

B.Sc. Non – Medical

Program outcome, B. Sc. Non-Medical

1. Demonstrate, solve and understanding of major concepts in different disciplines of Non-medical i.e. Physics, Chemistry and Mathematics.
2. Think scientifically and draw a logical conclusion and solve problems independently.
3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of the experiments.
4. Use modern techniques, lab equipment to have experiment knowledge about subject.

Program specific outcomes B. Sc. Physics

On the completion of the B. SC. Non-Medical the students are able to:

1. Develop scientific attitude and temperament and give emphasis on the development of experimental skills, data analysis, calculation, measurements and also on the limitations and precautions about the experimental method data and results obtained.
2. Understand the conceptual development of the subject and its application in emerging areas of Physic , Chemistry and Mathematics
3. Understand the scientific theories and its relevance in present context.
4. Study mathematical tools to solve the problems in various branches in Physics
5. To enhance experimental skill through experiments in diverse fields.

ਕੋਰਸ ਦਾ ਨਾਂਮੁੱਢਲੀ ਪੰਜਾਬੀ

ਕਲਾਸਬੀ ਏ/ਬੀ ਐੱਸ ਸੀ/ਬੀ ਕੋਮ ਬੀ ਸੀ ਏ/ਬੀ ਐੱਸ ਈ ਆਈ ਟੀ/

ਬੀ ਵੋਕ/ਬੀ ਐੱਮ ਐੱਮ/ਬੀ ਜੇ ਐੱਮ ਸੀ

ਸਮੈਸਟਰਪਹਿਲਾ

ਕੋਰਸ ਦਾ ਉਦੇਸ਼

- * ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨੀ ਅਤੇ ਲਿਖਣੀ ਸਿਖਾਉਣੀ
- * ਵਿਆਕਰਣ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਬਾਰੇ ਦੱਸਣਾ
- * ਪੰਜਾਬੀ ਸਾਹਿਤ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨਾ
- * ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ
- * ਸੰਵਾਦ ਰਚਾਉਣ ਦੇ ਯੋਗ ਬਣਾਉਣਾ

ਕੋਰਸ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ

(ੳ) ਬੌਧਿਕ ਹੁਨਰ

- * ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦੇ ਯੋਗ ਹੋਣਾ
- * ਵਿਆਕਰਨ ਬਾਰੇ ਗਹਿਰਾਈ ਨਾਲ ਜਾਣਕਾਰੀ ਹੋਣਾ
- * ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ ਦਾ ਅੰਤਰ ਪਤਾ ਹੋਣਾ
- * ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਸਾਹਿਤਕ ਕਿਰਤਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹੋਣਾ

(ਅ) ਅਮਲੀ ਹੁਨਰ

- * ਮਾਤ ਭਾਸ਼ਾ ਪ੍ਰਤੀ ਸਤਿਕਾਰ ਦੀ ਭਾਵਨਾ
- * ਵਿਆਕਰਨ ਦੇ ਨਿਯਮ ਸਮਝਣ ਦੀ ਯੋਗਤਾ
- * ਸ਼ੁੱਧ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਅਤੇ ਲਿਖਣ ਦੀ ਯੋਗਤਾ
- * ਈ-ਸਰੋਤਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹੋਣਾ

(ੲ) ਵਿਸ਼ੇ ਨੂੰ ਵਿਹਾਰਕ ਪੱਧਰ 'ਤੇ ਵਰਤਣ ਦਾ ਹੁਨਰ

- * ਸ਼ੁੱਧ ਸੰਚਾਰ ਕਰਨ ਦੀ ਯੋਗਤਾ
- * ਟੀਮ ਵਰਕ ਦੀ ਯੋਗਤਾ
- * ਚੰਗੀ ਲੀਡਰਸ਼ਿਪ ਦੀ ਯੋਗਤਾ
- * ਸਮਸਿਆਵਾਂ ਨੂੰ ਸਮਝਣ ਅਤੇ ਹੱਲ ਕਰਨ ਦੀ ਯੋਗਤਾ

ਪਰਚਾ: ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਕੋਰਸ ਦਾ ਨਾਂ: ਬੀ.ਏ / ਬੀਐੱਸ.ਸੀ / ਬੀਐੱਸ.ਸੀ (ਬੀ.ਟੀ.) / ਬੀ.ਕਾਮ/ ਬੀ.ਸੀ.ਏ/ ਬੀ.ਵਾਕ/ ਬੀ.ਐਮਐਮ

ਸਮੇਸਟਰ: ਪਹਿਲਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ :

ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਕੀਤੀ ਜਾਵੇਗੀ। ਬੌਧਿਕ ਪੱਧਰ ਤੇ ਵਿਕਾਸ ਕੀਤਾ ਜਾਵੇਗਾ। ਅਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕੀਤੀਆਂ ਜਾਣਗੀਆਂ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਆਪਣੀ ਮਾਂ ਬੋਲੀ ਵਿਚ ਸੰਚਾਰ ਕਰਨ ਲਈ ਉਤਸ਼ਾਹਿਤ ਕੀਤਾ ਜਾਵੇਗਾ। ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਵਿਦਿਅਕ, ਬੌਧਿਕ ਅਤੇ ਸਰਬਪੱਖੀ ਪ੍ਰਤਿਭਾਵਾਂ ਨੂੰ ਉਭਾਰਨ ਵੱਲ ਵਿਸ਼ੇਸ਼ ਧਿਆਨ ਦੇਣਾ।

ਕੋਰਸ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ :

1. ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੋਣਗੀਆਂ।
2. ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
3. ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੋਵੇਗਾ।

ਬੌਧਿਕ ਹੁਨਰ:

1. ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੋਚਣ ਸ਼ਕਤੀ ਵਿਚ ਵਾਧਾ ਹੋਵੇਗਾ।
2. ਅਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੋਣਗੀਆਂ।
3. ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋਣਗੇ।
4. ਕੋਈ ਵੀ ਸਾਹਿਤਕ ਰਚਨਾ ਦੇ ਕੇ ਉਸ ਵਿਚਲੇ ਵਿਸ਼ੇ ਨਾਲ ਸੰਬੰਧਿਤ ਪਰਤਾਂ ਉਜਾਗਰ ਕਰਨ ਦਾ ਹੁਨਰ ਵਿਕਸਿਤ ਕੀਤਾ ਜਾਵੇਗਾ।

ਅਮਲੀ ਹੁਨਰ:

1. ਇਸ ਪ੍ਰੋਗਰਾਮ ਦੇ ਜਰੀਏ ਪ੍ਰਾਪਤ ਕੀਤੇ ਗਿਆਨ ਨੂੰ ਵਿਦਿਆਰਥੀ ਵੱਖ-ਵੱਖ ਖੇਤਰਾਂ ਵਿਚ ਲਾਗੂ ਕਰ ਸਕਦੇ ਹਨ।
2. ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
3. ਆਪਣੀ ਮਾਂ ਭਾਸ਼ਾ (ਪੰਜਾਬੀ) ਦੇ ਵਿਕਾਸ ਵਿਚ ਅਹਿਮ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

ਵਿਸ਼ੇ ਨੂੰ ਵਿਹਾਰਿਕ ਪੱਧਰ ਤੇ ਵਰਤਣ ਦਾ ਹੁਨਰ:

ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ ਵਿਚਲੇ ਲੇਖਾਂ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਕੇ ਵਿਦਿਆਰਥੀ ਉਸਾਰੂ ਸੋਚ ਅਤੇ ਪਾਰਦਰਸ਼ੀ ਨਜ਼ਰੀਏ ਨਾਲ ਸਮਾਜ ਵਿਚ ਵਿਚਰਣ ਦੇ ਯੋਗ ਹੋਣਗੇ। ਨਾਟ ਕਲਾ ਦੇ ਜਰੀਏ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਿਕ ਮਸਲਿਆ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੋਣਗੇ ਅਤੇ ਸਮਾਜ ਨੂੰ ਵੀ ਜਾਗਰੂਕ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋਣਗੇ।

Objective of the Course: Educate students in both the artistry and utility of the English language through the study of literature and other contemporary forms of culture. Develop their intellectual, personal and professional abilities.

GRAMMAR

• Simple present tense • Be in the present tense • Singular/plural forms of regular nouns • Parts of speech

LITERATURE

Understand a basic paragraph • Scan for specific words in a text • Know most sound-to-letter correspondences • Write sentences using a limited vocabulary • Write a paragraph using a limited vocabulary • Copy a paragraph correctly

Course Outcomes:

Knowledge and Understanding:

Knowledge of major literary works, genres and critical traditions

Understand and empathize with other cultures and people through exploring their literary traditions

- Knowledge of linguistic, literary, cultural contexts in which literature is written and read
- Understanding:
- Written and oral communication skills - ability to define audience, construct an argument, present an idea, and provide background information on a variety of issues
- Write and speak with clarity and precision, and learn the best methods to persuade an audience
- Detailed, balanced and rigorous examination of texts or spoken language and the ability to articulate interpretations to others
- Sensitivity to how communication is shaped by circumstances, authorship and intended audience
- Sensitivity to the power of language and its role in creating meaning

- A broad vocabulary and ability to use critical terminology appropriately
- Skills in a variety of research methods and the ability to accurately and appropriately present research

Intellectual, Cognitive / Analytical Skills :

- Write and speak with clarity and precision, and learn the best methods to persuade an audience
- Detailed, balanced and rigorous examination of texts or spoken language and the ability to articulate interpretations to others
- Sensitivity to how communication is shaped by circumstances, authorship and intended audience
- Sensitivity to the power of language and its role in creating meaning
- A broad vocabulary and ability to use critical terminology appropriately
- Skills in a variety of research methods and the ability to accurately and appropriately present research
- Awareness of how different social and cultural contexts affect the nature of language and meaning.

