Bapuraoji Butle Arts,Naraynrao Bhat commerce and Bapusaheb Patil Science College ,Digras

Department of Botany

Programme Outcomes,Course Outcomes

Programme: B. Sc. Botany

POs: The students graduating with the degree B.Sc. with Botany will be able to

PO1.Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2.Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3. Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

PO6. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development. PO7. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

PSOs:

Upon completion of the programme successfully, students would be able to

1. Identify major groups of plants and compare the characteristics of lower (microbes, algae ,fungi, bryophytes and pteridophytes) and higher (Gymnosperms and angiosperms).

2. use evidence based comparative botany approach to explain the evolution of organism and understand the genetic diversity.

3. explain various plant processes and functions, metabolism, concepts of gene, genome and how organism's function is influenced at the cell, tissue and organ level.

4. understand adaptation, development and behavior of different forms of life.

5. demonstrate the experimental techniques and methods of their area of specialization in Botany

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Semester I

Code of the Course/Subject - BOT(1S)/Botany

Title of the Course/Subject BOT(1S)/Botany DIVERSITY Of MICROBES , PHYCOLOGY, MYCOLOGYAND PHYTOPATHOLOGY

Cos

After completion of this course successfully , the students would be able to

1. understand microbial diversity, reproduction and economic importance.

2. differentiate the microbes, algae and fungi on the basis of morphology, cellular organization, nutrition and metabolic activities.

3. classify and identify the various algal genera.

4. classify and identify the various fungal genera.

5. Systematize the plant diseases and their pathogens

6. Apply understanding of microbial diversity, phycology and mycology for teaching primary to high school

BOT(1S)/BOTANY Practical

COs

After completion of this course successfully , the students would be able to

1. Identify and classify the algae on the basis of morphology and other characters.

2. Create monograph of Algae and Fungi.

3. Demonstrate the structural details of viruses and bacteria included in practical work.

4. Evaluate the plant diseases of local plants and diagnosed the diseases on the basis of symptology

Semester II

Code of the Course/Subject- BOT(2 S)/Botany

Title of the Course/Subject -Bryophytes, Pteridophytes, Gymnosperms and Morphology of Angiosperms

COs

After completion of this course successfully , the students would be able to

1. demonstrate on understanding of Archegoniate, Bryophytes, Pteridophytes and Gymnosperms.

2. identify and classify plants from Bryophytes, Pteridophytes and Gymnosperms.

B.B.N.B. Commerce & B.P. Science College ★ DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

3. develop critical thinking on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.

4. acquire skill of collection and preservation of Bryophytes, Pteridophytes and Gymnosperms .

Semester II

Code of the Course/Subject

Title of the Course/Subject (Laboratory/Practical/practicum/handson/Activity)

BOT(2S)/Botany Bryophytes, Pteridophytes, Gymnosperms and Morphology of Angiosperms, Utilization of Plants

Cos

By the end of the Lab/Practical Course, generally students would be able to:

1) Understand forms of Bryophytes, Pteridophytes and Gymnosperms.

2) Acquire the skill of preparation of slides of plant body and reproductive organs.

3) Classify and identify different plant parts on the basis of external morphology.

4) Describe the plants in technical language.

5) develop critical understanding on morphology, botanical names and cultivation practices of economically important plants..

Semester-III

3S-Angiosperms Systematics,Antomy & Embryology

Course Outcomes

After completion of all semesters students should be able to

3S-Angiosperms Systematics,Antomy & Embryology

1. Understand Origin & Evolution,Botanical Nomenclature,preparation of herbaria,Botanical Gardens,Concept of Biodiversity.

2.study systems of classification, Systematic study of dicotyledons(Polypetalae) .

3. Systematic study of dicotyledons(Gamopetalae) Monocotyledons family. .

4. Understand types of tissues Anatomy of root..

-5. Study anatomy of stem, anomalous structure in stem,antomy of leaf.

6. Understand Microsporogenesis,Megasporogenesis,Types of ovules.

Semester-IV

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

4S-Cell Biology,Genetics and Biochemistry

1.Study cell concept, cell wall structure, structure and functions of nucleus,Plasma membrane,Chloroplasts.

2. Understand Structure and functions of ER, Golgi complex,Vacuole,Ribosome, Mitochondrion, Mitosis and Meiosis .

3. Structure of Chromosomes, Chromosomal aberrations,Numerical aberrations.

4. Study Mendels laws, Intraction of Genes,Problems based on Mendelism.

5. Study Concept and types of Linkage,Crossing over, Gene mutation.

6. Understand Nomenclature and characteristics of enzymes,theories for mechanism of action of enzymes..

Semester-V

5S-Plant Physiology and Ecology

After completion of all semesters students should be able to

Course Outcomes

1. Study Plant water relations-Diffusion, Osmosis, Imbibition,Plasmolysis,Absorption of water, Ascent of Sap, Transpiration.

