B.Sc. (Computer Science)

PROGRAM OUTCOMES (PO)

PO1: Learn how to organize information efficiently in the forms of outlines, charts, etc. by using appropriate software. Develop the skills to present ideas effectively and efficiently.

PO2: Do Academic and Professional Presentations - Designing and delivering an effective presentation and developing the various IT skills to the electronic databases.

PO3: Use the Systems Analysis Design paradigm to critically analyze a problem. Solve the problems (programming networking database and Web design) in the Information Technology environment. Function effectively on teams to accomplish a common goal and demonstrate professional behaviour.

PO4: Develop IT-oriented security issues and protocols. Design and implement a web page. Improve communication and business management skills, especially in providing technical support. Serve as the System Administrators with thorough knowledge of DBMS.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO1: Apply standard software engineering process and strategies in software project development using open source programming environment to deliver a quality product for business success.

PSO2: Acquaintance with latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

PSO3: Conceptual grounding in computer usage as well as its practical business applications.

PSO4: To demonstrate advanced skills in the effective analysis design and realization of business system utilizing contemporary information technology.

COURSE OUTCOMES

ਕੋਰਸ ਦਾ ਨਾਂ .....ਮੁੱਢਲੀ ਪੰਜਾਬੀ

ਕਲਾਸ   ....ਬੀ ਏ/ਬੀ ਐੱਸ ਸੀ/ਬੀ ਕੌਮ ਬੀ ਸੀ ਏ/ਬੀ ਐਸ ਈ ਆਈ ਟੀ/

        ਬੀ ਵੋਕ/ਬੀ ਅੈਮ ਅੈਮ/ਬੀ ਜੇ ਅੈਮ ਸੀ   ਸਮੈਸਟਰ   .....ਪਹਿਲਾ

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 ਨਿਯਮਾ 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

ਸਮੈਸਟਰ: ਪਹਿਲਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ :

ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਪੈਦਾ ਕੀਤੀ ਜਾਵੇਗੀ।ਬੋਧਿਕ ਪੱਧਰ ਤੇ ਵਿਕਾਸ ਕੀਤਾ ਜਾਵੇਗਾ।ਅਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕੀਤੀਆਂ ਜਾਣਗੀਆਂ।ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਆਪਣੀ ਮਾਂ ਬੋਲੀ ਵਿਚ ਸੰਚਾਰ ਕਰਨ ਲਈ ਏਤਸ਼ਾਹਿਤ ਕੀਤਾ ਜਾਵੇਗਾ।ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਵਿਦਿਅਕ, ਬੋਧਿਕ 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।

ਬੋਧਿਕ 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 ਓਸ 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 ਵਿਚਰਨ ਦੇ ਯੋਗ ਹੋਣਗੇ।ਨਾਟ ਕਲਾ ਦੇ ਜ਼ਰੀਏ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਿਕ ਮਸਲਿਆ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੋਣਗੇ ਅਤੇ ਸਮਾਜ ਨੂੰ ਵੀ ਜਾਗਰੂਕ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋਣਗੇ।

Course Name – General English

Class: B.Sc. Computer Science   SEMESTER I

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 the 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 the 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/proof reader
- 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.

Class: B.Sc. Computer Science

Course: Calculus and Trigonometry   Semester: I

Course Objectives:

This course provides an introduction to topics involving calculus and trigonometry. Both Calculus and trigonometry 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.

Course Outcomes:

A. Knowledge and Understanding:

-Learn the general concept of function and its applications to real-world situations.

-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.

-learn to use concept of integration to evaluate geometric area and solve other applied problems.

B. Intellectual(cognitive/Analytical) skills:

-Learn to calculate derivative for various type of function using definition.

-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.   Learn to work with exponential, logaritnmic and trigonometric functions and their applications in applied problems.

Class: B.Sc. Computer Science

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:

D. 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 cardon , Descarte and Ferrari's method.

E. 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.

F. 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.

COURSE NAME: Computer Science (COMPUTER FUNDAMENTAL & PC SOFTWARE)

CLASS – BA/B.Sc.(CS)   **SEMESTER – I**

Objectives of Course:

- Give students an in-depth understanding of why computers are essential components in business, education and society.
- Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.
- Provide hands-on use of Microsoft Office applications Word, Excel and PowerPoint. Completion of the assignments will result in MS Office applications knowledge and skills.