Practical Skills :

- Digital copywriter
- Editorial assistant
- English as a foreign language teacher
- Lexicographer
- Magazine journalist
- Newspaper journalist
- Publishing copy-editor/proofreader
- Secondary school teacher
- Web content manager
- Writer

Transferable Skills :

- **Setting schedules and working under deadline** - The bread and butter of an English major is meeting deadlines. That might mean reading 400 pages of Virginia Woolf and feminist literary criticism over five days, or conducting research for a 25-page term paper. Sometimes, it might mean cranking out a lengthy writing assignment on short notice. English majors routinely take on large projects that require them to manage their time efficiently, meet self-imposed deadlines, and work under time pressure to complete long- and short-term projects. Those skills are valuable in any workplace.
- **Communicating clearly and grasping tone** - Today, written communication reigns: email, instant messaging, texting, Twitter, Facebook, LinkedIn. That means writing skills are incredibly important. English majors know how to write crisply and concisely, and also have a strong grasp of tone. In business communications, for example, English majors will understand how to tailor their language to fit the company. English majors will also likely pick up the tone of an email from the boss or a client, and better understand what note to strike in the reply.
- **Thinking critically and arguing a point** - English majors are taught to rethink and question everything they read. Rarely is there one "right answer;" rather, there are many possible answers that can be interpreted and argued in different ways. "I think being able to take a work, a piece of literature, or anything in the written word and being able to analyze it and think about it and take it not necessarily at face value is something that can be used in many work settings," Goldman says. In learning to make an argument about a book, English majors are taught to pick a manageable topic, frame an argument, and present it effectively - skills that will serve them well for any workplace presentation or project.
- **Taking constructive criticism or "agreeing to disagree"** - Even though there's rarely one "right answer" in English, that doesn't mean everything is a right answer. Sometimes a professor will disagree with your point, or your argument will be discarded in favor of a classmate's. Goldman calls it the "ability to have healthy debate" and "understand how others argue their points." English majors learn to take constructive criticism.
- **Grammar and spelling** - Yes, this seems obvious, but far too few people these days have a solid knowledge of English grammar and a broad vocabulary. English majors love words. They know the difference between they're/their/there and why "less" is different

from "fewer." Everyone makes typos once in a while, but you can be sure most English majors are producing clean copy.

Paper Name: Electricity and Magnetism

Class: B.Sc. (Non Med and C.Sc.) Semester: 1st

Objectives of the Courses:

1. Provide the student with a broad spectrum of physics courses.
2. Emphasize the role of physics in life and other discipline (Chemistry, Mathematics and Biology).
3. To cultivate skills at formulating and solving physics problems.
4. To develop familiarity with physical concepts and mathematical relations of electromagnetism.
5. Provide the student with different practical, intellectual and transferable skills.

Course Outcomes:

A. Knowledge and Understanding:

Students will:

- Know how to define a various branches of Electricity and Magnetism.
- Understand and explain the basic concepts associated with the electric and magnetic field (e.g. Boit Savort Law, Implications of Maxwell equations, Gauss Law and other important laws of Electricity and Magnetism)
- Students will be able to understand basis of electricity and how does the things change in different situations.

B. Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Think critically about the theories of physics.
- Think critically about the contribution of various scientists in the particle world.
- Identify the different relations of momentum, energy, velocities etc.

- Think critically about the Maxwell relations.
- Think critically about the use of physics in our daily life.

C. Practical Skills:

Students will learn to:

- To practically demonstrate about applications of Faraday's law.
- To learn about Electricity and Magnetism and their applications.

D. Transferable skills:

Students will be able to:

- Use concepts of physics more effectively.
- Learn to think more creative as well as comparatively.
- Project Planning.
- Problem solving

Paper Name: Mechanics

Class: B.Sc. (Non Med and C.Sc.) Semester: 1st

Objectives of the Courses:

1. Provide the student with a broad spectrum of physics courses.
2. Emphasize the role of physics in life and other discipline (Chemistry, Mathematics and Biology).
3. To cultivate skills at formulating and solving physics problems.
4. To develop familiarity with physical concepts and mathematical relations of electromagnetism.
5. Provide the student with different practical, intellectual and transferable skills.

Course Outcomes:

E. Knowledge and Understanding:

Students will

- Understand basics formalism of Mechanics and its implications.
- Understand Foucault's Pendulum and motion of rigid bodies.
- Students will be able to understand motion of centre of mass.

F. Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Think critically about the theories of physics.
- Think critically about the contribution of various scientists in the particle world.
- Identify the different relations of momentum, energy, velocities etc.
- Think critically about the use of physics in our daily life.

G. Practical Skills:

Students will learn to:

- Study the characterizations of various applications of Ampere's Law
- To study the rigid body motions.
- To Understand behavior of Coupled Oscillator.

H. Transferable skills:

Students will be able to:

- Use concepts of physics more effectively.
- Learn to think more creative as well as comparatively.
- project planning
- Problem solving

Course Name **CHEMISTRY (INORGANIC CHEMISTRY-I)**

Class: **B.Sc (Medical & Non-Medical)**

Semester: I

Objective of the course:

- This course is intended to provide the students an in-depth understanding of the basic concepts of Inorganic Chemistry.
- To know the atomic structure, arrangement of elements in the periodic table and the periodic properties.
- To identify the nature of chemical bond as well as the existence of special types of compounds through weak chemical forces.

Course Outcomes:

- Acquire knowledge and understanding of essential facts, concepts, principles and theories relating to the Inorganic Chemistry.
- To develop skills to evaluate, analyze and solve problems competently.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Course Name **CHEMISTRY (ORGANIC CHEMISTRY-I)**

Class: **B.Sc (Medical & Non- Medical)**

Semester I

Objective of the course:

1. This course is intended to provide the students an in-depth understanding of the basic concepts of Organic Chemistry.
2. To understand the structure and bonding of organic compounds.

3. To know the method of naming and preparation of organic compounds, stereochemistry and the mechanism of organic reactions.
4. To understand the stereochemistry of aliphatic and aromatic hydrocarbons.

Course Outcomes:

- This course will equip the students with the necessary chemical knowledge concerning the fundamentals in the basic areas of Organic chemistry.
- To develop skills to evaluate, analyze and solve problems competently.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Class: B.Sc(Non Medical/Computer Science/Economics)/B.A

Course: Algebra Semester: I

Course Objectives:

The course on Algebra deals with advance topics on matrices viz. rank, eigen values, eigen vectors and homogeneous and non homogeneous systems, solution of cubic and bi-quadratic equations.

Course Outcomes:

A. Knowledge and Understanding:

- Understand all basic fundamentals of Matrices and vectors
- Learn to find rank of a matrix.
- Learn to solve linear system of equations (homogeneous and non homogeneous)
- Increasing Knowledge of the basic concepts of equations.
- Aware of a variety learning aids that can be used in the teaching of solving equations.
- Know how to transform the equation.

- Understand to solve cubic and bi-quadratic equations using Cardan, Descartes and Ferrari's method.

B. Intellectual(cognitive/Analytical) skills:

- Use the basic concepts of matrix algebra and vector, including linear dependence/independence, rank and nullity, for analysis of matrices and systems of linear equations.
- Use the characteristic polynomial to compute the eigen values and eigen vectors of a square matrix and use them to diagonalise matrices when this is possible; discriminate between diagonalizable and non- diagonalizable matrices.
- Orthogonally diagonalise symmetric matrices and quadratic forms.

C. General skills:

- Use questioning and explanation strategies to help students learn new concepts and to support students in their problem solving activities.
- Apply mathematical methods involving arithmetic, algebra to solve problems.
- Represent mathematical information and communicate mathematical reasoning symbolically and verbally.