2. Understand plant metabolism like Photosynthesis, Respiration .

3. Study Nitrogen metabolism, Growth Senescence and Abcission.

4. Study plant responses like Photoperiodism,Vernalization,Plant movements, Stress physiology .

5. Study Concept of environment, Scope of ecology,Ecological factors, Atmosphere and composition,Edaphic factor, Ecological adaptations.

6. Understand Population ecology , Ecological Succession, Ecosystems.

Semester-IV

6S-Molecular Biology and Biotechnology

Course Outcomes

1.Study Chemical composition, Double helical model of DNA, DNA Replication, DNA packaging .

2. Understand Fine structure of gene,Gene expression, Transcription in eukaryotes .

3. Study Regulation of gene in Prokaryotes and Eukaryotes,Protein folding mechanism, Protein sorting.

4. Study tools and techniques of r-DNA technology, Restriction enzymes, Cloning vectors, Gene transfer technique, Gene amplification..

5. Study basic aspects of plant tissue culture, Laboratory requirements for tissue culture laboratory, Tissue culture techniques .

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

6. Understand Applications of Biotechnology in agriculture, industry, health care and conservation .

Programme- M. Sc. (Botany)

POs By the end of the programme, students would be able to

PO1 Deep subject Knowledge and intellectual breadth Apply the subject knowledge to the solution of real-world problems.

PO2 Professional Ethics Apply ethical principles and commit to professional ethics and responsibilities and norms of the standard practices.

PO3 Creative & Critical Thinking Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO4 Innovation, Research and Problem Solving Identify, formulate, review research literature, and analyze complex problems reaching substantiated and innovative conclusions. Design solutions for complex problems with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. Use research-based knowledge and research methods to provide valid conclusions. Demonstrate the knowledge of, and need for sustainable development.

PO5 Team work and Communication Skills Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. Present/communicate research at national/international level, write effective articles, reports and design documentation, make effective presentations, and give and receive clear instructions. Communicate disciplinary knowledge to the community and broader public.

PO6 Professionalism and Leadership Readiness Demonstrate personal accountability and effective work habits, e.g., punctuality, working productively with others, and time as well as workload management. Demonstrate integrity and ethical behavior, act responsibly with the interests of the larger community in mind, and to learn from his/her mistakes. Use the strengths of others to achieve common goals, and use interpersonal skills to coach and develop others. Assess and manage his/her emotions and those of others; use empathetic skills to guide and motivate; and organize, prioritize, and delegate work.

PO7 Lifelong learning Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PO8 Competence for Digital World Prepare well for living, learning and working in a Digital Society; Create, select, and apply appropriate techniques, resources, and modern ICT tools to complex activities with an understanding of the limitations. Use existing digital technologies ethically and efficiently to solve problems, complete tasks, and accomplish goals. Demonstrate effective adaptability to new and emerging technologies.

PO9 Global Citizenship Act with an informed awareness of global issues. Engage in initiatives that encourage equity and growth for all.

PSOs: After completing the programme successfully, students would be able to

1. explore the cutting edge technologies and skills currently used in plant sciences.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

2. Be aware of social, environmental issues and plant significance in natural interest.

3. create interest in nature conservation and save the natural resources.

4. study the concepts of genetics, plant breeding and their applicability.

5. understand and correlate the various biochemical and physiological processes in plants.

6. study the evolutionary process in Bryophytes and Pteriodophytes.

7. study the bioactive principles in plants and their defence mechanis

Programme M.Sc. Botany

Semester I

Code of the Course Subject- DSC I

Title of the Couse/ Subject- Cell and Molecular Biology

Cos :

Upon completion of this course successfully, students would be able to

1. understand structural organization and functional role of cell, organelles and biomolecules.

2. correlate the various life processes and their functioning.

3. understand the process of chromosomal organization and its role in cellular metabolism.

4. evaluate the various life processes and their regulations with special reference to regulation of gene expression

Code of the Course- AEC I

Subject Title of the Couse AEC I Molecular Techniques

Course Outcomes: Upon completion of this course successfully, students would be able to

1. Become expert in laboratory preparation as well as chemical preparations of different concentrations.

2. apply various formulas in preparations of reagents and are aware of their properties.

3. Apply various techniques at appropriate places as per required.

4. standardize the process and techniques on basis of knowledge.

5. Analyze and interpret the results with accuracy.

Code of the Course Subject - DSC II

Title of the Couse/ Subject -Evolution and Diversity of Algae and Fungi

Cos:

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Upon completion of this course successfully, students would be able to

1. Understand the phycology with special reference to Indian work.

2. Identify Algae in diversified habitats (Terrestrial, fresh water, marine) Criteria used in classification of algae, Role of algae in human welfare

3. Know General account of thallus organization, reproduction and life history of algae.

4. Study important groups of algae Cyanophyta, Chlorophyta, Charophyta, Xanthophyta, Bacillariopyta, Phaeophyta & Rhodophyta.