COURSE OUTCOMES

At the end of this course the student shall be able to:

- Understand the basic terminology of computers
- Understand the fundamental hardware components that make up a computer's hardware and the role of each of these components
- Understand the difference between an operating system and an application program, and what each is used for in a computer
- Describe some examples of computers and state the effect that the use of computer technology has had on some common products
- Identify the applications of computer in daily life

Course Name – General English

Class- B.Sc.(CS)   SEMESTER II

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

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- A broad vocabulary and ability to use critical terminology appropriately

- Skills in a variety of research methods and the ability the accurately and appropriately present research

<u>Intellectual , Cognitive / Analytical Skills</u> :

• Write and speak with clarity and precision, and learn the best methods to persuade an audience

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• 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 the accurately and appropriately present research

• Awareness of how different social and cultural contexts affect the nature of language and meaning.

<u>Practical Skills</u> :

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ਕੋਰਸ ਦਾ ਨਾਮ : ਮੁੱਢਲੀ ਪੰਜਾਬੀ

ਕੋਰਸ ਦਾ ਨਾਂ: ਬੀ.ਏ / ਬੀਐੱਸ.ਸੀ / ਬੀਐੱਸ.ਸੀ (ਬੀ.ਟੀ.)/ ਬੀ.ਕਾਮ/ ਬੀ.ਸੀ.ਏ/ ਬੀ.ਵਾਕ/ ਬੀ.ਓਮਐਮ 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 ਸ਼ੁੱਧ 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 ਜਾਣਗੇ ਅਤੇ ਉਨ੍ਹਾਂ ਦੀ ਸ਼ਬਦਾਵਲੀ ਵਿਚ ਵਾਧਾ ਹੋਵੇਗਾ।

ਬੌਧਿਕ ਹੁਨਰ :

1) ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਸਹੀ ਰੂਪ ਵਿਚ ਸਮਝ ਸਕਣਗੇ ਅਤੇ ਉਸ ਬਾਰੇ ਖੁਦ ਵਿਸ਼ਲੇਸ਼ਨ 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 ਜੁੜਨਗੇ।

ਅਮਲੀ ਹੁਨਰ (Practical skill)

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

ਸਹਾਇਤਾ

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।

ਵਿਰਿਆਰਥੀ 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 ਪਰਖਿਆਂ ਜਾਵੇਗਾ।

ਭਾਸ਼ਾਂ ਦੇ ਵਿਵਹਾਰਕ ਪੱਧਰ ਤੇ ਵਰਤਣ ਦਾ ਹੁਨਰ

1) ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਣ ਦੇ ਜੋਗ 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.ਓਮਐਮ

ਸਮੈਸਟਰ –ਦੂਜਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ : ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਪੈਦਾ ਕੀਤੀ ਜਾਵੇਗੀ । ਬੋਧਿਕ 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 ਬੋਧਿਕ ਅਤੇ ਸਰਬ-ਪੱਖੀ ਪ੍ਰਤਿਭਾਵਾਂ ਨੂੰ ਉਭਾਰਨ ਵੱਲ ਵਿਸ਼ੇਸ 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।

ਬੋਧਿਕ 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 ਹੋਵੇਗਾ।
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।

Class: B.Sc. Computer Science

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:

J. 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

K. 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.

L. 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.

Class: B.Sc. Computer Science

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:

P. 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

Q. 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.

R. 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.

COURSE NAME: Computer Science (PROGRAMMING USING C)

CLASS – BA/B.Sc.(CS)   **SEMESTER – II**

Objectives:

- The primary goal is to develop the programming skills in C.
- To get good knowledge of procedural language approach so that students can make software in the later stage of their course.
- This will help the students to frame the real world modeling of data and its associated functions
- This course also aims to an understanding of various concepts of C with the help of which one can create its own data types that can be used globally in different program files.

Outcomes:

a) Knowledge and Understanding: On successful completion of this subject the students have the programming ability in C Language.

b) Intellectual Cognitive/ Analytical Skills: Enhancing Logical Thinking and Reasoning Skills through Collaborative Learning in C Programming.

c) Practical Skills: Students would be capable of developing various applications to solve deluge of real world problems. They can also learn to make system software as well as application software. These existing languages could become base for developing new languages which can inherent its features. On the backend of various embedded systems, these languages are deployed.

d) Transferable Skills: In many multinational companies they can work effectively in a group or team to achieve goals and can show initiative and leadership abilities.

