# B.SC IN COMPUTER SCIENCE, MATHEMATICS & STATISITCS (CMS)
## Programme Outcome(PO)

On Graduating from BSc CMS, a student is:

**PO 1:** Able to apply problem solving and logical skills

**PO 2:** Able to work alongside engineering, medical, ICT professionals and Scientists to assist them in scientific problem solving

**PO 3:** Well versed in elementary Statistics and can branch out into Actuaries and Financial Mathematics

**PO 4:** Able to communicate Mathematical / Logical ideas in writing

**PO 5:** A competent Computer Programmer

**PO 6:** Familiar with several subfields of Mathematics and Statistics

**PO 7:** Qualified to apply for Post-Graduation and Doctoral Research Degrees to work in Colleges and Universities as Professors or as Scientists in Research Establishments

## Program Specific Outcome (PSO)

**PSO1**: Program becomes a precursor to Higher Education or Research

**PSO 2**: It prepares one for elementary Research, Teaching and Technical Institutions

**PSO 3**: Graduates of the course can apply to Financial Service and Data ProcessingCompanies, Testing and Research Centers of Multinational Companies which are aggressively recruiting graduates in Mathematics and Statistics

**PSO 4**: Graduates can, with experience, function as Programmers or Software Engineers with a sound knowledge of practical and theoretical concepts for developing software

**PSO 5**: Serve as IT Officers and Statisticians in Banks and Co-Operative Societies

**PSO6**: Serve as Web Designers with latest web development technologies

**PSO7**: Graduate has gained the understanding of the underlying unifying structures of mathematics and the relationships between them

## COURSE OUTCOME
## SEMESTER:I

**Course Name: GENERAL PROFICIENCY AND COMMUNICATIVE ENGLISH**

**Course Code: BSCENL103**

**Course outcome:**

CO1-Effective and fluent oral communication.

CO2- Perfect writing skills.

CO3- Creative skills in presenting stories.

**Pedagogy**: Lectures, Assignments, Discussions, Role play and Seminars.

**Evaluation method:** Two internal test, one final semester exam

**Course Name: HINDI**
**Course Code: BSCHDL104**
**Course outcome:**
CO1- Enrichment of competence in Hindi
CO2- Development of story writing skill
CO3- Knowledge of different critical terms
**Pedagogy:** chalk and talk method, lectures, assignments, Projects, debate on specific topics, chart work, PPT Presentations, discussions.
**Evaluation method:** Two internal test, one final semester exam

**Course Name: KANNADA**
**Course Code: BSCKAL104**
**Course Outcomes:**
ಕಾವ್ಯ: ಕಾವ್ಯಭಾಗಗಳನ್ನು, ಓದಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವ, ಕವನ ರಚಿಸುವ, ಆಸ್ವಾದಿಸುವ ಸಾಮರ್ಥ್ಯಗಳಿಸುವುದು.
ಪಠ್ಯ: ಹಳಗನ್ನಡ ಕಾವ್ಯ ಭಾಗ, ವಚನಸಾಹಿತ್ಯದ ಭಾಗ, ಜನಪದಕಾವ್ಯ ಮತ್ತು ಹೊಸಗನ್ನಡದ ಕವನಗಳು.
ಗದ್ಯ: ೧. ಪ್ರಬಂಧಗಳು: ಲೇಖನಗಳನ್ನು ಓದಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವ, ಸೃಜನಶೀಲವಾಗಿ ಅಭಿವ್ಯಕ್ತಿಗೊಳಿಸುವ ಸಾಮರ್ಥ್ಯ ಗಳಿಸುವುದಕ್ಕೆ ಪೂರಕವಾದ ಲೇಖನಗಳು.
**ನಾಟಕ:** ನಾಟಕದ ಸ್ವರೂಪದಅಧ್ಯಯನ, ನಾಟಕ ಓದಿನ ಆಸ್ವಾದ ಹಾಗೂ ಕನ್ನಡರಂಗಭೂಮಿಯ ಪರಿಚಯ. ಜೀವನ ಮೌಲ್ಯಗಳ ಕಲಿಕೆ, ಕಲೆಯ ಮೂಲಕ ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳನ್ನು ಅಭಿವ್ಯಕ್ತಿಗೊಳಿಸುವ ಸಾಮರ್ಥ್ಯ ಗಳಿಸುವುದು. – ನಾಟಕಅಧ್ಯಯನ
**Pedagogy:** Chalk and talk method, Lectures, Assignments, Discussions, Role play and Seminars