5. Study General Characters of Fungi Classification., Economic importance of fungi in medicine,

6. Use Algae and fungi in Agriculture (Biopesticide and biofertilizer) & Fungi as plant pathogen.

Code of the Course\ Subject- DSC III

Title of the Couse- Economic Botany and Resource Utilization

Cos :

Upon completion of this course successfully, students would be able to

1. Study the origin, divarication, utility and conservation strategies & natural resources

2. Study importance of food, fiber, medicines & oil yielding plant

3. Study the plants and their value in the service & mankind.

4. Study the conservation of biodiversity

Code of the Course /Subject- DSC IV

Title of the Couse/ Subject -Plant Development

Cos :

Upon completion of this course successfully, students would be able to

1. Deal with regulation of growth and development of plants in relation to bio-molecular interaction.

2. know the various structural and anatomical components of plant tissue and reproductive parts.

3. Understand Structure and development of Flower, Male gametophyte, Female gametophyte, Seed development, dormancy

Semester II

Code of the Course /Subject - DSC V

Title of the Couse/ Subject Plant Physiology

Cos :

B.N.B. Comm. Sc. & B.P. Science College DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Upon completion of this course successfully, students would be able to

Grasp concepts of proteins, enzymes, basic plant signaling mechanisms, sensory photobiology. deal with physiology of nutrient uptake, photosynthesis and nitrogen metabolism

Code of the Course/ Subject - AEC II

Title of the Couse/ Subject Modern Techniques

Cos :

Upon completion of this course successfully, students would be able to

1. learn about the latest techniques used in plant sciences
2. get training on the tools and techniques.
3. know the principle and applications of these techniques

Code of the Course Subject - DSC VI

Title of the Couse/ Subject -Evolution and Diversity of Bryophytes and Pteridophytes

Cos : Upon completion of this course successfully, students would be able to

1. understand evolutionary diversification of early land plants and morphology and reproduction in bryophytes, pteridophytes.
2. know the Ecological and Economic Importance of bryophytes, pteridophytes.
3. classify Bryophytes into various groups, study their importance
4. classify Pteridophytes into various groups, study their importance and multiplication of important ferns
5. know the applied aspects of Bryophytes and Pteridophytes

Code of the Course/ Subject - DSC VII

Title of the Couse/ Subject -Genetics and Plant Breeding

Cos:

Upon completion of this course successfully, students would be able to

1. understand the concept of classical and modern genetics clearly.
2. study the inheritance pattern.
3. know the role of chromosomes in evolution and the factors leading to changes in them.
4. study mutations and breeding and their significance in crop improvement.
5. study the variation in populations

Code of the Course /Subject- DSC VIII

B.B.A. N.B. Commerce & B.P. Science College DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Title of the Couse/ Subject -Plant Biochemistry and Pharmacognosy

Cos:

Upon completion of this course successfully, students would be able to

1. study the plant biochemistry and its various aspects.

2. study the metabolism and regulation of bio molecules.

3. understand the medicinal properties of plants and its constituents.

4. study the evaluation and standardization methods of drugs Plant Biochemistry and Pharmacognosy

Semester III

Paper IX-Biology and Diversity of Pteridophytes and Gymnosperms

Cos : Upon completion of this course successfully, students would be able to

1. understand evolutionary diversification of early land plants and morphology and reproduction in pteridophyte and Gymnosperms.

2. know the Ecological and Economic Importance of, pteridophytes and Gymnosperms.

3. classify Pteridophytes into various groups, study their importance and multiplication of important ferns

4. classify Gymnosperms. into various groups, study their importance and multiplication of important Gymnosperms.

5. know the applied aspects of Pteridophytes and Gymnosperms.

Paper X-Taxonomy of Angiosperms

Cos : Upon completion of this course successfully, students would be able to

1. understand evolutionary diversification of plants and morphology and reproduction in Angiosperms

2. Morphological characters of different families of Angiosperms..

3. classify Angiosperms into various groups, study their importance and multiplication of important Angiosperms

4.. know the Ecological and Economic Importance of Angiosperms

5. know the applied aspects of Angiosperms

Paper XI-Angiosperm Taxonomy,Phytochemistry and Pharmacognasy-I (Elective)

Cos : Upon completion of this course successfully, students would be able to

1. Understand basic principles and phytochemical techniques.

2.To study the basic aims and concepts of taxonomy.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

3.Classify Angiosperms into various groups, study their importance and multiplication of important Angiosperms

4. Understand the medicinal properties of plants and its constituents.

5. Study the evaluation and standardization methods of drugs Plant phytochemistry and Pharmacognosy

Paper XII-Angiosperm Taxonomy,Phytochemistry and Pharmacognasy-II (Elective)

Cos : Upon completion of this course successfully, students would be able to

1. understand evolutionary diversification of plants and morphology and reproduction in Angiosperms

2. Morphological characters of different families of Angiosperms..

3. classify Angiosperms into various groups, study their importance and multiplication of important Angiosperms

4. understand the medicinal properties of plants and its constituents.