Course Name: General English (Compulsory)

Class: B.A.   **Semester:** III

Objective of The course: The course aims to introduce a wide range of Literature in English. In its basic sense, the course has the aim to offer the opportunity for students to be able to respond and read cum create poetry with associated genres. It also tells the students about the structure of English language.

 Course Outcomes:

a) **Knowledge and Understanding:** The students will be able to understand different genres   of English literature. They will also understand the structure of the grammar through its practical knowledge and its usefulness in our day to day life.

b) **Intellectual Cognitive /Analytical skills:** Students will be able to enhance their mental ability by learning techniques, symbols and terms which are used in English Literature. It will further develops the critical or analytical thinking of the students, when they practice the exercises of Grammar pertaining to Tenses, voices, Modals etc.

c) **Practical skills:** The students will develop their writing skills by using exercises based on sentence structure. Students will understand the basic concepts related to spoken English language in an effective way and use the rules of grammar in their daily communication.

d) **Transferable skills:** After the completion of the course, students can impart their knowledge while pursuing higher studies or doing jobs and help other students in making better communication with others.

ਪਰਚਾ:   ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

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

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ :

ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ 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

ਸਮੈਸਟਰ   – ਤੀਜਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼:   ਇਸ ਕੋਰਸ ਦਾ ਉਦੇਸ਼ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬਾਰੇ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ
ਕਰਨਾ ਹੈ ਤਾਂ ਜੋ ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੇ ਯੋਗ ਹੋ ਸਕਣ।
ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਵਿੱਦਿਅਕ, ਬੋਧਿਕ ਅਤੇ ਸਰਵਪੱਖੀ ਪ੍ਰਤਿਭਾਵਾਂ ਨੂੰ ਉਭਾਰਨ ਅਤੇ
ਉਘਾੜਨ ਵੱਲ ਵਿਸ਼ੇਸ਼ ਧਿਆਨ ਦੇਣਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ
ਵਿਆਕਰਨਿਕ ਨੇਮਾ 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)   ਬੋਧਿਕ ਹੁਨਰ:-

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਸਹਿਤ ਨੂੰ ਪੜ੍ਹਨ ਦੇ ਯੋਗ ਹੋ ਸਕਣਗੇ ਤੇ ਉਹਨਾਂ ਦਾ ਸਮਾਜ ਪ੍ਰਤੀ ਚੰਗਾ
ਨਜ਼ਰੀਆ ਬਣੇਗਾ।

- ਵੱਖ-ਵੱਖ ਪ੍ਰਦੇਸ਼ਾ ਤੋਂ ਆਏ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸੱਭਿਆਚਾਰ ਨੂੰ ਵੀ
ਸਮਝਣ ਦੇ ਯੋਗ ਹੋਣਗੇ।

(ੲ)   ਅਮਲੀ ਹੁਨਰ:-

- ਹਫਤੇ 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 ਪੜ੍ਹਨ 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 ਤਰ੍ਹਾ ਲਿਖਣ ਦੇ ਯੋਗ ਹੋਣਗੇ।

Class: B.Sc. Computer Science

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:

S. 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.

T. 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.

U. 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 R and the ability to explain the steps in standard mathematical notation.

Class: B.Sc. Computer Science

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:

V. Knowledge and Understanding:

Students will be able to:

- Parameterize curves.

- Evaluate the distance and angle.

- Sketch conic sections.

- Identify conic sections.

- Classify quadratic equations.

W. 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.

COURSE NAME: Computer Science (COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)

CLASS – BA/B.Sc.(CS)   SEMESTER – III

Objectives of the Course:

The objectives of the course are to develop numerical methods aided by technology to solve algebraic, transcendental, and differential equations, and to calculate derivatives and integrals. The course will also develop an understanding of the elements of error analysis for numerical methods and certain proofs.