ਕੋਰਸ ਦਾ ਨਾਮ : ਮੁੱਢਲੀ ਪੰਜਾਬੀ

ਕੋਰਸ ਦਾ ਨਾਂ: ਬੀ.ਏ / ਬੀਐੱਸ.ਸੀ / ਬੀਐੱਸ.ਸੀ (ਬੀ.ਟੀ.)/ ਬੀ.ਕਾਮ/ ਬੀ.ਸੀ.ਏ/ ਬੀ.ਵਾਕ/ ਬੀ.ਐਮਐਮ

ਸਮੇਸਟਰ -ਦੂਜਾ

- 1) ਕੋਰਸ ਦਾ ਉਦੇਸ਼ :- ਇਸ ਕੋਰਸ ਦਾ ਉਦੇਸ਼ ਵਿਦਿਆਰਥੀ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਮੁੱਢਲਾ ਗਿਆਨ ਦੇਣਾ ਜਿਸ ਨਾਲ ਉਹ ਭਾਸ਼ਾ ਦਾ ਸਹੀ ਰੂਪ ਵਿਚ ਉਚਾਰਨ ਤੇ ਵਿਆਕਰਣ ਬਾਰੇ ਮੁੱਢਲੇ ਤੌਰ ਤੇ ਚੰਗੀ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਕਰ ਸਕੇ। ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਬਣਤਰ ਬਾਰੇ ਦੱਸਦੇ ਹੋਏ, ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆ ਦੀ ਪਹਿਚਾਣ ਅਤੇ ਵਰਤੋਂ, ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ ਦੀ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਬਾਰੇ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਗਿਆਨ ਦੇਣਾ ਹੈ।

ਇਸ ਪ੍ਰੋਗਰਾਮ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ

- 1) ਇਸ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਹੋਵੇਗਾ।
- 2) ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਤੇ ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ ਬਾਰੇ ਜਾਣਕਾਰੀ।
- 3) ਆਪਣੀ ਮਾਤ ਭਾਸ਼ਾ ਪੰਜਾਬੀ ਚੰਗੀ ਤਰ੍ਹਾਂ ਜਾਣਕਾਰੀ ਤੇ ਸੁੱਧ ਉਚਾਰਨ ਕਰਨ ਵਿਚ ਕਾਮਯਾਬ ਹੋਣਗੇ ਅਤੇ ਉਨ੍ਹਾਂ ਦੇ ਅੰਦਰ ਹੋਰ ਭਾਸ਼ਾਵਾਂ ਸਿਖਣ ਤੇ ਸਮਝਣ ਦਾ ਹੌਸਲਾ ਹੋਰ ਵਧੇਗਾ।
- 4) ਬੱਚੇ ਆਪਣੀ ਮਾਂ-ਬੋਲੀ ਬਾਰੇ ਚੰਗੀ ਤਰ੍ਹਾਂ ਜਾਣਨਗੇ ਅਤੇ ਉਨ੍ਹਾਂ ਦੀ ਸ਼ਬਦਾਵਲੀ ਵਿਚ ਵਾਧਾ ਹੋਵੇਗਾ।

ਬੌਧਿਕ ਹੁਨਰ :

- 1) ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਸਹੀ ਰੂਪ ਵਿਚ ਸਮਝ ਸਕਣਗੇ ਅਤੇ ਉਸ ਬਾਰੇ ਖੁਦ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।
- 2) ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਿਆਕਰਣ ਰਾਹੀਂ ਸ਼ਬਦ ਜੋੜ, ਵਾਕ ਨੂੰ ਸਹੀ ਰੂਪ ਵਿਚ ਬਣਾ ਸਕਣਗੇ।
- 3) ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਤੇ ਸੱਭਿਆਚਾਰ ਨਾਲ ਜੁੜਣਗੇ।

ਅਮਲੀ ਹੁਨਰ (Practical skill)

1) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਸ਼ਬਦ ਜੋੜ, ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ, ਵਾਕ ਬਣਤਰ, ਨਾਵ-ਪੜਨਾਂਵ ਨੂੰ ਚਾਟ ਦੀ ਸਹਾਇਤਾ ਨਾਲ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰਨਾ ਸਿਖਾਇਆ ਜਾਵੇਗਾ।

2) ਵਿਦਿਆਰਥੀ ਨੂੰ ਪੰਜਾਬੀ ਵਿਆਕਰਣ ਦੀ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਲਈ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨਾਲ ਜੁੜੀਆਂ ਵੈਬਸਾਇਟ ਨਾਲ ਸਾਂਝ ਪਵਾਈ ਜਾਵੇਗੀ

3) ਬਲੈਕ ਬੋਰਡ ਜਾਂ ਚਾਰਟ, ਨੋਟ ਬੁੱਕ ਉਪਰ ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਸਬੰਧ, ਯੋਜਕ ਵਾਕ ਬਣਤਰ ਦੀ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਆਦਿ ਦਾ ਵਰਗੀਕਰਨ ਕਰਨਾ ਸਿਖਾਇਆ ਜਾਵੇਗਾ।

ਵਿਦਿਆਰਥੀ ਦੀ ਪਰਖ ਲਈ ਉਹਨਾਂ ਨੂੰ ਸਮੇਂ ਸਮੇਂ ਉਪਰ ਸਵਾਲ ਜਵਾਬ ਕੀਤੇ ਜਾਣਗੇ। ਉਹਨਾਂ ਤੋਂ ਲਿਖਤ ਕਾਰਜ ਕਰਵਾਇਆ ਜਾਵੇਗਾ। ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਉਪਰ ਬੋਲਣ ਜਾਂ ਚਾਰਟ ਤੇ ਬਲੈਕ ਬੋਰਡ ਦੀ ਸਹਾਇਤਾ ਰਾਹੀਂ ਉਹਨਾਂ ਦੇ ਹੁਨਰ ਨੂੰ ਪਰਖਿਆ ਜਾਵੇਗਾ।

ਭਾਸ਼ਾਂ ਦੇ ਵਿਵਹਾਰਕ ਪੱਧਰ ਤੇ ਵਰਤਣ ਦਾ ਹੁਨਰ

1) ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਣ ਦੇ ਯੋਗ ਹੋਣਗੇ।

2) ਪੰਜਾਬੀ ਦੇ ਨਵੇਂ ਸ਼ਬਦਾਂ ਤੇ ਵਾਕਾਂ ਨੂੰ ਬਣਾਉਣ ਵਿਚ ਸਮੱਰਥ ਹੋਣਗੇ।

3) ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਨੂੰ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੋਣਗੇ।

4) ਵਿਦਿਆਰਥੀ ਵਿਚ ਸੰਚਾਰ ਕਰਨ ਦਾ ਹੁਨਰ ਪਰਿਪੱਕ ਹੋਵੇਗਾ।

ਪਰਚਾ: ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਪ੍ਰੋਗਰਾਮ: ਬੀ.ਏ / ਬੀਐੱਸ.ਸੀ / ਬੀਐੱਸ.ਸੀ (ਬੀ.ਟੀ.) / ਬੀ.ਕਾਮ/ ਬੀ.ਸੀ.ਏ/ ਬੀ.ਵਾਕ/
ਬੀ.ਐਮਐਮ

ਸਮੇਸਟਰ –ਦੂਜਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ : ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਪੈਦਾ ਕੀਤੀ ਜਾਵੇਗੀ । ਬੌਧਿਕ ਪੱਧਰ ਤੇ ਵਿਕਾਸ ਕੀਤਾ ਜਾਵੇਗਾ । ਅਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕੀਤੀਆਂ ਜਾਣਗੀਆਂ। ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਆਪਣੀ ਮਾਂ ਬੋਲੀ ਵਿਚ ਸੰਚਾਰ ਕਰਨ ਲਈ ਉਤਸ਼ਾਹਿਤ ਕੀਤਾ ਜਾਵੇਗਾ। ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਵਿਦਿਅਕ ਬੌਧਿਕ ਅਤੇ ਸਰਬ-ਪੱਖੀ ਪ੍ਰਤਿਭਾਵਾਂ ਨੂੰ ਉਭਾਰਨ ਵੱਲ ਵਿਸ਼ੇਸ਼ ਧਿਆਨ ਦੇਣਾ।

ਇਸ ਪ੍ਰੋਗਰਾਮ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ :

- ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੋਣਗੀਆਂ।
- ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
- ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੋਵੇਗਾ।

ਬੌਧਿਕ ਹੁਨਰ:

1. ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੋਚਣ ਸ਼ਕਤੀ ਵਿਚ ਵਾਧਾ ਹੋਵੇਗਾ।
2. ਅਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੋਣਗੀਆਂ।
3. ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋਣਗੇ।
4. ਕੋਈ ਵੀ ਸਾਹਿਤਕ ਰਚਨਾ ਦੇ ਕੇ ਉਸ ਵਿਚਲੇ ਵਿਸ਼ੇ ਨਾਲ ਸੰਬੰਧਿਤ ਪਰਤਾਂ ਉਜਾਗਰ ਕਰਨ ਦਾ ਹੁਨਰ ਵਿਕਸਿਤ ਕੀਤਾ ਜਾਵੇਗਾ।

ਅਮਲੀ ਹੁਨਰ (Practical skill) :

1. ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
2. ਆਪਣੀ ਮਾਂ ਭਾਸ਼ਾ (ਪੰਜਾਬੀ) ਦੇ ਵਿਕਾਸ ਵਿਚ ਅਹਿਮ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।
3. ਵੱਖ ਵੱਖ ਨਾਇਕਾਂ ਦੀਆਂ ਜੀਵਨੀਆਂ ਪੜ੍ਹ ਕੇ ਵਿਦਿਆਰਥੀ ਪ੍ਰੇਰਿਤ ਹੋਣਗੇ।

Paper Name: Vibrations and Waves

Class: B.Sc. (Non Med and C.Sc.) Semester: 2nd

Objectives of the Courses:

1. Provide the student with a broad spectrum of physics courses.
2. Emphasize the role of physics in life and other discipline (Chemistry, Mathematics and Biology).
3. To cultivate skills at formulating and solving physics problems.
4. To develop familiarity with physical concepts and mathematical relations of vibration and waves.
5. Provide the student with different practical, intellectual and transferable skills.