5. study the evaluation and standardization methods of drugs Plant phytochemistry and Pharmacognosy

Semester IV

Paper –XIII-Plant Ecology

Cos : Upon completion of this course successfully, students would be able to

1.To understand the basic concepts and scope of ecology

2.Study Concept of environment, Scope of ecology,Ecological factors, Atmosphere and composition,Edaphic factor, Ecological adaptations.

3. Understand Population ecology , Ecological Succession, Ecosystems.

4.Understand the Ecosystem organization.

5. Understand the Ecosystem functional aspects.

Paper XIV-Environment Ecology

Cos : Upon completion of this course successfully, students would be able to

1.to understand the basic concepts and scope of environmental ecology.

2 to study the various aspects of Environmental pollution

3 to study the various aspects ofwater pollution.

3 to study the various aspects conservation strategies.

5 to study the various aspects sustainable management.

Paper XV-Plant Biotechnology

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Cos : Upon completion of this course successfully, students would be able to

1.to understand the basic concepts principles and scope of biotechnology.

2 to study the various aspects of somatic hybridization

3 to study the various aspects plant transformation technology

3 to study the various aspects Environmental biotechnology.

5 to study the applications of biotechnology.

Paper XVI-Genetic Engineering

Cos : Upon completion of this course successfully, students would be able to

1.to understand the basic concepts principles and scope of Genetic Engineering.

2 to study the various aspects and methods of gene cloning.

3 to study the various aspects sustainable development.

3 to study the various aspects enzymes and recombinant DNA technology

5 to study the applications of Genetic Engineering

.

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

B.B. ARTS, N.B. COMMERCE AND B.P. SCIENCE COLLEGE, DIGRAS

DEPARTMENT OF ZOOLOGY

2022-23

Programme Outcomes, Programs Specific Outcome and Course Outcome.

Department of Zoology	After successful completion of B.Sc three year degree program in Zoology a student is able to,
Programme Outcomes	**PO-1.** Understand history of Phylum of Non-Chordata & Chordata **PO-2.** Demonstration & understand the major concepts in Zoology. **PO-3.** To study & understand the classification of whole phyla of Non-Chordates & Chordates with the help of specimens/models/pictures. **PO-4**. Create awareness in students about biodiversity of Non-Chordates & Chordates **PO-5**.To create awareness of the impact of Zoology on the environment, society and development outside the scientific community **PO-6.** To inculcate the scientific temperament in the students and outside the scientific community.
Programme Specific Outcomes	**PSO-1.** Gain the knowledge of Zoology through theory & practical. **PSO-2.**Use modern zoological tools, models, charts, specimens &equipments. **PSO-3**. Understand the good laboratory practices and safety. **PSO-4**.Make aware & handle the sophisticated instruments/equipments. **PSO-5**.To develops research oriented skills.

B.B.A., N.B.Commerce & B.P.Science College ★ DIGRAS ★ E.S.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Course Outcomes B. Sc. Zoology

Semester - I

Course Outcomes	After completion of all semesters students should be able to
1S-Life and Diversity of Non-Chordata	**CO-1**. Understand the history of phylum. **CO-2** Understand about the non-chordate animals. **CO-3**. To study the external as well as internal character of non-Chordate. **CO-4**.to study the distinguishing character of non-chordate. **CO-5**.understand economic importance of some non-chordate animals. **CO-6**. Understand various internal systems. **CO-7.** Understand various diseases caused by protozoan parasite.

Semester-II

Course Outcomes	Life and diversity of chordata and concept of evolution
2S- Life and diversity of chordata and concept of evolution	. **CO-1**.understand history of phylum chordata. **CO-2**.To study the external as well as internal characters of chordates. **CO-3**.To study the distinguishing characters of chordates. **CO-4**. Understand the evolution. **CO-5.** Understand diversity of chordate animals among various graph. **CO-6**. To study the adaptive radiation.

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Semester-III

Course Outcome	Life and diversity of chordata and concept of evolution.
3S- Life and diversity of chordata and concept of evolution	**CO-1**.understand history of phylum chordata. **CO-2**.To study the external as well as internal characters of chordates. **CO-3**.To study the distinguishing characters of chordates. **CO-4**. Understand the evolution. **CO-5.** Understand diversity of chordate animals among various graph. **CO-6**. To study the adaptive radiation.

Semester-IV

Course Outcomes	After completion of all semesters students should be able to
4S-Advance genetics and animal ecology	**CO-1**.To study Mendel's law's of hereditary and interaction o gene. **CO-2**. Understand the terms linkage, crossing over, multiple alleles and sex determination disorders. **CO-3**. Aware the students with genetic disorders. **CO-4**. To study different concepts in ecology. **CO-5**. To study different types of ecosystem.