Program Learning Outcomes:

- Develop appropriate numerical methods to approximate a function
- Perform an error analysis for various numerical methods
- Develop appropriate numerical methods to solve a differential equation
- Derive appropriate numerical methods to solve a linear system of equations
- Derive appropriate numerical methods to evaluate a derivative at a value
- Prove results for various numerical root finding methods

- Derive appropriate numerical methods to calculate a definite integral
- Code various numerical methods in a modern computer language

Course Name: General English (Compulsory)

Class: B.Sc. (CS)   Semester: IV

Objective of The course: The course aims to introduce a wide range of Literature in English. In its basic sense, the course has the aim to offer the opportunity for students to be able to respond and read cum create poetry with associated genres. It also tells the students about the structure of English language.

Course Outcomes:

a) **Knowledge and Understanding:** The students will be able to understand different genres of English literature. They will also understand the structure of the grammar through its practical knowledge and its usefulness in our day to day life.

b) **Intellectual Cognitive /Analytical skills:** Students will be able to enhance their mental ability by learning techniques, symbols and terms which are used in English Literature. It will further develops the critical or analytical thinking of the students, when they practice the exercises of Grammar pertaining to Tenses, voices, Modals etc.

c) **Practical skills:** The students will develop their writing skills by using exercises based on sentence structure. Students will understand the basic concepts related to spoken English language in an effective way and use the rules of grammar in their daily communication.

d) **Transferable skills:** After the completion of the course, students can impart their knowledge while pursuing higher studies or doing jobs and help other students in making better communication with others.

ਪਰਚਾ:   ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਕੋਰਸ ਦਾ ਨਾਂ:   ਬੀ.ਏ / ਬੀਐੱਸ.ਸੀ / ਬੀ.ਕਾਮ/ਬੀ.ਬੀ.ਏ.   ਸਮੈਸਟਰ: ਚੌਥਾ

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ :

ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ 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 :

7. ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੋਣਗੀਆਂ।
8. ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
9. ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੋਵੇਗਾ।

ਬੌਧਿਕ ਹੁਨਰ:

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

ਅਮਲੀ ਹੁਨਰ:

7. ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਨਾਟ ਕਲਾ ਅਤੇ ਰੰਗ ਮੰਚ ਅਤੇ ਸਵੇਜੀਵਣੀ ਪ੍ਰਤੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
8. ਸਾਹਿਤ ਸਿਰਜਣ ਦੀ ਰੁਚੀ ਪੈਦਾ ਹੋਵੇਗੀ।
9. ਆਪਣੀ ਮਾਂ ਭਾਸ਼ਾ (ਪੰਜਾਬੀ) ਦੇ ਵਿਕਾਸ ਵਿਚ ਅਹਿਮ ਜੋਗਦਾਨ ਪਾਉਣਗੇ।

ਵਿਸ਼ੇ ਨੂੰ ਵਿਹਾਰਿਕ ਪੱਧਰ ਤੇ ਵਰਤਣ ਦਾ ਹੁਨਰ:

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

Course: Solid Geometry   Semester: IV

Class: B.Sc. Computer Science

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. Computer Science

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

2. Evaluate plane stresses

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.

COURSE NAME: Computer Science (DATA STRUCTURES & PROGRAMMING LANGUAGE USING C++)

CLASS – BA/B.Sc.(CS)   SEMESTER – IV

<u>**Objectives of the Course:**</u>

- To take review or tour of Programming in C and make aware of limitation of C, thereby need of the origin of C++.
- To impart knowledge in such a way that students should be able to use of concept of Object Oriented Programming Approach in their programming skills.
- To imbibe with the knowledge of implementation of various features of C++ i.e. concept of Object, Object communication, Encapsulation, Data hiding, overloading, inheritance, polymorphism etc.
- To impart the basic concepts of data structures and algorithms
- To teach efficient storage mechanisms of data for an easy access.
- To design and implementation of various basic and advanced data structures.
- To introduce various techniques for representation of the data in the real world.
- To improve the logical ability

Learning Outcomes:

- Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms.
- Demonstrate advantages and disadvantages of specific algorithms and data structures,
- Select basic data structures and algorithms for autonomous realization of simple programs or program parts

- Determine and demonstrate bugs in program, recognize needed basic operations with data structures
- Formulate new solutions for programming problems or improve existing code using learned algorithms and data structures,
- Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.
- Able to know how to do programming in C++ environment.
- Able to understand and implement the concepts of object oriented approach using C++.
- Able to acquire in depth knowledge and develop software in C++
- identify different class attributes, member functions, base class and derived class and their relationships among them
- learn how to reuse the code using polymorphism

Course Name: General **English**

Class: **B.Sc. (CS)**   Semester: **V**

Objective of the course:

- As the concluding level program in the subject of English for students at the graduation levels, the course is aimed at preparing students in the target language for an optimum and skilful use in their further studies
- The course also takes into objective the establishment of a close proximity of students with English literature and helping them appreciate various facets of literary genres with special deliberations on poetry

Course Outcomes:

A. **Knowledge and Understanding:** Comprehending and appreciating literature in the pure textual form subsequently ensuring an acquaintance with English drama and its various devices.