Course Outcomes:

A. Knowledge and Understanding:

Students will:

- Know how to define various branches of Vibration and Waves.
- Understand and explain the basic concepts associated with Oscillation, simple harmonic oscillation, damped oscillations energy of oscillator (Mechanical and electrical), Waves.
- Students will understand and able to describe Oscillations and simple harmonic motion, and waves and standing waves.

B. Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Think critically about the theories of physics.
- Think critically about the contribution of various scientists in the particle world.
- Identify the different relations of displacement, velocities, acceleration and energy etc.

- Think critically about the basic motion of every particle in the Universe i.e vibration .
- Think critically about the use of physics in our daily life.

C. Practical Skills:

Students will learn to:

- To find the damping coefficient of a simple pendulum.
- To study Melde's experiment.
- To study Electrical oscillator.

D. Transferable skills:

Students will be able to:

- Use concepts of physics more effectively.
- Learn to think more creative as well as comparatively.
- Project planning.
- Develop Problem solving attitude.

Paper Name: Relativity and Electromagnetism

Class: B.Sc. (Non Med and C.Sc.) Semester: 2nd

Objectives of the Courses:

1. Provide the student with a broad spectrum of physics courses.
2. Emphasize the role of physics in life and other discipline (Chemistry, Mathematics and Biology).
3. To cultivate skills at formulating and solving physics problems.
4. To develop familiarity with physical concepts and mathematical relations of electromagnetism.
5. Provide the student with different practical, intellectual and transferable skills.

Course Outcomes:

A. Knowledge and Understanding:

Students will:

- Know how to define a various branches of Relativity And Electromagnetism.
- Understand and explain the basic concepts associated with the electric and magnetic field (eg. Boit Savart Law and Ampere's Law and their applications)
- Students will understand and able to describe the difference between the particles travelling with speed f light and with velocity very smaller than the speed of light.

B. Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Think critically about the theories of physics.
- Think critically about the contribution of various scientists in the particle world.
- Identify the different relations of momentum, energy ,velocities etc.
- Think critically about the Maxwell relations.
- Think critically about the use of physics in our daily life.

C. Practical Skills:

Students will learn to:

- Study the characterizations of various applications of Ampere's Law
- To study the variation of self and mutual inductance.

D. Tranferable skills:

Students will be able to:

- Use concepts of physics more effectively.
- Learn to think more creative as well as comparatively.
- project planning.
- Problem solving

Course Name **CHEMISTRY (INORGANIC CHEMISTRY-II)**

Class: **B.Sc (Medical & Non-Medical)**

Semester :**II**

Objective of the course:

- This course is intended to provide the students an in-depth understanding of the groups of elements in Inorganic Chemistry.
- To know the periodic properties of s, p and d block elements.
- To understand the physical and chemical properties of elements and their compounds.

Course Outcomes:

- Acquire knowledge and understanding of essential facts, concepts, principles and theories relating to the Inorganic Chemistry.
- To develop skills to evaluate, analyze and solve problems competently.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Course Name **CHEMISTRY (Physical CHEMISTRY–I)**

Class: **B.Sc (Medical & Non- Medical)**

Semester **II**

Objective of the course:

5. This course is intended to provide the students an in-depth understanding of the basic concepts of Physical Chemistry.
6. To understand the physical aspects of chemical reactions.
7. To know the methods of evaluating the physical parameters .
8. To understand the numerical concepts.

Course Outcomes:

- This course will equip the students with the necessary chemical knowledge concerning the fundamentals in the basic areas of Physical chemistry.
- To develop skills to evaluate, analyze and solve problems competently.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Class: B.Sc. (Non Medical/Computer Science/Economics)/B.A

Course: Calculus II

Semester: II

Course Objectives:

This course introduces the student to integral calculus with the techniques of integration and application of integration to physical problem.

Course Outcomes:

A. Knowledge and Understanding:

- Extend the concept of integrals to a variety of applications, establishing several integration
- Use a variety of mathematical techniques to evaluate integrals
- Develop problem solving skills through diverse applications of the integral
- Analyze the parameterization of curves and the polar coordinate system

B. Intellectual(cognitive/Analytical) skills:

- Examine various techniques of integration and apply them to definite and improper integrals,

- Approximate definite integrals using numerical integration techniques and solve related problems,
- Model physical phenomena using partial differential equations,-
- Compute limits of, differentiate, integrate and solve related problems involving functions represented parametrically or in polar coordinates,
- Differentiate, and integrate functions represented using power series expansions, including Taylor series, and solve related problems.

C. Practical skills:

Students will be able to:

- Evaluate iterated integrals and switch the order of integration.
- Find volumes of solids by calculating appropriate double integrals in rectangular and polar coordinates.
- Find surface area using a double integral.
- Evaluate triple integrals and use them to find volumes in rectangular, cylindrical and spherical coordinates.
- Use a Jacobian to make a change of variables in a double integral.

Department: Mathematics

Class: B.Sc (Non Medical/Computer Science/Economics)/B.A

Course: Calculus and Differential equations II Semester: II

Course Objectives:

This course provides an introduction to topics involving calculus and ordinary differential equations. Both Calculus and Differential equations have applications in all areas of applied Sciences and engineering. Upon completion, students will be able to understand the applications of differential and integral calculus and also demonstrate understanding of the theoretical concepts and select and use appropriate techniques for finding solutions to differential equations.

Course Outcomes:

A. Knowledge and Understanding:

- Write the definition of indefinite and definite integrals.
- Define the integral of the inverse trigonometric and hyperbolic functions.
- State the Fundamental theorem of calculus
- Find general solutions to first order, second order and higher order homogeneous and non-homogenous differential equations with constant and variable coefficients.
- find the series solution of differential equation

B. Intellectual(cognitive/Analytical) skills:

- Evaluate Indefinite integral involving hyperbolic functions and Definite integral of all the functions.
- Sketch the graph of curves (Cartesian and parametric co-ordinates)
- Calculate areas of plane regions and arc length.
- Select and apply appropriate methods to solve differential equations.
- Apply power series method to find solution of Differential equations involving Bessel and Legendre equations.
- Use fundamental theorem of calculus to evaluate integral involving algebraic and transcendental functions.

C. Practical skills:

- Present mathematics to others, both in oral and written form clearly and in a well organized manner.
- Have the ability to carry out complex calculations orally and mentally.

ਪਰਚਾ: ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਕੋਰਸ ਦਾ ਨਾਂ: ਬੀ.ਏ / ਬੀਐੱਸ.ਸੀ / ਬੀ.ਕਾਮ ਸਮੇਸਟਰ: ਤੀਜਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ :

ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਕੀਤੀ ਜਾਵੇਗੀ। ਬੌਧਿਕ ਪੱਧਰ ਤੇ ਵਿਕਾਸ ਕੀਤਾ ਜਾਵੇਗਾ। ਅਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕੀਤੀਆਂ ਜਾਣਗੀਆਂ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਆਪਣੀ ਮਾਂ ਬੋਲੀ ਵਿਚ ਸੰਚਾਰ ਕਰਨ ਲਈ ਉਤਸ਼ਾਹਿਤ ਕੀਤਾ ਜਾਵੇਗਾ। ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਵਿਦਿਅਕ, ਬੌਧਿਕ ਅਤੇ ਸਰਬਪੱਖੀ ਪ੍ਰਤਿਭਾਵਾਂ ਨੂੰ ਉਭਾਰਨ ਵੱਲ ਵਿਸ਼ੇਸ਼ ਧਿਆਨ ਦੇਣਾ।

Course Outcomes:

ਕੋਰਸ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ :

4. ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੋਣਗੀਆਂ।
5. ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
6. ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੋਵੇਗਾ।

ਬੌਧਿਕ ਹੁਨਰ:

5. ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੋਚਣ ਸ਼ਕਤੀ ਵਿਚ ਵਾਧਾ ਹੋਵੇਗਾ।
6. ਅਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੋਣਗੀਆਂ।
7. ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋਣਗੇ।
8. ਕੋਈ ਵੀ ਸਾਹਿਤਕ ਰਚਨਾ ਦੇ ਕੇ ਉਸ ਵਿਚਲੇ ਵਿਸ਼ੇ ਨਾਲ ਸੰਬੰਧਿਤ ਪਰਤਾਂ ਉਜਾਗਰ ਕਰਨ ਦਾ ਹੁਨਰ ਵਿਕਸਿਤ ਕੀਤਾ ਜਾਵੇਗਾ।

ਅਮਲੀ ਹੁਨਰ:

4. ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਨਾਟ ਕਲਾ ਅਤੇ ਰੰਗ ਮੰਚ ਪ੍ਰਤੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
5. ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
6. ਆਪਣੀ ਮਾਂ ਭਾਸ਼ਾ (ਪੰਜਾਬੀ) ਦੇ ਵਿਕਾਸ ਵਿਚ ਅਹਿਮ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