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Semester-V

Course Outcomes	After completion of all semesters students should be able to
5S –Animal physiology and economic zoology	**CO-1**. Understand the term of physiology. **CO-2**.To study the muscle physiology, nerve physiology and reproductive physiology. **CO-3**.To study the histology of various organs and endocrine glands. **CO-4**. Understand the economic importance of insects. **CO-5**.Understand the details of aquaculture. **CO-6**.Understand the significance of beneficial and harmful insects.

Semester-VI

Course Outcomes	After completion of all semesters students should be able to
6S-Molecular Biology and Biotechnology	**CO-1**.Understand the tools and techniques used in molecular biology and biotechnology. **CO-2**. To study types of mutation. **CO-3**. To study genetic material, protein synthesis, and concepts of gene **CO-4**. Understand the terms DNA fingerprinting, ELISA technique and RIYA technique **CO-5**To study concepts in immunology.

B.B.A., N.B.Commerce & B.P.Science College DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

B. B. Arts, N. B. Commerce & B. P. Science College, Digras Dist. Yavatmal

Department of Physics

Programme Outcomes:

At the time of graduation, students will be able to

1. Critical thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions(intellectual, organizational and personal) from different perspectives.
2. Effective Communication: Speak, read, write and listen clearly in person through electronic media in English and in one Indian language and make meaning of the world by connecting people, ideas, books, media and technology.
3. Social Interaction: Elicit views of others , mediate disagreements and help reach conclusions in group settings.
4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions and accept responsibility for them.
6. Environment and sustainability: Understand the issues of environmental contexts and sustainable
7. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life -long learning in the broadest context socio-technological changes.

Programme Special Outcomes:

Upon completion of the programme successfully, students will be able to

1. Acquire comprehensive knowledge and sound understanding of fundamentals of Physics
2. Develop laboratory skills, enabling them to take measurement in a physics laboratory and analyze the measurements to draw valid conclusions.
3. Be prepared to acquire a range of general skills, to solve problems, to evaluate information, to use computers productively, to communicate with society effectively and learn independently.
4. Develop good oral and written scientific communication skill.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Course Outcomes:

On successful completion of this course, the students would be able to

1. Discuss the basic concepts of rotational dynamics.
2. Examine the phenomenon of simple harmonic motion and distinction between undamped, damped and forced oscillations and the concept of resonance.
3. Explain the superposition of simple harmonic motion and acquire the knowledge of ultrasonic waves, their production, detection and applications in different field.
4. Determine the constant of elasticity and relate it with appropriate things
5. Interpret the postulates of special theory of relativity.
6. Know the concepts of Global Positioning Systems (GPS).
7. Discuss the concept of scalars & vectors and their properties.
8. Develop an understanding of Gauss law and its applications to obtain electric field in different cases.
9. Formulate the relationship between electric displacement vector, electric polarization and dielectric constant.
10. Distinguish between the magnetic effect of electric current, electromagnetic induction and the related laws in appropriate circumstances.
11. Simplify electrical circuits by applying various network theorems.
12. Apply the principles of measurement and error analysis.
13. Develop the skills to handle various instruments with precision.
14. Make the use of multimeter for the measurement of electrical parameters and get the knowledge of electronic components and their applications.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

15. Estimate the power consumption of domestic appliances and carry out energy audit.

On successful completion of practical course, the students would be able to

1. List out, identify and handle various equipments like different types of pendulums.
2. Learn the procedures of operation of various oscillating objects.
3. Acquire skills in observing and measuring different types of errors.
4. Perform procedures and techniques related to experiments based on mechanics.
5. Conduct experiments collaboratively and ethically.
6. Simplify various electrical circuits by using network theorems.
7. Learn the procedures of operation of electrical components like capacitor, resistor and inductor.
8. Acquire skills in measuring dielectric constants of different materials.
9. Perform procedures and techniques related to experiments based on electrical and electronic circuits.
10. Conduct experiments collaboratively and ethically.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

DEPARTMENT OF CHEMISTRY

Course

Following outcomes are considered for the students of B. Sc.1 Semester I.

By the end of this course, the students would be able to:

CHE(IS)T (Chemistry IS)

COs:

1. Solve the conceptual questions using the knowledge gained by studying periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements.
2. Apply concepts of acids and bases as well as non-aqueous solvents and their industrial usage.
3. Compare different reaction intermediates, functional group chemistry through the study of methods of preparation, properties and chemical reactions with underlying mechanism.
4. Choose correct synthetic approach to prepare derivatives of industrially important molecules
5. Solve different numerical problem of varying difficulty associated with gaseous and liquid state.
6. Apply the concepts from advanced mathematics to solve the derivation of different chemical formulae.