B. **Intellectual Cognitive /Analytical skills:** Learning numerous literary techniques as put forth through the curriculum and also developing general awareness on contemporary issues in target language

C. **Practical skills :** Enhancing writing skills through skill-based questions on the same and gaining knowledge of technical writings such as technical, newspaper and finding reports along with other official documentations

D. **Transferable skills:** Developing professional writing skills through resume building tasks and other professional write-ups

Class: B.Sc. Computer Science

Course: General Punjabi   Semester: V

ਕੋਰਸ ਦੇ ਉਦੇਸ਼ : -

ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਵਿੱਦਿਅਕ, ਬੌਧਿਕ ਅਤੇ ਸਰਵਪੱਖੀ ਪ੍ਰਿਭਾਵਾਂ ਨੂੰ ਉਭਾਰਨ ਅਤੇ ਉਘਾੜਨ ਵੱਲ ਵਿਸ਼ੇਸ਼ ਧਿਆਨ ਦੇਣਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਦਿਆ ਦਾ ਮਕਸਦ ਸਮਝਾਉਣਾ। ਚੰਗੇ ਇਨਸਾਨ ਬਣਨ ਲਈ ਪ੍ਰੇਰਨਾ ਅਤੇ ਸਮਾਜਿਕ ਜ਼ਿਮੇਂਵਾਰੀਆਂ ਦੇ ਅਨੁਕੂਲ ਬਣਾਉਣਾ ਤੇ ਉੱਤਮ ਸਾਹਿਤਕ ਕਿਰਤਾਂ ਪੜ੍ਹਨ ਲਈ ਪ੍ਰੇਰਨਾ ਦੇਣਾ ਤਾਂ ਕਿ ਉਹ ਚੰਗੀ ਜੀਵਨ ਜਾਂਚ ਸਿੱਖ ਸਕਣ।

(ੳ) <u>ਕੋਰਸ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ</u> :-

- ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖ – ਵੱਖ ਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।
- ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਲਿਖਣ ਵੱਲ ਆਕਰਸ਼ਿਤ ਹੋਣਗੇ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਿਆਕਰਨਿਕ ਨੇਮ ਵਿਧਾਨ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

(ਅ) <u>ਬੌਧਿਕ ਹੁਨਰ</u> :-

- ਸਾਹਿਤ ਸਮਾਜ ਦਾ ਦਰਪਣ ਹੈ। ਸਾਹਿਤ ਨੂੰ ਪੜ੍ਹਨ ਨਾਲ ਉਨ੍ਹਾਂ ਦਾ ਸਮਾਜ ਪ੍ਰਤੀ ਚੰਗਾ ਨਜਰੀਆਂ ਬਣੇਗਾ।
- ਸਾਹਿਤ ਜਿੱਥੇ ਉਨ੍ਹਾਂ ਨੂੰ ਰੋਜਗਾਰ ਦੇ ਵਸੀਲੇ ਪ੍ਰਾਪਤ ਕਰਵਾਏਗਾ ਉੱਥੇ ਉਹ ਚੰਗੇ ਪ੍ਰਾਣੀ ਵਜੋ ਹੋਂਦ ਗ੍ਰਹਿਣ ਕਰਨਗੇ।
- ਸਾਹਿਤ ਪੜ੍ਹਨ ਨਾਲ ਉਨ੍ਹਾਂ ਦੀ ਆਪਣੀ ਸੋਚ ਬਦਲੇਗੀ ਜਿਸ ਨਾਲ ਉਹ ਸਮਾਜ ਨੂੰ ਚੰਗੀ ਸੋਚ ਦੇਣਗੇ।