ਵਿਸ਼ੇ ਨੂੰ ਵਿਹਾਰਿਕ ਪੱਧਰ ਤੇ ਵਰਤਣ ਦਾ ਹੁਨਰ:

ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ ਵਿਚਲੇ ਲੇਖਾਂ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਕੇ ਵਿਦਿਆਰਥੀ ਉਸਾਰੂ ਸੋਚ ਅਤੇ ਪਾਰਦਰਸ਼ੀ ਨਜ਼ਰੀਏ ਨਾਲ ਸਮਾਜ ਵਿਚ ਵਿਚਰਣ ਦੇ ਯੋਗ ਹੋਣਗੇ। ਨਾਟ ਕਲਾ ਦੇ ਜ਼ਰੀਏ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਿਕ ਮਸਲਿਆ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੋਣਗੇ ਅਤੇ ਸਮਾਜ ਨੂੰ ਵੀ ਜਾਗਰੂਕ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋਣਗੇ।

- ਕੋਰਸ ਦਾ ਨਾਂ - ਮੁੱਢਲੀ ਪੰਜਾਬੀ
- ਕਲਾਸ - ਬੀ.ਏ / ਬੀਐੱਸ.ਸੀ / ਬੀਐੱਸ.ਸੀ (ਬੀ.ਟੀ.)/ ਬੀ.ਕਾਮ/ ਬੀ.ਸੀ.ਏ/ ਬੀ.ਵਾਕ/ ਬੀ.ਐਮਐਮ
- ਸਮੇਸਟਰ - ਤੀਜਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼: ਇਸ ਕੋਰਸ ਦਾ ਉਦੇਸ਼ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬਾਰੇ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ ਤਾਂ ਜੋ ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਪੜ੍ਹਣ ਤੇ ਲਿਖਣ ਦੇ ਯੋਗ ਹੋ ਸਕਣ। ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਵਿੱਦਿਅਕ, ਬੌਧਿਕ ਅਤੇ ਸਰਵਪੱਖੀ ਪ੍ਰਤਿਭਾਵਾਂ ਨੂੰ ਉਭਾਰਨ ਅਤੇ ਉਘਾੜਨ ਵੱਲ ਵਿਸ਼ੇਸ਼ ਧਿਆਨ ਦੇਣਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਿਕ ਨੇਮਾਂ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਤਾਂ ਜੋ ਉਹ ਭਾਸ਼ਾ ਦਾ ਸਹੀ ਸੰਚਾਰ ਕਰ ਸਕਣ।

(ੳ) ਕੋਰਸ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ:-

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਲਿਖਣ ਤੇ ਪੜ੍ਹਨ ਦੇ ਯੋਗ ਬਣਨਗੇ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਿਆਕਰਨਿਕ ਨੇਮ ਵਿਧਾਨ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ਤੇ ਸਹੀ ਤਰਾਂ ਇਹਨਾਂ ਦੀ ਵਰਤੋਂ ਦੇ ਯੋਗ ਹੋ ਸਕਣਗੇ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਵੱਲ ਆਕਰਸ਼ਿਤ ਹੋਣਗੇ।

(ਅ) ਬੌਧਿਕ ਹੁਨਰ:-

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਸਾਹਿਤ ਨੂੰ ਪੜ੍ਹਨ ਦੇ ਯੋਗ ਹੋ ਸਕਣਗੇ ਤੇ ਉਹਨਾਂ ਦਾ ਸਮਾਜ ਪ੍ਰਤੀ ਚੰਗਾ ਨਜ਼ਰੀਆ ਬਣੇਗਾ।
- ਵੱਖ-ਵੱਖ ਪ੍ਰਦੇਸ਼ਾਂ ਤੋਂ ਆਏ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਣ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸੱਭਿਆਚਾਰ ਨੂੰ ਵੀ ਸਮਝਣ ਦੇ ਯੋਗ ਹੋਣਗੇ।

(ੲ) ਅਮਲੀ ਹੁਨਰ:-

- ਹਫ਼ਤੇ ਦੇ ਛੇ ਦਿਨ ਲੈਕਚਰ।
- ਸਮੇਂ-ਸਮੇਂ ਵਿਦਿਆਰਥੀਆਂ ਤੋਂ ਮੌਖਿਕ ਅਤੇ ਲਿਖਤੀ ਟੈਸਟ ਲੈਣੇ।

- ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਆਤਮ ਵਿਸ਼ਵਾਸ ਪੈਦਾ ਕਰਨ ਲਈ ਹਫਤੇ ਵਿਚ ਇਕ ਦਿਨ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਉੱਪਰ ਵਿਚਾਰ ਵਟਾਂਦਰਾ ਕਰਨ ਲਈ ਕਹਿਣਾ।
- ਸਮੇਂ-ਸਮੇਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਲਾਇਬ੍ਰੇਰੀ ਲਿਜਾਣਾ ਤਾਂ ਜੋ ਉਹਨਾਂ ਅੰਦਰ ਪੁਸਤਕਾਂ ਪੜ੍ਹਣ ਦੀ ਜਗਿਆਸਾ ਪੈਦਾ ਹੋਵੇ।

(ਸ) ਵਿਸ਼ੇ ਨੂੰ ਵਿਹਾਰਕ ਪੱਧਰ ਤੇ ਵਰਤਣ ਦਾ ਹੁਨਰ:-

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸੰਚਾਰ ਕਰਨ ਦਾ ਹੁਨਰ ਪਰਿਪੱਕ ਹੋਵੇਗਾ।
- ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਣ ਦੇ ਯੋਗ ਹੋਣਗੇ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਹੀ ਤਰ੍ਹਾਂ ਲਿਖਣ ਦੇ ਯੋਗ ਹੋਣਗੇ।

Paper Name: Statistical Physics and Thermodynamics

Class: B.Sc. (Non Med and C.Sc.) Semester: 3rd

Objectives of the Courses:

This course introduces students to the fundamental concepts of building up complexity from elementary constituents in the framework of thermodynamics and statistical physics. Starting with an overview of the kinetic theory of gases, this course develops concepts in classical laws of thermodynamics and their application, postulates of statistical mechanics, statistical interpretation of thermodynamics. Various methods of statistical mechanics are used to develop the statistics for Bose-Einstein, Fermi-Dirac and photon gases; selected topics from low temperature physics and electrical and thermal properties of matter are discussed.

Learning Outcomes:

1. Explain statistical physics and thermodynamics as logical consequences of the postulates of statistical mechanics.
2. Apply the principles of statistical mechanics to selected problems.
3. Apply techniques from statistical mechanics to a range of situations.

4. Use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanations
5. Use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanation.
6. The major objective of the course is to to impart knowledge about basic statistical physics properties and their relation with thermodynamics for understanding of various particle distributions in ensembles.
7. To cultivate skills at formulating and solving physics problems.
8. Provide the student with different practical, intellectual and transferable skills.

Course Outcomes:

Knowledge and Understanding:

The Students :

- Achieved the ability to explain the various statistical physics and their properties.
- Explain the various laws of thermodynamics and all the thermo dynamical processes along with their essential variables.
- Acquires knowledge of properties of carnot heat engine.
- Acquires knowledge of all quantum states and phase space..
- Describe the role of Bose Einstein Condensation and their all concepts in brief.
- read, understand and explain scholarly journal articles in statistical physics

A. Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Describe and analyses quantitatively processes, relationships and techniques related to the areas covered in the statistical physics course;
- Develop a clear understanding of the basic concepts in statistical mechanics physics.
- Use the physical knowledge to analyze a suitable technique to solve problems.
- Be able to outline the importance of statistical physics and its various applications in the modern society.

B. Practical Skills:

Students will learn to

- Apply appropriate mathematical techniques to solve statistical physics problems.
- Apply appropriate laboratory techniques to study particle distribution in phase space.
- Discuss applications of the topics included in the statistical physics course, and appreciate their relation to other topics in course components taken.
- Develop the ability of the students to conduct, observe, analyzes and report an experiment

C. **Tranferable skills:**

Students will be able to:

- Use concepts of statistical mechanics physics more effectively.
- Learn to think more creative as well as comparatively.
- Apply logical analysis to problem solving;
- Contribute to the management of a group engaged in project work
- Develop the ability of the students to deal with various particle distributions classically as well as using quantum mechanics and formulas mathematically.
- Prepare and deliver a presentation and report of group work.
- Apply team-working skills to address a complex physics problem and contribute significantly to the work of a group tackling such a problem

Paper Name: Optics

Class: B.Sc. (Non Med and C.Sc.) Semester: 3rd

Objectives of the Courses:

This course introduces students to the fundamental concepts of optics. Optics is concerned with the genesis and propagation of light, the changes that it undergoes and produces, and other phenomena closely associated with it. There are two major branches of optics, physical and geometrical. Physical optics deals primarily with the nature and properties of light itself. Geometrical optics has to do with the principles that govern the image-forming properties of lenses, mirrors, and other devices that make use of light. It also includes optical data processing,

which involves the manipulation of the information content of an image formed by coherent optical systems.