**Course Name: DIGITAL FUNDAMENTALS**
**Course Code: CS101**
**Objective:** To acquire the basic knowledge of digital logic levels and application of knowledge to understand and design digital electronic circuits
**Course outcome:**
Students are able to

- **CO1**- Contrast and compare digital representation of information with the analog representation
- **CO2**- Explain fundamental concepts of the decimal number system. Represent number systems using powers of the base
- **CO3**- Use the methods of systematic reduction of Boolean algebra expressions including Karnaugh maps
- **CO4**- Understand the basic electronics of logic circuits and are able to use integrated circuit packages
- **CO5**- Model, analyse, and test a digital circuit using a computer software application

**Pedagogy**: Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: DIGITAL LOGIC & MS OFFICE LAB**
**Course Code: CS102**
**Objective:** To attain proficiency in Microsoft Office and fundamentals of the design and construct of logic circuits
**Course outcome:**
- **CO1**- Students will be able to analyze, design, build, and troubleshoot a broad range of combinational circuits using digital ICs
- **CO2**- Student will demonstrate understanding of flip-flops, one-shots, and timers
- **CO3**- Students will be able to analyze, design, build, and troubleshoot a broad range of counters
- **CO4**- Student will demonstrate understanding of the basics of shift register, the various kinds, their operating characteristics, and applications
- **CO5**- Students will be able to use the computer for modelling digital circuits

**Pedagogy**: Laboratory Practicals
**Evaluation Method:** One internal examination and One end-semester examination


**Course Name: NUMBER THEORY AND CALCULUS**
**Course Code: MT 101**
**Objective:**
• Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them
• Represent mathematical information symbolically, visually, numerically, and verbally
• Use arithmetical, algebraic, and statistical methods to solve problems
• Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results
• Recognize that mathematical and statistical methods have limits
**Course outcome:**
- **CO1**- Master the skills of reasoning, estimating, and problem solving
- **CO2**- Use ratios, rates, and proportional reasoning in context (real world data sets)
- **CO3**- Understand the basics of set theory, number theory, and logic
- **CO4**- Operate within and between different measurement scales including unit conversion and dimensional analysis
- **CO5**- Model real world problems using linear equations & inequalities, quadratic equations, and systems of equations
- **CO6**- Understand and apply fundamental principles of counting, probability and statistics

**Pedagogy**: Lectures, Seminars and Assignments
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: NUMERICAL ANALYSIS**
**Course Code: MT 302**
**Objective:**
- To provide the numerical methods of solving the non-linear equations, interpolation, differentiation and integration
- To improve the students skills in numerical methods by using the numerical analysis software and computer facilities.

**Course outcome:**
Students are able to
- **CO1**- Explain the consequences of finite precision and the inherent limits of the numerical methods considered
- **CO2**-Select appropriate numerical methods to apply to various types of problems in engineering and science inconsideration of the mathematical operations involved, accuracy requirements, and available computational resources
- **CO3**- Demonstrate they understand the mathematics concept underlying the numerical methods considered
- **CO4**- Solve equations and system of equations
- **CO5**- Solve problems using Taylor Series

**Pedagogy**:  Lectures, Seminars and Assignments
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: DESCRIPTIVE STATISTICS AND PROBABILITY THEORY**
**Course Code:ST101**
**Objective:** To educate on Probability theory which is the branch of mathematics that deals with modelling uncertainty. It is important because of its direct application in areas such as genetics, finance and telecommunications

**Course outcome:**
- **CO1**- Thorough understanding of the fundamental basis of Statistics and Probability Theory
- **CO2**- Students are trained to think logically and mathematically
- **CO3**- Fundamentals of population and parameters, sample, variables and attributes are obtained
- **CO4**- Fundamentals of the collection of primary data and sources of data secondary data
- **CO5**- Fundamentals of the scales of measurement

**Pedagogy**:  Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: DESCRIPTIVE STATISTICS AND PROBABILITY THEORY- PRACTICAL**
**Course Code:ST102**
**Objective:** In conjunction with theory, to provide an introduction to probability theory, random variables and Markov processes
**Course outcome:**
In conjunction with theory, the students learn to apply fundamentals of
- **CO1**- Statistics and Probability Theory
- **CO2**- Problem solving techniques needed to calculate accurate probabilities
- **CO3**- The connection of theory with practice
- **CO4**- Problem solving skills to solve real-world problems
- **CO5**-Analysis of Derived Statistics to all audiences