CHE(IS)PR

COs

At the end of Lab/Practical course, students would be able to

1. Synthesise different types of organic compounds.
2. Perform the process of filtration, crystallization, melting point, waste management.
3. Understand the effect of orientation effect of a group.
4. Skilfully determine the surface tension, viscosity of liquid.
5. Predict the endothermic or exothermic process from heat of solution of a salt.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Following outcomes are considered for the students of B. Sc.1 Semester II

By the end of this course, the students would be able to:

CHE (2S)T
COs

1. Apply the knowledge gained by studying types of bonding, solvation, hybridization and molecular geometries.
2. Draw the correct molecular structures, bond order and bond length.
3. Synthesize commercially important compounds of varying carbon backbone.
4. Choose correct synthetic approach to prepare derivatives of industrially important molecules.
5. Solve numerical problems related to crystalline state
6. Acquire skills to use chemical kinetics to develop mechanism of chemical reactions.

CHE (2S)PR

COs

At the end of Lab/Practical course, students would be able to –

1. Analyse the given organic compound qualitatively by different tests.
2. Prepare the derivative of the provided substance
3. Illustrate the practical skills in volumetric analysis.
4. Differentiate types of titrations e.g. acid-base, redox, etc.
5. Comprehend the kinetics of reactions and interpret the experimental data.
6. Calculate, communicate and analyses the result.

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Following outcomes are considered for the students of B. Sc.2 Semester III

Students of the class became aware and got the knowledge of following important points.

1. The basic quantum-mechanical approach to derive molecular orbitals from atomic orbitals.

2. Describe traits of bonding and anti-bonding molecular orbitals.

3. Students can calculate bond orders based on molecular electron configurations.

4. Students can write molecular electron configurations for first- and second-row diatomic molecules.

5. Related these electron configurations to the molecules' stabilities and magnetic properties.

6. Given a Lewis structure, distinguish between bonded pairs and non-bonded pairs of electrons

7. Use the Valence Shell Electron Pair Repulsion (VSEPR) model to predict the geometries of molecules and

8. Students got adequate knowledge of new thermodynamic properties as free energy, entropy.

9. Requirements for spontaneity of process.

10. Various conductance and their relationships.

11. How to measure the conductance.

12. Application qf conductance to study progress of different titrations.

13. How to purify and extract the compound by solvent extraction.

14.Students Gate knowledge about stereochemistry different types of isomerism like optical geometrical and conformational unit 6 liquid state students get brief knowledge about liquid state and its related concepts like surface tension effect of temperature on surface tension viscosity relative viscosity etc

15. Recognise and assign names to aldehyde and ketone.

16. How to write the mechanism for nucleophilic addition and nucleophilic elimination reaction of aldehyde and ketone and be able to predict the products of such reaction.

17. Predict the product of addition reaction to alpha beta unsaturated carbonyl compound.

18. Distinguish the applications of quantitative analysis.

19. Perform a systematic and skillful volumetric and Gravimetric analysis.

B.B.A. N.B.Commerce & B.P. Science College ★ DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Following outcomes are considered for the students of B. Sc.2 Semester IV

Students of the class became aware and got the knowledge of following important points.

1. New type of organic compounds such as heterocyclic, organometallic involved in our day to day life.

2. How the compounds can be synthesized.

3. Information of crystals, how to determine crystal structure etc.

4. How to determine the molecular formula of newly synthesized compounds from colligative property.

5. Students get knowledge about aromatic nitro compounds amino compounds diazonium salt and amino acid and proteins

6. Distinguish between monosaccharides, disaccharides and polysaccharides.

7. Identify several major functions of carbohydrates.

8. Lanthanaids and actinaids: Electronic configurations, oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides (ion exchange method)

9. Classify the various metallurgical operations.

A.N.B. Comm. & B.P. Science College ★ DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Following outcomes are considered for the students of B. Sc.3 Semester V

Students of the class became aware and got the knowledge of following important points.

1. The properties of the inner transition elements depending on the periodic properties in the Periodic table in addition to a comparative studies of the elements in their groups.

2. The spectroscopic and magnetic properties of the transition elements.

3. List several methods for concentration of ores and the methods and techniques for mineral processing is studied-

4. Describe the processes of oxidation and reduction and understand that oxidation of metals is a naturally occurring process.

5. Discuss the relationships between ligand binding in a metal complex and the degeneracy of the d orbitals and between the geometry of a metal complex and the splitting of the d orbitals.

. To understand the key features of coordination compounds, including:

- the variety of structures
- oxidation numbers and electronic configurations
- coordination numbers
- ligands, chelates
- bonding, stability of complexes

6. To be able to use Crystal Field Theory to understand the magnetic properties (and in simple terms the colour) of coordination compounds.

7. Describe the various deactivation processes of molecular excited states

8. Characterize the kinetics of deactivation processes and their role in the photochemical reactivity

9. Students get the idea of new type of compounds involved in our daily life.

10. Students get the Knowledge about the synthesis process.

11. Idea about spectra and its concerted concepts like selection rule ground term symbol orgel diagram spectrochemical series, other related concepts like EMI its characterization where parameter types of spectra degree of freedom energy level related to Electronic vibrational and

A.N.B. Commerce & D.P. Science College DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

rotational transitions selection rule rigid rotor moment of inertia zero point energy for Raman effect.