Learning Outcomes:

- The students will learn about superposition and interference, Diffraction, Reflection and Refraction.
- The students will learn about Polarization. They will learn about the difference between Linearly, Circularly and Elliptically polarized light.
- The students will learn about Scattering, Half Period Zones.

Knowledge and Understanding:

The Students

- Achieved the ability to explain the various optical phenomena.
- Explain the various laws of Optics and all processes along with their essential variables.
- Read, understand and explain scholarly journal articles in Optics

Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Describe and analyse quantitatively processes, relationships and techniques related to the areas covered in the course
- Develop a clear understanding of the basic concepts in Optical Physics.
- Use the physical knowledge to analyze a suitable technique to solve problems.
- Be able to outline the importance of statistical physics and its various applications in the modern society.

Practical Skills:

Students will learn to

- Apply appropriate mathematical techniques to solve Optical Problems.

- Apply appropriate laboratory techniques to study Bright and Dark fringes.
- Develop the ability of the students to conduct, observe, analyzes and report an experiment

Tranferable skills:

Students will be able to:

- Use concepts of Optical Physics more effectively.
 - Learn to think more creative as well as comparatively.
 - Apply logical analysis to problem solving;
 - Contribute to the management of a group engaged in project work
 - Prepare and deliver a presentation and report of group work.
- Apply team-working skills to address a complex physics problem and contribute significantly to the work of a group tackling such a problem.

Course Name **CHEMISTRY (ORGANIC CHEMISTRY–II)**

Class: **B.Sc (Medical & Non-Medical)**

Semester **III**

Objective of the course:

- This course is intended to provide the students an in-depth understanding of the stereochemistry of organic compounds.
- To provide a complete knowledge of nomenclature, structure and bonding, methods of preparation and chemical reactions of the compounds related to functional groups like alcohols, phenols, aldehydes and ketones.

Course Outcomes:

- This course will equip the students with the necessary chemical knowledge concerning the organic chemistry of functional groups.
- To develop skills to interpret and explain the mechanism of organic reactions involving different functional groups.

- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Course Name **CHEMISTRY (PHYSICAL CHEMISTRY–II)**

Class: **B.Sc (Medical & Non -Medical)**

Semester **III**

Objective of the course:

This course is intended:

- To provide the students an in-depth understanding of the basic concepts of thermodynamics discussing the fundamental laws.
- To provide a complete knowledge related to phase as well as chemical equilibrium while discussing various examples.

Course Outcomes:

- This course will help the students to acquire knowledge and understanding of basic concepts of thermodynamics as well as equilibrium in a detailed manner.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Class: B.Sc. (Non Medical/Computer Science/Economics)/B.A

Course: Analysis Semester: III

Course Objectives:

The aims of this course are to develop an understanding of convergence in its simplest setting to explain the difference between the sequence and series in the mathematical context to lay foundations for further investigation of infinite processes, in particular differential and integral calculus.

Learning outcomes:

A. Knowledge and Understanding:

Students will have

- An ability to work within an axiomatic framework.
- Knowledge of some simple technique for testing the convergence of sequences and series and confidence in applying them.
- An understanding of how the elementary functions can be defined by power series with an ability to deduce some of their easier properties.

B. Intellectual(cognitive/Analytical) skills:

- Express correctly the definitions of basic concepts from the course unit, for example the definition of the limit of a sequence.
- Decide on the correctness or otherwise of statements involving the basic concepts from the course unit, providing justifications or counter examples as appropriate.

C. Practical skills:

- Decide on convergence or divergence a wide class of series of real numbers or power series with real coefficient.
- A detailed understanding of how Cauchy's criterion for the convergence of real sequences and series follows from the completeness for \mathbb{R} and the ability to explain the steps in standard mathematical notation.

Class: B.Sc. (Non Medical/Computer Science/Economics)/B.A

Course: Analytical Geometry Semester: III

Course Objectives:

The aim of this course is to introduce the geometry of lines and conics in the Euclidean plane. Students can develop geometry with a degree of confidence and will gain fluency in the basics of

Euclidean geometry. In this course, foundational mathematical training is also pursued. Curves studied include straight lines, ellipse, parabolas, hyperbolas and sphere. The course assumes a sound background in algebra, geometry and trigonometry.

Course Outcomes:

- **Knowledge and Understanding:**

Students will be able to:

- Parameterize curves.
- Evaluate the distance and angle.
- Sketch conic sections.
- Identify conic sections.
- Classify quadratic equations.

- **Intellectual(cognitive/Analytical) skills:**

On completion of this module, students should be able to:

- Establish rectangular coordinate system in the plane and in the space, express concept of vector both geometrically and analytically, understand operations on vectors and the properties of these operations.
- Estimate polar equations of conics and their graphs.
- Study of conics like ellipse, parabola and hyperbola.
- Express condition of parallel or perpendicular of the two lines.

Practical skills:

- Define conics and draw the graphs of conics such as ellipse, hyperbola, parabola and ellipse.
- Use the polar coordinate system, relate it to the rectangular coordinate system and graph equations using polar coordinates.
- Model real world situations with equations of conics.
- Determine equation of curves when given information that determines the curve.

Paper Name: Quantum Mechanics

Class: B.Sc. (Non Med and C.Sc.) Semester: 4th

Objectives of the Courses:

1. Provide the student with a broad spectrum of physics courses.
2. Emphasize the role of physics in life and other discipline (chemistry ,mathematics and biology).
3. To cultivate skills at formulating and solving physics problems.
4. To develop familiarity with the physical concepts and mathematical methods of quantum mechanics.
5. Provide the student with different practical, intellectual and transferable skills.

Course Outcomes:

A. Knowledge and Understanding:

Students will:

- Know how to define a various branches of Quantum Physics (eg. high energy physics, high particle physics, Molecular Physics).
- Understand and explain the basic concepts associated with the quantum physics (eg. Uncertainty principle, Normalization, Operators)
- Students will understand and able to describe the difference between classical (old) and quantum (new) physics.

B. Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Think critically about the theories of physics.

- Think critically about the contribution of various scientists in the particle world.
- Identify the different process of how individual atoms interact with one another.
- Think critically about the wave particle duality nature.
- Learn about degenerate states of same energy level.
- Think critically about the use of physics in our daily life.

C. Practical Skills:

Students will learn to:

- Study the characterizations of Photovoltaic cell.
- Determine the value of planck's constant.
- To study the absorption and rotational spectra.
- To study the variation of light intensity with distance.

D. Tranferable skills:

Students will be able to:

- Use concepts of physics more effectively.
- Learn to think more creative as well as comparatively.
- Project planning.
- Problem solving

Paper Name: Atomic Spectra & Lasers

Class: B.Sc. (Non Med and C.Sc.) Semester: 4th

Objectives of the Courses:

This course introduces students to the fundamental concepts of Atomic Spectra & Lasers. When atoms are excited they emit light of certain wavelengths which correspond to different colors. The emitted light can be observed as a series of colored lines with dark spaces in between; this series of colored lines is called a line or atomic spectra. Each element produces a unique set of spectral lines. Since no two elements emit the same spectral lines, elements can be identified by

their line spectrum. Laser is a device that stimulates atoms or molecules to emit light at particular wavelengths and amplifies that light, typically producing a very narrow beam of radiation. The emission generally covers an extremely limited range of visible, infrared, or ultraviolet wavelengths. Many different types of lasers have been developed, with highly varied characteristics. Laser is an acronym for “light amplification by the stimulated emission of radiation.

Learning Outcomes:

- The students will learn about Hydrogen atom spectra.
- The students will also learn about many electron spectra, LS coupling selection rules.
- The students will learn about Laser fundamentals and Laser systems.

Knowledge and Understanding:

The Students

- Achieved the ability to explain the various atomic spectra phenomenons.
- Explain the various laws of Lasers and all processes along with their essential variables.
- Read, understand and explain scholarly journal articles in Laser Spectra

Intellectual (Cognitive/ Analytical) Skills:

Students will be able to:

- Describe and analyses quantitatively processes, relationships and techniques related to the areas covered in the course
- Develop a clear understanding of the basic concepts in Atomic Spectra and Lasers.
- Use the physical knowledge to analyze a suitable technique to solve problems.
- Be able to outline the importance of statistical physics and its various applications in the modern society.

Practical Skills:

Students will learn to

- Apply appropriate mathematical techniques to solve Laser Problems.
- Apply appropriate laboratory techniques to study Laser Spectra.
- Develop the ability of the students to conduct, observe, analyzes and report an experiment

Tranferable skills:

Students will be able to:

- Use concepts of Atomic Spectra and Laser Physics more effectively.
- Learn to think more creative as well as comparatively.
- Apply logical analysis to problem solving;
- Contribute to the management of a group engaged in project work
- Prepare and deliver a presentation and report of group work.

Apply team-working skills to address a complex physics problem and contribute significantly to the work of a group tackling such a problem.

Course Name **CHEMISTRY (ORGANIC CHEMISTRY–III)**

Class: **B.Sc (Medical & Non-Medical)**

Semester **IV**

Objective of the course:

- This course is intended to provide the students an in-depth understanding of the stereochemistry of organic compounds.
- To provide a complete knowledge of nomenclature, structure and bonding, methods of preparation and chemical reactions of the compounds related to functional groups like carboxylic acids, ethers and epoxides, organic compounds of nitrogen.