**Pedagogy**:  Problem solving
**Evaluation Method:** One internal examination and One end-semester examination

**Course Name: CONSTITUTION OF INDIA**
**Course Code: BSCCIF102**
**Objective:** To educate students on Indian constitution and bring in them a sense of social concern towards the country.
**Course outcomes:**
C01- The History and formation of IC is studied in detailed.
CO2-To understand the various aspects of Indian constitution, specially the articles
CO 3-To educate on important articles which have to be known by everyone
CO 4-To educate the students on how various elections are carried on in India
CO 5- Knowledge regarding various issues and matters of Parliament is learnt in the particular subject
**Pedagogy:** lectures, assignments, discussions, case studies
**Evaluation method:** Two internal test , one final semester exam

**SEMESTER:II**

**Course Name**: GENERAL PROFICIENCY AND COMMUNICATIVE ENGLISH
**Course Code: BSCENL153**
**Course outcome:**
CO1-Effective reading, writing, speaking and listening skills.
CO2- Better conversation skills to communicate in real life situations.
CO3- Improved skills in role play and enactment of a situation.
**Pedagogy**:  Lectures, Assignments, Discussions, Role play and Seminars.
**Evaluation method:** Two internal test, one final semester exam

**Course Name: HINDI**

**Course code: BSCHDL154**

**Course outcome:**

CO1- Development of conversation, text organization, presupposition and implicature

CO2- Introduction of clauses and phrases

**Pedagogy**: chalk and talk method, lectures, assignments, Projects, debate on specific topics, chart work, PPT Presentations, discussions.

**Evaluation method**: Two internal test, one final semester exam.


**Course Name**: **KANNADA**

**Course Code: BSCKAL154**

**Course Outcomes:**

ಕಾವ್ಯ: ಕಾವ್ಯಭಾಗಗಳನ್ನು, ಓದಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವ, ಕವನ ರಚಿಸುವ, ಆಸ್ವಾದಿಸುವ ಸಾಮರ್ಥ್ಯ ಗಳಿಸುವುದು.

ಪಠ್ಯ: ವಚನಸಾಹಿತ್ಯದ ಭಾಗ, ನಡುಗನ್ನಡಕಾವ್ಯದ ಭಾಗ ಮತ್ತು ಹೊಸಗನ್ನಡದ ಕವನಗಳು.

ಗದ್ಯ: ೧. ಪ್ರಬಂಧಗಳು: ಲೇಖನಗಳನ್ನು ಓದಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವ, ಸೃಜನಶೀಲವಾಗಿ ಅಭಿವ್ಯಕ್ತಿಗೊಳಿಸುವ ಸಾಮರ್ಥ್ಯ ಗಳಿಸುವುದಕ್ಕೆ ಪೂರಕವಾದ ಲೇಖನಗಳು.

ಗದ್ಯ: ೨. ಸಣ್ಣಕಥೆಗಳು: ಓದಿನ ಆಸ್ವಾದ ಗಳಿಸುವುದು, ಜೀವನ ಮೌಲ್ಯಗಳಿಗೆ ಸ್ಪಂದಿಸುವುದು, ಅನುಭವಗಳನ್ನು ಕಲೆಯಾಗಿ ಅಭಿವ್ಯಕ್ತಿಗೊಳಿಸುವ ಶಕ್ತಿಗಳಿಸುವುದು – ಹೊಸಗನ್ನಡದ ಕಥೆಗಳು

ಕ್ರಿಯಾತ್ಮಕಕನ್ನಡ: ಕನ್ನಡದತಾಂತ್ರಿಕ ವ್ಯವಹಾರಜ್ಞಾನ ಗಳಿಕೆಗಾಗಿ.