12. Discuss the properties of coordination compound.

13. Categorise coordination compound.

14. Consider effective atomic number theory and Werner's complexes.

15. Explain the spectroscopic properties of coordination compound.

16. To become familiar with some applications of coordination compound.

17. To be able to describe the shapes and structure of coordination complexes with coordination numbers ranging from 4 to 6.

18. Know the various pharmaceutical drugs, their application and synthesis.

19. To understand the function of dyes, paints and pigments.

20. Have the knowledge of various Pesticides, insecticide, fungicide & herbicides.

Following outcomes are considered for the students of B. Sc. III Semester VI

1. The students will be able to:

- Explain the basic principles of NMR.
- Show and explain function of the main units of an NMR instrument.
- Prepare a sample for an NMR experiment.
- Elucidate structure of an unknown compound from a set of NMR spectra.

2. Identify, describe and explain the function of the several components of a mass spectrometer (sample introduction, ionization source, mass analyzer and detector)

3. Students became aware of-

- Potential and pH
- Various electrodes
- Calculation of pH and potential to study the progress of Acid-base, precipitation titration.

4. Students get concept about electronic Spectroscopy its theory instrumentation types of electronic transition presentation of spectra and its related seats and its application in structure determination of organic compound

5.Organometallic compounds are very important in biological bodies like hemoglobin, chlorophyll vitamin B-12 and also they can be used as chemical reagents this topic discuss about the synthesis and properties of these organometallics.

6. Explain and rationalize the synthesis structure bonding properties and reactivity of metal carbonyls like $Ni(CO)_4$,$Fe(CO)_5$ and $Cr(CO)_6$.

7. Distinguish the spectrophotometry & colorimetry with complete instrumentation and determine the conc. of Cu (II) ions.

8. Explain the principles of paper chromatography techniques and to apply them.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Department of Chemistry

Programme: B.Sc. (Chemistry)

POs: At the time of graduation, Students would be able to..

PO1. Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2. Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3. Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO4. Effective Citizenship: Demonstrate empathetic social concern and equity centred nationa development, and the ability to act with an informed awareness of issues and participate in civ life through volunteering.

PO5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

PO6. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

PO7. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

PSOs: Upon completion of the programme successfully, the learners would be able to-

1. Understand the scope, methodology and application of modem chemistry.

2. Apply theoretical and practical concepts of instruments that are commonly used-in most chemistry field.

3. Plan and conduct scientific experiments and record the results of such experiments.

4. Get acquainted with safety of chemicals, transfer, and measurements of chemicals, preparation of solutions, and using physical properties to identity compounds and chemical reactions.

5. Describe how chemistry is useful to solve social, economic and environmental problem issues facing our society in energy, medicine, and health.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Department of Computer Science
B.Sc Computer Science

POs:
After completion of graduation, students will be competent to:

PO1: Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2: Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3: Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO4: Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5: Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

PO6: Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

PO7: Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Department of Computer Science
B.Sc Sem I
COs

Upon completion of this course successfully, Students would be able to -

1. Understand the computer, I/O and peripheral devices.
2. Understand concept of Operating systems.
3. Apply the Programming concepts.
4. Learn C language.
5. Write Simple C Programs.

COs:

1. To draw flowchart, learn Algorithms and write simple programs.
2. To assess the curricular skills acquired by students at college level through Assignments, Unit test, Internal Test, Group Discussion/Seminar/Mini Project, Study Tour

Activities

1. Assignment
2. Group discussion
3. Study tour/ Industrial visit (4 periods)

COs

Upon completion of this course successfully, Students would be able to demonstrate/perform/accomplish the following

1. Write word processing task.
2. Create worksheet and perform operations on it.
3. Design, compile and debug programs in C language.
4. Classify conditional expressions and looping statement to solve problems associated with conditions and repetitions.
5. Demonstrate the programs using arithmetic and relational operators.
6. Implement the concept of various string handling functions.
7. Classify programming components that efficiently solve computing problems in real-world.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Department of Computer Science
B.Sc Sem II

COs
Upon completion of this course successfully, Students would be able to -
1. Implement basic data structures such as arrays, stacks.
2. use linked list, trees and queues.
3. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.
4. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects. 5. Perform programming on functions, inline functions, constructor and destructor.
6. Perform programming on the concept of function overloading, operator overloading, virtual functions and polymorphism.

COs:
1. Acquire skill to work with core components of data structure
2. Acquire object oriented programming skill.

Activities
1. Assignment
2. Group discussion
3. Study tour/ Industrial visit

COs
Upon completion of this course successfully, Students would be able to demonstrate/perform/accomplish the following

1. Perform various operations Data structure using CPP.
2. Develop the concept of dynamic memory allocation through linked list.
3. Design stack and queue with contiguous and non-contiguous data storage mechanism.
4. Perform the various operations on binary tree.
5. Implement sorting on 1-D array using different techniques.

