure of Indian Financial System.

503-Advanced Goods and Services Tax

Course Outcomes:

1 Student will be a ware about taxability in GST

2 Demonstrate working on GST Portal Understand various GST return form and other compliances

504-Corporate Finance

Course Outcomes:

1. Student will understand the exiting condition of corporate finance in India.

2. The course will be power students with various tools and techniques used in Financial Management.

3. The courses will enable student with various international sources of finance

505-Lab in Analysis of Financial Statement

Course Outcomes:

1. The course will help students understand with tools of Financial Statement Analysis

2. Develop skills to Analysis Balance sheet, P&L, CFS&FF.

506-Finishing School

Course Outcomes:

1. The course will acquaint students with basic concepts of Finance required in industry

2. The courses will enable to student to acquire hands on financial analysis, modeling, and MF& portfolio management.

SEMESTER VI

601- Entrepreneurship Development

Course Outcomes:

1. The course will enable students to gain know ledge about

2. The courses will help students understand various skills and training institutes associated with ED India

3. It will make understand government scheme, incentives & theories of Entrepreneurship 602-IFRS (International Financial Reporting Standards

602 IFRS

Course Outcomes:

1. The course will enable students to gain insights abc TCDS

2. The course will help understand structure and elements IFRS

3. The course will make students a ware about IFRS Disclosure

603-E-Commerce

Course Outcomes:

1. This course will make students will understand the application of Ecommerce usage and me

2. This course will enable students will learn various concepts and principles in current scenario

3. The subject enables the students to clear their fundamentals and learn the practical approach fit

604-Financial Management: Analysis of financial Statement

Course Outcomes:

1 Analyze the situation and comment on financial position of the firm

2 Understand the impact of Business decisions on Financial Statement

605-Lab in Entrepreneur

Course Outcomes:

1 The course will enable student to how to profile entre pruner character sketch

2 Experience hands on leaning and practice of entrepreneur

606-Lab in IFRS

Course Outcomes:

1 Define the basic concepts of Finance required in industry

2 Acquire hands on financial analysis, modeling, and MF & portfolio management outcome.