(ੲ) <u>ਅਮਲੀ ਹੁਨਰ</u> :-

- ਹਫ਼ਤੇ ਦੇ ਛੇ ਦਿਨ ਲੈਕਚਰ।
- ਸਮੇਂ – ਸਮੇਂ ਵਿਦਿਆਰਥੀਆਂ ਤੋਂ ਮੌਖਿਕ ਅਤੇ ਲਿਖਿਤ ਟੈਸਟ ਲੈਣੇ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਆਤਮ ਵਿਸ਼ਵਾਸ ਪੈਦਾ ਕਰਨ ਲਈ ਡੀਬੇਟ ਅਤੇ ਕੋਈ ਇੱਕ ਵਿਸ਼ਾ ਦੇ ਕੇ ਉਸ ਉਪਰ ਵਿਚਾਰ –ਵਿਟਾਂਦਰਾ ਕਰਨ ਲਈ ਕਹਿਣਾ।
- ਪਾਠਕ੍ਰਮ ਨਾਲ ਸੰਬੰਧਿਤ ਵਿਸ਼ਿਆਂ ਉਪਰ ਲਿਖਤੀ ਰੂਪ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਵਿਚਾਰ ਪੇਸ਼ ਕਰਾਉਣੇ ਅਤੇ ਵਿਚਾਰ ਚਰਚਾ ਕਰਾਉਣੀ।

• ਸਮੇਂ-ਸਮੇਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਲਾਇਬਰੇਰੀ ਲਿਜਾਇਆ ਤਾਂ ਜੋ ਉਹਨਾਂ ਅੰਦਰ ਪੁਸਤਕਾਂ ਪੜ੍ਹਨ ਦੀ ਜਗਿਆਸਾ ਪੈਦਾ ਹੋਵੇ।

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

• ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਿਰਜਨਾਤਮਕ ਯੋਗਤਾਵਾਂ ਪਰਿਪੱਕ ਹੋਣਗੀਆਂ।

• ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸੰਚਾਰ ਕਰਨ ਦਾ ਹੁਨਰ ਪਰਿਪੱਕ ਹੋਵੇਗਾ।

• ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਤੇ ਤੁਲਨਾਤਮਕ ਅਧਿਐਨ ਉਸਾਰਨ ਦੇ ਕਾਬਲ ਹੋਣਗੇ।

• ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਣ ਦੇ ਯੋਗ ਹੋਣਗੇ।

Class: B.Sc. Computer Science

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. Computer Science

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.

B. Intellectual(cognitive/Analytical) skills:

- Enchance 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.

COURSE NAME: Computer Science (DATA BASE MANAGEMENT SYSTEM & ORACLE)
CLASS – BA/B.Sc.(CS)   SEMESTER – V
Objective of the course:

It aims at acquainting students better with the basics of DBMS, different Architectural Models for DBMS, Normalization of data, Concurrency control problems and its management, Protection, Security and recovery aspects of databases along with practical knowledges of databases using SQL and PL/SQL. Career prospectus after completion of course of study are as Data manager, Data administrator, Database analyst, Database designer and allied jobs. Further Knowledge of database management systems software and strong programming skills are essential for achieving heights in this field.

- The key goal is to prepare students for a professional career in the field of data administration and database design.
- To get acquaint students with good knowledge of DBMS. During the course, students will learn about database design and database handling activities.
- To get acquaint students with basics of database security and administration.

Course Outcomes:

- Knowledge & Understanding : Databases and their design & development
- Intellectual Cognitive/ analytical skills: Normalization of Databases.
- Practical Skills :Using SQL and PL/SQL.
- Transferable skills: Usage of DBMS design and administration

<u>Course Name</u>: General **English**

<u>Class</u>:   **B.Sc. (CS)**   <u>Semester</u>: **VI**

<u>Objective of the course</u>:

- As the concluding level program in the subject of English for students at the graduation levels, the course is aimed at preparing students in the target language for an optimum and skilful use in their further studies
- The course also takes into objective the establishment of a close proximity of students with English literature and helping them appreciate various facets of literary genres with special deliberations on poetry

<u>Course Outcomes</u>:

E. **Knowledge and Understanding:** Comprehending and appreciating literature in the pure textual form subsequently ensuring an acquaintance with English drama and its various devices

F. **Intellectual Cognitive /Analytical skills:** Learning numerous literary techniques as put forth through the curriculum and also developing general awareness on contemporary issues in target language