N.B. College & B.P. Science College DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

B. B. ARTS, N.B. COMMERCE & B. P. SCIENCE COLLEGE DIGRAS

Department of Mathematics

Course Outcome (2022-23)

Semester I: Maths I- Algebra and Trigonometry

After completing this course students would able to-

1. Find inverse and normal form of matrices
2. Evaluate the characteristics equations, eigen value and eigen vector of a given matrix.
3. Evaluate the relation between the roots and coefficients of equations
4. Study application of Demoivres Theorem
5. Compute summation of trigonometric series

Semester 1: Maths II – Calculus (Differential and Integral Calculus)

After completing this course students would able to-

1. Define limit and study the basic property
2. Classify the continuity and discontinuity of fuctions
3. Find derivative and evaluate limit by L'hospitals rule.
4. Describe geometrical applications of MVT
5. Evaluate the reduction formulae.

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Semester II: Maths III -Ordinary Differential equation

After completing this course students will able to-

1. Solve first order differential equation using different technique
2. Solve higher order differential equation and orthogonal trajectory
3. Calculate complementary function and particular integral
4. Solve second order differential equation by different methods
5. Illustrate application of differential equation

Semester II: Maths IV - Vector analysis and geometry

After completing this course students would be able to-

1Interprete vectors there products
2 determine curvature and torsion
3 use the concept of divergence curl and gradient
4 describe the different forms of sphere and properties
5 Discuss the equation of cone and cylinder

Semester III: Maths V - Advance calculus

Students will able to-

1. Decide convergence and divergence of sequence. 2. Decide convergence and divergence of series by using comparison test, Cuschy integral test, ratio test, root test, Lebnitz rule and Abels test. 3. Expand the function of two variables by Tailor's theorem. 4. Find maxima and minima of function of two variables by second derivative test and Lagranges multiplier method.5. Draw the region of double integral and evaluate it.

Semester III: Maths VI - Number theory

Students will able to

1. Find greatest common divisor by division algorithm and Euclidean algorithm method.

2. Find least common multiple and greatest common divisor by prime factorization. 3. Define prime numbers, composite numbers and Fermat numbers. 4. Define congruence relation and solve linear congruence.

5. Find the Euler's function, Tow and Sigma functions and define arithmetic and Mobius function.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

Semester IV: Maths VII - Modern Algebra

Students will able to-

1. Define group, subgroup, cyclic groups, permutation group and order of an element. 2. Define cosets, normal subgroup and quotient group, cyclic subgroups, and understand the structure and characteristics of these subgroups, 3. Define homomorphism, isomorphism, kernel and range of homomorphism.

4. Define ring, types of ring, integral domain and field. 5. Define ideal, quotient ideal and describe identity element of quotient ideal.

Semester IV: Maths VIII - Classical mechanics

Students will able to-

1. Define constrains and use D'Alemberts principle 2. Find extremals of function.

3. State Hamilton Principle.

4. Find Eulerian angle.

Semester V: Maths IX - Mathematical analysis

Students will able to-

1. Decideintegrability of functions. 2. Test the convergence & divergence of improper integral.

3. Verify Cauchy-Reimann equation and find the analytic function by Milne Thomson method. 4. Find critical points and decide the types of transformation.

Semester V: Maths X - Mathematical methods

Students will able to

1. Find Fourier series, Fourier series of even and odd function.. 2. Find Laplace transform of elementary function.

3. Solve ordinary D. E., partial D. E. and simultaneous D. E. by L. T.

4. Find Fourier transform, Finite - Transform, F-sine Transform and F-cosine Transform of the function.

Semester VI: Maths XI - Linear Algebra

Students will able to-

1. Define vector space, span, dependent and independent vectors, basis and dimension.

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS

2. Find range space and null space of linear transformation and verify rank nullity theorem.

3. Find Eigen value and Eigen vectors of linear transformation. 4. Find orthogonal and orthonormal sets.

Semester VI: Maths XII - Graph Theory

Students will able to-

1. Describe the origin of Graph theory 2. Illustrate different types of graphs.

3. Determine degree, vertex and edges of graph. 4. Draw diagrams of different graphs.

B.B.Arts, N.B.Commerce and B.P.Science College Digras

Department of Mathematics

Programme outcomes

At the end of programme graduate would be able to

1. Enhance the knowledge of students in all basic science
2. Identify , formulate and develop solutions to computational challenges
3. Develop scientific temper and think in critical manner
4. Build up progressive and successful career in academics industry, and society
5. Develop students abilities and aptitudes to apply the mathematical ideas

PSOs

After completion of programme successfully students would be able to understand

1. Major concepts in all disciplines of mathematics
2. Formulate and develop mathematical argument in a logical manner
3. Gain good knowledge and understanding in advance mathematics
4. Create and awareness of the impact of mathematics on environment , society and development outside the scientific community
5. Create sensitivity towards environmental concerns and contribute in the development of nation

DIGRAS

Principal,
B.B.Arts, N.B. Commerce &
B.P. Science College, DIGRAS