Course Outcomes:

- This course will equip the students with the necessary chemical knowledge concerning the organic chemistry of functional groups.
- To develop skills to interpret and explain the mechanism of organic reactions involving different functional groups.

- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Course Name **CHEMISTRY (INORGANIC CHEMISTRY–III)**

Class: **B.Sc (Medical & Non -Medical)**

Semester **IV**

Objective of the course:

- This course is intended to provide the students an in-depth understanding of the coordination chemistry of inorganic compounds.
- To provide a complete knowledge of non aqueous solvents, oxidation and reaction behaviour, chemistry of lanthanoids and actinoids etc.

Course Outcomes:

- This course will equip the students with the necessary chemical knowledge concerning the biological properties of inorganic compounds.
- To develop skills to devise uses of inorganic compounds in medicine and industry.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Course: Solid Geometry Semester: IV

Class: B.Sc.(Non Medical/Computer Science/Economics)/B.A

Course Objectives:

This course provides an introduction of solid geometry that studies the size, shape, and position of 2-dimensional shapes and 3-dimensional figures.

Students will be able to identify geometric shapes in objects they use in their daily lives. Studying solid geometry provides many foundational skills and helps to build the thinking skills of logic, deductive reasoning, analytical reasoning, and problem-solving.

Course outcomes:

A. Knowledge and Understanding:

- The method of using virtual reality in desktop application that is intended to be used for solid geometry
- Geometry covers a whole range of concepts which will be encountered in everyday life
- Show them examples of 2-D and 3-D shapes, such as a circle and a sphere
- Geometry has many practical applications like architects and interior designers need to use their geometry knowledge to guide their designs

B. Intellectual(cognitive/Analytical) skills:

- Allowing the systematic use of linear equations and matrix algebra, which are important for higher dimensions
-

C. Practical skills:

- 3-D Computer graphics revolutionized animation, Video games, graphics etc.
- Architectural designing is another area in which applications of solid geometry play a major role

Class: B.Sc. (Non Medical/Computer Science/Economics)/B.A

Course: Statics and Vector Calculus Semester: IV

Course Objectives:

This Course introduces the student to review vector arithmetic, distinguish point and vectors, relate geometric concepts to their algebraic representation, describe point, line, and planes, use the dot product and cross product and their applications in Graphics. In Statics, we deal with equilibrium of bodies under action of forces (bodies may be either at rest or move with a constant velocity)

Course Outcomes:

A. Knowledge and Understanding:

Students will be able to:

- Identify conservative vector fields.
- Find the divergence and curl of a vector field.
- Evaluate line integrals of curves and vector fields.
- Use Green's theorem to evaluate line integrals.
- Gradient vector fields and constructing potentials

B. Intellectual(cognitive/Analytical) skills:

On completion of this module, students should be able to:

- a) calculate vector and scalar derivatives of vector and scalar fields using the grad, div and curl operators in Cartesian and in cylindrical and spherical polar coordinates;
- b) Use suffix notation to manipulate Cartesian vectors and their derivatives;
- c) calculate multiple integrals in two and three dimensions including changing variables using Jacobians.
- d) Calculate line and surface integrals and use the various integral theorems.

Undertake the analysis of symmetric beams under vertical loads and torsion of cylindrical shafts

C. Practical skills:

- The integral ideas of the functions defined including line, surface and volume integrals - both derivation and calculation in rectangular, cylindrical and spherical coordinate systems and understand the proofs of each instance of the fundamental theorem of calculus.
- Examples of the fundamental theorem of calculus and see their relation to the fundamental theorems of calculus in calculus leading to the more generalised version of Stokes' theorem in the setting of differential forms.
- The differential ideas of divergence, curl, and the Laplacian along with their physical interpretations, using differential forms or tensors to represent derivative operations.

Paper Name: Condensed Matter Physics

Class: B.Sc. (Non-Med. & C.Sc.) Semester: 5 th

Objective of the Course:

This course aims to establish fundamental concepts of crystal structures, diffraction, lattice vibrations and free electron theory of metals. It also aims to explore the students with principle, theory and mathematical calculations involved in crystal structure studies in detail.

Course content:

Crystal structure, Symmetry operations for a two and three dimensional crystal, Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystal planes and Miller indices, Diamond and NaCl structure. _Crystal Diffraction: Bragg's law, Experimental methods for crystal structure studies, Laue equations, Reciprocal lattices of SC, BCC and FCC, Bragg's law in reciprocal lattice, Brillouin zones and its construction in two and three dimensions, Lattice vibrations, Concepts of phonons, Free electron model of metals, Free electron, Band Theory: Kronnig- Penney model.

Course Outcomes :

A. Knowledge and understanding:

Students will

- Have a basic knowledge of crystal structure and symmetry operations.
- Understand the concept of reciprocal lattice and be able to use it as a tool .
- Know the significance of grain boundaries .
- Know the fundamental principles of Fermi levels and band gap in semiconductors.

B. Intellectual (Cognitive/Analytical) skills:

Students will

- be able to outline the importance of Brillouin zones.
- be able to perform structure determination of simple structures.
- Industrial applications.

C. Practical skills:

Students will learn to:

- Apply appropriate mathematical techniques to solve different theories of lattice specific heat.
- Think in graphical terms and approximate terms when appropriate.
- Apply appropriate laboratory techniques to measure semiconductor properties.
- Understand the operation and characteristics of various semiconductors.

D. Transferrable skills:

- Communication skills.
- Thinking skills.
- Problem solving.

Paper Name: Electronics

Class: B.Sc. (Non-Med. & C.Sc.) Semester: 5 th

Objective of the Course:

This course aims to establish fundamental concepts of basic electronics, concepts of current and voltage source, Diode and Transistor Characteristics. It also aims to explore the students with principle, theory and mathematical calculations involved in electronics aspect studies in detail.

Course content:

Concepts of current and voltage sources, p-n junction, Biasing of diode, V-I characteristics, Rectification: half wave, full wave rectifiers and bridge rectifiers, Efficiency, Ripple factor.

Junction transistor : Structure and working relation between different currents in transistors, Sign conventions, Amplifying action, Different configurations of a transistor and their comparison, CB and CE characteristics, Working of CE amplifier, Amplifier analysis using h-parameters, Equivalent circuits, Determination of current gain, Power gain, Input impedance, FET amplifier and its voltage gain, Feed back in amplifiers Barkausen criterion of sustained oscillations, LC oscillator (tuned collector, tuned base Hartley), RC oscillators, phase shift and Wein bridge.

What will be the teaching methods:

- Lectures: Three per week.
- Interactive classroom discussions.
- Assignments & Seminars.
- Power point presentations.

Program Learning Outcomes:

Knowledge and understanding:

Students will

- have a basic knowledge of how semi conductor electronics works..
- know the significance of Amplitude gain .
- know the fundamental principles of oscillators.

Practical skills:

Students will learn to:

- Apply appropriate mathematical techniques to solve diode equation and its implications.
- Think in graphical terms and approximate terms when appropriate.
- Apply appropriate laboratory techniques to measure semiconductor properties.
- Understand the operation and characteristics of various types of transistors.

Transferrable skills:

- Communication skills.
- Thinking skills.
- Problem solving.

Course Name **CHEMISTRY (INORGANIC CHEMISTRY–IV)**

Class: **B.Sc (Medical & Non-Medical)**

Semester **V**

Objective of the course:

This course is intended:

- To provide the students an in-depth understanding of bonding and magnetic properties of transition metal complexes.
- To discuss various factors affecting the kinetic as well as thermodynamic stability, electronic spectra.
- To give brief introduction to organometallic compounds.

Course Outcomes:

- This course will equip the students with the necessary chemical knowledge concerning the inorganic chemistry of transition metal complexes.
- To develop skills to interpret and explain the bonding, magnetic as well as spectral properties of transition metal complexes.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Course Name **CHEMISTRY (PHYSICAL CHEMISTRY–III)**

Class: **B.Sc (Medical & Non-Medical)**

Semester **V**

Objective of the course:

This course is intended:

- To provide the students an in-depth understanding of basic as well as advanced concepts of electrochemistry.
- To discuss the nuclear chemistry in detail including various laws governing the nuclear processes and various factors affecting them.
- To give brief introduction to spectroscopy discussing rotational and vibrational spectroscopy and electronic spectrum.

Course Outcomes:

- To understand the inter conversion of chemical and electrical energy and to link thermodynamics with electrochemistry.
- To apply the concepts of electrochemistry, spectroscopy to different chemical processes as well as in practicals.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Class: B.Sc.(Non Medical/Computer Science/Economics)/B.A

Course: Dynamics Semester: V

Course Objectives:

This course aims to equip the student with fundamental knowledge of dynamics of machines so that student can appreciate problems of dynamic force balance, transmissibility of forces, isolation of systems and vibrations. The overall objective of this course is to learn how to analyze the motions of mechanisms, design mechanisms to have given motions and analyze forces in machines.