**Pedagogy**: Chalk and talk method, Lectures, Assignments, Discussions, Role play and Seminars


**Course name:PROGRAMMING IN C**

**Course code:CS151**

**Objective:**

- To have the student learn a programming language
- To learn problem solving techniques
- To teach the students to write Programs in C and to solve the problems

**Course outcome:**

Students are able to

- **CO1**- Develop applications
- **CO2**- Create algorithms and flowcharts to solve simple programming problems
- **CO3**- Understand design, implementation, testing and debugging of a program that uses calculations, loops, array, function, pointers, structure etc.,
- **CO4**- Follow memory management using C
- **CO5**- Develop structured level programs

**Pedagogy**:  Lectures, Seminars, Assignments, Practicals

**Evaluation Method:** Two internal examinations and One end-semester examination

**Course name:C PROGRAMMING LAB**
**Course code:CS152**
**Objective:** To teach the students to write Programs in C and to solve problems
**Course outcome:**
The students will be able to
- **CO1**- Acquire logical thinking
- **CO2**- Implement algorithms
- **CO3**- Analyze algorithm time complexity
- **CO4**- Identify the correct and efficient ways of solving problems
- **CO5-** Implement real time applications using C language features

**Pedagogy**:  Laboratory practicals
**Evaluation Method:** One internal examination and One end-semester examination


**Course name:CALCULUS, GROUP THEORY AND DIFFERENTIAL EQUATIONS**
**Course code:MT 151**
**Objective:**
• Classify ordinary differential equations
• Introduce calculus-based techniques to solving ordinary differential equations and
related application problems
**Course outcome:**
Student will be able to
- **CO1**- Model with first-order differential equations (DE) and identify initial value problems
- **CO2**- Solve scalar differential equations - homogeneous and non-homogeneous, using methods including separation of variables, integrating factors
- **CO3**- Using Eigen values and Laplace transformations
- **CO4**- Model with systems of first-order DEs and higher-order DEs
- **CO5**- Solve systems of linear differential equations using matrices and eigenvalues

**Pedagogy**:  Lectures, Seminars and Assignments
**Evaluation Method:** Two internal examinations and One end-semester examination


**Course name:REGRESSION ANALYSIS AND DISCRETE DISTRIBUTIONS**
**Course code:ST 151**
**Objective:** To learn about the various Discrete Distributions and Regressions to estimate the relationships among variables
**Course outcome:**
- **CO1**- Familiar with concepts of Correlation Analysis
- **CO2**- Familiarity with Regression Model for Single estimates and
- **CO3**- Familiarity with Bivariate estimates
- **CO4**- Familiarity with Trivariate estimates

- **CO5**- Develop a greater familiarity with a range of techniques and methods of Discrete Distributions and Fittings through a diverse set of theoretical and applied readings

**Pedagogy**: Lectures, Seminars, Assignments, Practicals

**Evaluation Method:** Two internal examinations and One end-semester examination

**Course name:REGRESSION ANALYSIS AND DISCRETE DISTRIBUTIONS -PRACTICAL**

**Course code:** ST152

**Objective:** In conjunction with theory, the students learn to apply fundamentals of Correlation, Bivariate and Trivariate Regression, Discrete Probability Distributions and its curve fittings and observations

**Course outcome:**

- **CO1**- Students can solve problems on bivariate and trivariate regressions
- **CO2**- Students can solve problems on discrete probability distributions
- **CO3**- Identification of different distributions and their usage
- **CO4**- Fundamentals of correlation
- **CO5**- Curve fittings of observations of distributions

**Pedagogy**: Problem solving

**Evaluation Method:** One internal examination and One end-semester examination

**Subject: HUMAN RIGHTS, GENDER EQUITY & ENVIRONMENTAL STUDIES**

**Subject code: BSCHGF152**

**Objective:** To bring out a sense of gender equity to the students

**Course outcomes:**

CO 1- To understand the Economic development and economic growth.

CO2 –Concept of poverty, population and unemployment are made aware of.

CO3- Describe about the small scale, large scale and cottage industries.

CO4 - Understand about the 1 to 12$^{th}$ Five Year Planning in India.

CO 5 – To study the different Rights and its significance.

**Pedagogy:** lectures, assignments, discussions, case studies

**Evaluation method:** Two internal test, one final semester exam

## SEMESTER:III

**Course Name**: **GENERAL PROFICIENCY AND COMMUNICATIVE ENGLISH**

**Course Code: BSCENL203**

**Course outcome:**

CO1- Better creative and critical reading skills.

CO2-Ability to read a text from different angles and perspectives.

CO3- Improved skills in analyzing texts.