G. **Practical skills :** Enhancing writing skills through skill-based questions on the same and gaining knowledge of technical writings such as technical, newspaper and finding reports along with other official documentations

H. **Transferable skills:** Developing professional writing skills through resume building tasks and other professional write-ups

Course Name: General Punjabi

<u>Class:</u>   **B.Sc.(CS)** <u>Semester</u>: **VI**

<u>ਕੋਰਸ ਦੇ ਉਦੇਸ਼</u> : ਇਸ ਕੋਰਸ ਦਾ ਉਦੇਸ਼ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਸਾਹਿਤ ਬਾਰੇ ਜਾਗਰੂਕ ਕਰਨਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਾਹਿਤ ਵਿਚ ਰੁਚੀ ਪੈਦਾ ਕਰਕੇ ਸਾਹਿਤ ਰਚਨ ਲਈ ਪ੍ਰੇਰਿਤ ਕਰਨਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਵਿਆਕਰਣ ਬਾਰੇ ਜਾਣੂ ਕਰਵਾਉਣਾ।

ਇਸ ਪ੍ਰੋਗਰਾਮ ਨਾਲ ਹੋਣ ਵਾਲੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ :

- ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰਥ ਹੋਣਗੇ।
- ਸਾਹਿਤ ਵਿਚ ਰੁਚੀ ਪੈਦਾ ਹੋਏਗੀ।
- ਵਿਆਕਰਨਿਕ ਇਕਾਈਆਂ ਅਤੇ ਵਿਆਕਰਨਕ ਵਰਗਾਂ ਨਾਲ ਜੁੜੇ ਹੋਏ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਬਾਰੇ ਜਾਣਨਗੇ।
- ਸ਼ਬਦ ਬਣਤਰ ਤੇ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਨਾਲ-ਨਾਲ ਮਾਤ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਬੋਲਣ ਵਿੱਚ ਰੁਚੀ ਪੈਦਾ ਹੋਏਗੀ।

ਅਮਲੀ ਹੁਨਰ (Practical skill) :

1. ਇਸ ਪ੍ਰੋਗਰਾਮ ਦੇ ਜਰੀਏ ਪ੍ਰਾਪਤ ਕੀਤੇ ਗਿਆਨ ਨੂੰ ਵਿਦਿਆਰਥੀ ਵੱਖ-ਵੱਖ ਖੇਤਰਾਂ ਵਿਚ ਲਾਗੂ ਕਰ ਸਕਦੇ ਹਨ।
2. ਇਸ ਪ੍ਰੋਗਰਾਮ ਦੇ ਜਰੀਏ ਵਿਦਿਆਰਥੀ ਤਕਨਾਲੋਜੀ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।
3. ਇੰਟਰਨੈੱਟ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀ ਦੀ ਬਹੁਪੱਖੀ ਸਖਸ਼ੀਅਤ ਨੂੰ ਉਘੇੜਨ ਤੇ ਨਿਖਾਰਨ ਵਿਚ ਸਹਿਯੋਗ ਦੇਵੇਗਾ।

*ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਪਰਖ ਲਈ ਉਹਨਾਂ ਨੂੰ ਸਮੇਂ-ਸਮੇਂ ਵੱਖ-ਵੱਖ ਵਿਸ਼ਿਆਂ ਤੇ ਲਿਖਤ ਕਾਰਜ ਦਿੱਤਾ ਜਾਵੇਗਾ।

Class: B.Sc. Computer Science

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:

D. 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

E. 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.

F. 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. Computer Science

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 **Z**, the set of

integers; other important examples include **Q**, **Z** modulo n, and **Q**[X], which is the set of polynomials in X with rational Coefficients.

Course Outcomes:

G. 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 Rn.

H. 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 mode, solve problems and view solutions especially in R2 and R3.

I. 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.

COURSE NAME: Computer Science (INFORMATION TECHNOLOGY)

CLASS – BA/B.Sc.(CS)   SEMESTER – VI

Objective:

- The primary goal is to prepare students for basics of networking
- Students will learn skills of management.
- Be able to effectively integrate IT- based solutions into the user environment

Outcomes:

- Understand professional, ethical, legal, security and social issues and responsibilities
- Be able to communicate effectively with a range of audiences
- Be able to analyse the local and global impact of computing on individuals, organizations, and society