Learning outcomes:

A. Knowledge and Understanding:

Students will be able to

- Understand the set of physical laws, describing the motion of bodies, under the influence of system of forces.
- Understand and use basic terms for the description of the motion of particles, vector functions and the fundamental laws of Newtonian mechanics.
- Solve mechanics problems in one dimension that involve one or more of the forces of gravity, friction and air resistance.
- understand the concept of terminal speed, and use it in solving mechanics problems in one dimension

B. Intellectual(cognitive/Analytical) skills:

- Analyze the applications of mathematics to the problems in physics & develop suitable mathematical method for such application.
- Solve problems relating to the motion of a projectile in the absence of air resistance

C. Practical skills:

- Understood the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
- Solve mechanics problems in one dimension that involve one or more of the forces of gravity, friction and air resistance.

Class: B.Sc. (Non Medical/Computer Science/Economics)/B.A

Course: Number theory Semester: V

Course Objectives:

The objective of this course is the study of basic structure and properties of integers. Learning number theory helps improving one's ability of mathematical thinking. The objectives for this course are to expose students to this beautiful theory, to understand what inspired this quote from Gauss and to allow students to experience mathematics as a creative, empirical science.

Learning Outcomes:

A. Knowledge and Understanding:

Students will be able to

- Explore the use of arithmetical functions, the Mobius function and the Euler totient function.
- Solve systems of linear congruences with different moduli using the Chinese Remainder Theorem.
- Prove results involving divisibility and greatest common divisors.
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B. Intellectual(cognitive/Analytical) skills:

- Enhance and reinforce the student's understanding of concepts through the use of technology when appropriate.
- Apply Euler-Fermat's Theorem to prove relations involving prime numbers.

C. General skills:

- Analyze the structure of real-world problems and plan solution strategies.
- Communicate quantitative data verbally, graphically, symbolically and numerically.
- Use mathematical concepts in problem-solving through integration of new material and modeling.

Paper Name: Nuclear Physics

Class: B.Sc. (Non-Med. & C.Sc.) Semester: 6 th

Objective of the Course:

This course aims to establish fundamental concepts of nucleus and its properties. The course will also emphasize upon various nuclear models. The Nuclear Physics is the study of protons and neutrons at the centre of an atom and the interactions that hold atom together in a space just a few femtometers (10-15 meters) across.

Course content:

The students will learn about nuclear properties, radioactive decays, nuclear reactions and various nuclear models. The students will learn about shell model, nuclear radius, radioactive decays. The students will learn about parity violation, beta alpha and decay. Nuclear forces, Yukawa theory and quadruple moment and other nuclear feature will be part of the discussion in the course.

What will be the teaching methods:

- Lectures: Three per week.
- Interactive classroom discussions.
- Assignments & Seminars.
- Power point presentations.

Course Outcomes:

Knowledge and understanding:

Students will

- have a basic knowledge of how nuclear forces work..
- know the significance of radioactive decay.
- know the fundamental principles of Nuclear Reactions.

Practical skills:

Students will learn to:

- Apply appropriate mathematical techniques to solve nuclear equation and its implications.
- Think in graphical terms and approximate terms when appropriate.
- Apply appropriate laboratory techniques to measure nuclear properties.
- Understand the operation and characteristics of radioactive decays.

Transferrable skills:

- Communication skills.
- Thinking skills.
- Problem solving.

Paper Name: Radiation and Particle Physics

Class: B.Sc. (Non-Med. & C.Sc.) Semester: 6 th

Objective of the Course:

This course aims to establish fundamental concepts of radiation and particle physics. Radiation, flow of atomic and subatomic particles and of waves, such as those that characterize heat rays, light rays, and X rays. All matter is constantly bombarded with radiation of both types from cosmic and terrestrial sources. This article delineates the properties and behavior of radiation and the matter with which it interacts and describes how energy is transferred from radiation to its surroundings. The course will cover a range of detectors to be used for detecting various types of radiations. The course will also cover high energy physics because many elementary particles do not occur under normal circumstances in nature, but can be created and detected during energetic collisions of other particles, as is done in particle accelerators. These include atomic constituents such as electrons, protons, and neutrons (protons and neutrons are actually composite particles, made up of quarks), particles produced by radiative and scattering processes, such as photons, neutrinos, and muons, as well as a wide range of exotic particles.

Course content:

The students will learn about interaction of radiation and charged particles with matter. It will cover nuclear radiation detection and accelerators. The course will also cover elementary particles and their interactions. The students will learn about Quark model and quantum numbers related to various conservation laws.

What will be the teaching methods:

- Lectures: Three per week.
- Interactive classroom discussions.
- Assignments & Seminars.
- Power point presentations.

Course Outcomes:

Knowledge and understanding:

Students will

- have a basic knowledge of nuclear radiation and its properties.
- know the significance of accelerators.
- know the fundamental properties of elementary particles.

Practical skills:

Students will learn to:

- Apply appropriate mathematical techniques to solve radiation equations.
- Think in graphical terms and approximate terms when appropriate.
- Apply appropriate laboratory techniques to measure elementary particle properties.
- Understand the operation and characteristics of radiation detectors.

Transferrable skills:

- Communication skills.
- Thinking skills.
- Problem solving.

Course Name **CHEMISTRY (PHYSICAL CHEMISTRY–IV)**

Class: **B.Sc (Medical & Non -Medical)**

Semester **VI**

Objective of the course:

This course is intended:

- To provide the students an in-depth understanding of the basic concepts of quantum mechanics.
- To provide a complete knowledge related to solid state and photochemistry.

Course Outcomes:

- This course will help the students to acquire knowledge and understanding of basic concepts of quantum chemistry in a detailed manner.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Course Name **CHEMISTRY (ORGANIC CHEMISTRY–IV)**

Class: **B.Sc (Medical & Non-Medical)**

Semester **VI**

Objective of the course:

This course is intended:

- To provide the students an in-depth understanding of spectroscopy of organic compounds.
- To discuss various spectroscopic techniques and spectral analysis.
- To give complete knowledge of amino acids, peptides and nucleic acids.

Course Outcomes:

- This course will equip the students with the necessary knowledge concerning uses of spectroscopic techniques.
- To develop skills to interpret and explain the spectras.
- The students will be able to pursue their career objectives in higher education, scientific research and teaching.

Class: B.Sc. (Non Medical/Computer Science/Economics)/B.A

Course: Numerical Analysis Semester: VIth

Course Objectives:

This course aims to provide a first approach to the subject of algebra, which is one of the basic pillars of modern mathematics. The focus of the course will be the study of certain structures called groups, rings, fields and some related structures. Abstract algebra gives to student a good mathematical maturity and enables to build mathematical thinking and skill.

Course Outcomes:

A. Knowledge and Understanding:

Students will know how

- Solve an algebraic or transcendental equation using an appropriate numerical method.
- Approximate a function using an appropriate numerical method.
- solve a differential equation using an appropriate numerical method
- evaluate a derivative at a value using an appropriate numerical method
- code a numerical method in a modern computer language

B. Intellectual(cognitive/Analytical) skills:

- Derive numerical methods for approximating the solution of problems of continuous mathematics,

- Analyze the error incumbent in any such numerical approximation,
- Implement a variety of numerical algorithms using appropriate technology.
- Compare the viability of different approaches to the numerical solution of problems arising in roots of solution of non-linear equations, interpolation.
- And approximation, numerical differentiation and integration, solution of linear systems.

C. Transferable skills:

- solve a linear system of equations using an appropriate numerical method
- Problem solving and Analytical skills
- Be able to develop numerical literacy
- Social responsibility and global citizenship skills

Class: B.Sc. (Non Medical/Computer Science/Economics)/B.A

Course: Linear Algebra Semester: VI

Course Objectives:

Algebraic structures -- such as groups, rings, and fields -- are pervasive in mathematics. This course focuses on (commutative) rings, which are sets equipped with two (commutative) operations (called addition and multiplication), and that contain an additive identity and an additive inverse for each element of the set. A fundamental example of a ring is \mathbf{Z} , the set of integers; other important examples include \mathbf{Q} , \mathbf{Z} modulo n , and $\mathbf{Q}[X]$, which is the set of polynomials in X with rational Coefficients.

Course Outcomes:

A. Knowledge and Understanding:

Students will be able to

- Develop an understanding of linear algebra in mathematics, natural and social sciences.

- Use matrix algebra to analyze and solve equations arising in many applications that require a background in linear algebra.
- Utilize vector space terminology and describe how closely other vector spaces resemble \mathbb{R}^n .

B. Intellectual(cognitive/Analytical) skills:

- Demonstrate factual knowledge of the fundamental concepts of spanning, linear independence, and linear transformations.
- Acquire communication and organizational skills, including effective written communication in their weekly assignments.
- Use visualization, spatial reasoning as well as geometric properties and strategies to model, solve problems and view solutions especially in \mathbb{R}^2 and \mathbb{R}^3 .

C. General skills:

- Apply mathematical methods involving arithmetic, algebra, geometry and graphs to solve problems.
- Represent mathematical information and communicate mathematical reasoning symbolically and verbally.
- Interpret and analyze numerical data, mathematical concepts and identify patterns to formulate and validate reasoning.