**Pedagogy**: Lectures, Assignments, Discussions, Role play and Seminars.

**Evaluation method:** Two internal test, one final semester exam

**Course Name: HINDI**
**Course code: BSCHDL204**
Course outcome:
CO1- Development of poetry writing skill
CO2- Development of story writing skill.
**Pedagogy**: chalk and talk method, lectures, assignments, Projects, debate on specific topics, chart work, PPT Presentations, discussions.
**Evaluation method**: Two internal test, one final semester exam

**Course Name**: **KANNADA**
**Course Code: BSCKAL 204**
**Course Outcomes:**
ಕಾವ್ಯ: ಕಾವ್ಯಭಾಗಗಳನ್ನು, ಓದಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವ, ಕವನ ರಚಿಸುವ, ಆಸ್ವಾದಿಸುವ ಸಾಮರ್ಥ್ಯ ಗಳಿಸುವುದು.

ಪದ್ಯ: ಹಳಗನ್ನಡ ಕಾವ್ಯ ಭಾಗ, ವಚನ ಸಾಹಿತ್ಯದ ಭಾಗ, ಜನಪದಕಾವ್ಯ ಮತ್ತು ಹೊಸಗನ್ನಡದ ಕವನಗಳು

ಗದ್ಯ: ೧. ಪ್ರಬಂಧಗಳು: ಲೇಖನಗಳನ್ನು ಓದಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವ, ಸೃಜನಶೀಲವಾಗಿ ಅಭಿವ್ಯಕ್ತಿಗೊಳಿಸುವ ಸಾಮರ್ಥ್ಯಗಳಿಸುವುದಕ್ಕೆ ಪೂರಕವಾದ ಲೇಖನಗಳು.

ಗದ್ಯ ೨. ದೀರ್ಘಗದ್ಯ: ಭಾಷಾಚಿಂತನೆ, ಅಭಿವ್ಯಕ್ತಿಯ ಕೌಶಲ ಗಳಿಕೆ ಹಾಗೂ ಹೊಸಗನ್ನಡ ಸಾಹಿತ್ಯ ಪರಂಪರೆಯನ್ನುಅರಿತುಕೊಂಡು ಸೃಜನಶೀಲತೆಯನ್ನು ಮೈಗೂಡಿಸಿಕೊಳ್ಳುವುದಕ್ಕಾಗಿ ಹಾಗೂ ಓದಿನ ಆಸ್ವಾದದ ಸಾಮರ್ಥ್ಯ ಗಳಿಸುವುದಕ್ಕಾಗಿ ದೀರ್ಘಗದ್ಯಅಭ್ಯಾಸ ಮಾಡುವುದು. ಕಾದಂಬರಿ / ಆತ್ಮಕಥನ / ಅನುಭವಕಥನ– ಯಾವುದಾದರೂಒಂದು ಪ್ರಕಾರದಅಧ್ಯಯನ

**Pedagogy:** Chalk and talk method, Lectures, Assignments, Discussions, Role play and Seminars

**Course Name: C++ AND DATA STRUCTURES**
**Course Code: CS 201**
**Objective:**
- To use object-oriented design principles in computer problem solving
- To teach efficient storage mechanisms of data for an easy access
- To design and implementation of various basic and advanced data structures

**Course outcome:**
Students are able to
- **CO1**- Use an object-oriented programming language in a program
- **CO2**- Use the basic object-oriented design principles of computer problem solving
- **CO3**- Program with advanced features of the C++
- **CO4**- Use C++ classes for code reuse
- **CO5**- Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures

**Pedagogy**: Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: C++ AND DATA STRUCTURE LAB**
**Course Code: CS 202**
**Objective:**
- To develop applications using data structures
- Implement real time applications using the power of C++ language features

**Course outcome:**
- **CO1**- Programming with advanced features of the C++ programming language
- **CO2**- Student will be able to choose appropriate data structure as applied to specified problem definition
- **CO3**- Describe the Object Oriented Programming approach in connection with C++
- **CO4**- Apply concepts of Object Oriented Programming
- **CO5**- Illustrate the process of data file management using C++

**Pedagogy**: Laboratory Practicals
**Evaluation Method:** One internal examination and One end-semester examination

**Course Name: NUMBER THEORY, PARTIAL DERIVATIVES AND GROUP THEORY**
**Course Code: MT 201**
**Objective:**
• Classify ordinary differential equations
• Introduce calculus-based techniques to solving ordinary differential equations and related application problems

**Course outcome:**
- **CO1**- Developing problem solving skills for various types of equations such as wave equation, heat equation and Lapse equations
- **CO2**- Developing several perspectives of differential equations
- **CO3**- Developing the knowledge of closure, associativity, identity and invertibility of an Abelian group
- **CO4**- Knowledge of the theorems of commutativity and their applications
- **CO5**- Creating interest with finite sets particularly those areas relevant to business

**Pedagogy**: Lectures, Seminars and Assignments
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: CONTINUOUS PROBABILITY DISTRIBUTIONS**
**Course Code: ST 201**
**Objective:** To provide an introduction to probability theory, random variables and Markov processes

**Course outcome:**
- **CO1**- A thorough understanding of Continuous Univariate Distributions, Cauchy Distributions, Sampling Distributions, Probability Inequalities and Convergence Concepts
- **CO2**- Introduction and basic usage of PDF

- **CO3**- Computation of M.G.F and C.G.F for exponential, Gamma and Normal Distributions
- **CO4**- The student can perform Transformation of Random Variables and use Jacobian Transformation
- **CO5**- He/She also has a grasp of the concepts and usage of Probability Inequalities and Convergence in Distributions, Limiting distributions and The Central Limit Theorem

**Pedagogy**: Lectures, Seminars, Assignments, Practicals

**Evaluation Method:** Two internal examinations and One end-semester examination


**Course Name: CONTINUOUS PROBABILITY DISTRIBUTIONS -PRACTICAL**

**Course Code: ST 202**

**Objective:** In conjunction with theory, a thorough understanding of Application of Continuous Univariate Distributions, Chebyshev's Inequality and Central Limit Theorem in computing probabilities is achieved

**Course outcome:**

- **CO1**- Application of Continuous Univariate Distributions
- **CO2**- Students can find the range of standard deviations around the mean
- **CO3**- Knowledge of Chebyshev's Inequality which is widely used in all probability distributions in which mean and variance are defined
- **CO4**- Practical usage of Central Limit Theorem
- **CO5**- Familiarity with usage of CLT to calculate how means of various samples vary without comparison of other sample menas

**Pedagogy**: Problem solving

**Evaluation Method:** One internal examination and One end-semester examination


**Course Name: GENERAL STUDIES**

**Course code: BSCGSG201**

**Objective:** To ensure acquisition of general knowledge of the accomplishments of individuals, their respective countries and of the world at large.

**Course outcome:**

- **CO1**- Students have common place knowledge of important happenings
- **CO2**- Students acquire knowledge of matters outside the prescribed syllabus
- **CO3**- General studies are an important component of competitive exams and this course helps the students in facing them
- **CO4**- Helps students learn the highlights and accomplishments of individuals and countries in a fun and collaborative way
- **CO5**- Ensures all students are sensitive towards general trivia

**Pedagogy**: Lecture, Collaborative Discussions

**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: GENERAL PROFICIENCY AND COMMUNICATIVE ENGLISH**
**Course Code: BSCENL252**
**Course outcome:**
CO1- Ability to read and review literary works.
CO2- Distinguished skills in reading and enacting plays.
CO3- Improved language skills, and management of affective matters.
**Pedagogy**: Lectures, Assignments, Discussions, Role play and Seminars.
**Evaluation method:** Two internal test, one final semester exam
**Pedagogy:** Chalk and talk method, Lectures, Assignments, Discussions, Role play and Seminars

**Course Name: HINDI**
**Course code: BSCHDL 254**
**Course outcome:**
CO1- Development of letter writing skill Knowledge regarding the usage of Hindi
language.
**Pedagogy**: chalk and talk method, lectures, assignments, Projects, debate on specific topics, chart work, PPT Presentations, discussions.
**Evaluation method**: Two internal test, one final semester exam

**Course Name: KANNADA**
**Course Code: BSCKAL 254**
**Course Outcomes:**
ಕಾವ್ಯ: ಕಾವ್ಯಭಾಗಗಳನ್ನು, ಓದಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವ, ಕವನ ರಚಿಸುವ, ಆಸ್ವಾದಿಸುವ ಸಾಮರ್ಥ್ಯ ಗಳಿಸುವುದು.
ಪಠ್ಯ: ಹಳಗನ್ನಡ ಕಾವ್ಯ, ವಚನ ಸಾಹಿತ್ಯ, ಹೊಸಗನ್ನಡಕಾವ್ಯ.
ಗದ್ಯ : ಪ್ರವಾಸ ಸಾಹಿತ್ಯದ / ಜೀವನಚರಿತ್ರೆಯ ಓದಿನ ಮೂಲಕ ಓದಿನಲ್ಲಿ ಆಸಕ್ತಿ ಗಳಿಸುವುದು, ವಿವಿಧ ಪ್ರದೇಶಗಳ ಸಂಸ್ಕೃತಿಅಭ್ಯಾಸ / ವಿವಿಧ ವ್ಯಕ್ತಿತ್ವಗಳ ಪರಿಚಯ ಮಾಡುವುದು. ಗಳಿಸಿದ ಅನುಭವಗಳನ್ನು ಸೃಜನಶೀಲವಾಗಿ ಅಭಿವ್ಯಕ್ತಿಗೊಳಿಸುವ ಕೌಶಲವೃದ್ಧಿ.
ಗದ್ಯ ೧. ಕನ್ನಡ ಸಾಹಿತ್ಯದಲ್ಲಿಆಸಕ್ತಿಮೂಡಿಸುವುದಕ್ಕಾಗಿ ಸ್ವಾರಸ್ಯಕರವಾಗಿ ಸರಳವಾಗಿರುವ ಕಥನ ಸಾಹಿತ್ಯದಅಧ್ಯಯನ: ಪರಿಸರಕುರಿತುಚಿಂತಿಸುವ, ಕಾಳಜಿ ವ್ಯಕ್ತಪಡಿಸುವ ಆ ಕುರಿತಅಭಿವ್ಯಕ್ತಿ ಸಾಮರ್ಥ್ಯ ಗಳಿಕೆಗಾಗಿ ಪರಿಸರ ಕಥೆಗಳನ್ನು ಅಭ್ಯಾಸ ಮಾಡುವುದು.
ಕಾದಂಬರಿ / ಆತ್ಮಕಥನ / ಅನುಭವಕಥನ– ಯಾವುದಾದರೂಒಂದು ಪ್ರಕಾರದಅಧ್ಯಯನ

**Pedagogy:** Chalk and talk method, Lectures, Assignments, Discussions, Role play and Seminars

**Course Name: OPERATING SYSTEM & LINUX**
**Course Code:CS251**
**Objective:**
- To understand the main components of an OS & their functions
- To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS

- To understand the concepts and implementation, memory management and virtual memory

**Course outcome:**

Students are able to

- **CO1**- Describe the important computer system resources and the role of operating system in their management policies and algorithms
- **CO2**- Understand the process management policies and scheduling of processes by CPU
- **CO3**- Evaluate the requirement for process synchronization and coordination handled by operating system
- **CO4**- Describe and analyze the memory management and its allocation policies
- **CO5**- Use various Linux commands
- **CO6**- Develop shell scripts

**Pedagogy**:  Lectures, Seminars, Assignments, Practicals

**Evaluation Method:** Two internal examinations and One end-semester examination


**Course Name: OS AND LINUX LAB**

**Course Code:CS252**

**Objective:**

- To develop shell scripts
- To be able to develop Linux OS

**Course outcome:**

Students are able to

- **CO1**- Use file and directory oriented commands efficiently
- **CO2**- Use process oriented and background processing commands
- **CO3**- Use vi editor efficiently
- **CO4**- Creating shell scripts
- **CO5**- Use Linux commands

**Pedagogy**:  Laboratory Practicals

**Evaluation Method:** One internal examination and One end-semester examination


**Course Name: MULTIPLE INTEGRALS, COMPLEX VARIABLES, SEQUENCES AND SERIES**

**Course Code: MT 251**

**Objective:**

• Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.

• Represent mathematical information symbolically, visually, numerically, and verbally.

• Use arithmetical, algebraic, and statistical methods to solve problems.

• Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.

• Recognize that mathematical and statistical methods have limits.

**Course outcome:**
- **CO1**- Developing the knowledge of real numbers and real valued functions such assequences convergence and continuity
- **CO2**- Studying the properties of real numbers ($R^2$ space and positive operators)
- **CO3**- Study of algorithms that are used in numerical approximation
- **CO4**- Study of Sequences and Series and the importance of Cauchy Sequences
- **CO5**- Computation the trajectory of a spacecraft requires the accurate numerical solution of a system of ordinary differential equations

**Pedagogy**: Lectures, Seminars and Assignments

**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: SAMPLING THEORY**

**Course Code: ST251**

**Objective:** To apply mathematical concepts and principles to perform numerical and symbolic computations

**Course outcome:**
- **CO1**- Familiarity with Sample Investigation
- **CO2**- Knowledge of differences between Simple random sampling and Systematic Sampling
- **CO3**- Familiarity with Stratification Sampling
- **CO4**- Able to analyse data from multi-stage surveys
- **CO5**- Understand the underlying principles of Sampling as a means of making inferences about a population

**Pedagogy**: Lectures, Seminars, Assignments, Practicals

**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: SAMPLING THEORY - PRACTICAL**

**Course Code: ST 252**

**Objective:**
- To Learn differences in simple random sampling, sampling with replacement and other types of sampling

**Course outcome:**

Students can, on completion of the course
- **CO1**- Distinguish between different types of data
- **CO2**- Demonstrate the ability to apply fundamental concepts of Sampling Theory in real life
- **CO3**- Estimate Mean, Variance and Totals from Frequency and Contingency tables
- **CO4**- Perform Systematic and Random Sampling, Sampling Proportions
- **CO5**- Have an appreciation of the practical issues arising in sampling studies

**Pedagogy**: Problem solving

**Evaluation Method:** One internal examination and One end-semester examination

**Course Name: HUMAN RESOURCE DEVELOPMENT STUDIES**
**Course Code: BSCIDI251**
**Pedagogy:** lectures, assignments, discussions, case studies
**Course outcomes:**
CO 1- To familiarize the students with the basic elements of Human Resource Development.
CO2 – To make the students understand the components and process of HRD.
CO3- To be aware of the functions of HRD.
CO4 – To be in tune with the recent trends in HRD
**Evaluation method:** Two internal test, one final semester exam

## SEMESTER:V

**Course Name: MICROPROCESSOR ARCHITECTURE AND 8086 PROGRAMMING**
**Course Code: CS301**
**Objective:**
- To understand basic architecture of 16 bit and 32 bit microprocessors
- To understand interfacing of 16-bit microprocessor with memory and peripheral chips involving system design.
- To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors

**Course outcome:**
Students are able to
- **CO1**- Write programs that run on 8086 microprocessor based systems
- **CO2**- Design systems using memory chips and peripheral chips for 16 bit 8086 microprocessor
- **CO3**- Understand and devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors
- **CO4**- Understand system components and control operations
- **CO5**- Prepare structure that makes data transfer between a number of registers via a shared common bus

**Pedagogy**: Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: DATABASE CONCEPTS AND ORACLE**
**Course Code: CS302E1.1**
**Objective:**
- To describe a sound introduction to the discipline of database management systems
- To introduce the concepts of basic SQL as a universal Database language

**Course outcome:**

Students are able to:

- **CO1**- Explain the features of database management systems and relational database
- **CO2**- Create and populate a RDBMS for real life situations, with constraints and keys, using SQL
- **CO3**- Retrieve any type of information from a data base by formulating complex queries in SQL
- **CO4**- Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database
- **CO5**- Manage database efficiently

**Pedagogy**: Lectures, Seminars, Assignments, Practicals

**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: ORACLE LAB**

**Course Code: CS303E1.1**

**Objective:**

- To create and use database
- To introduce the concepts of basic SQL queries

**Course outcome:**

Students are able to

- **CO1**- Create simple database tables, queries, reports and forms
- **CO2**- Store and retrieve data efficiently
- **CO3**- Retrieve any type of information from a data base by formulating complex queries in SQL
- **CO4**- Identify entities
- **CO5**- Use Oracle efficiently for large data retrieval

**Pedagogy**: Laboratory Practicals

**Evaluation Method:** One internal examination and One end-semester examination

**Course Name: 8086 MP PROGRAMMING LAB**

**Course Code: CS303**

**Objective:** To study the Architecture of 8086 microprocessorsand to learn the design of I/O and Memory Interfacing circuits

**Course outcome:**

- **CO1**- Students will be able to design and implement programs on 8086 microprocessor
- **CO2**-Distinguish between the upgraded 8086 capabilities and the 8085
- **CO3**- Students learn of the instruction queue
- **CO4**-Students can understand the two modes of operation ie.,Maximum mode and Minimum mode
- **CO5**- Students learn powerful instruction sets for 8086

**Pedagogy**:  Laboratory Practicals
**Evaluation Method:** One internal examination and One end-semester examination

**Course Name: DIFFERENTIAL EQUATIONS AND RING THEORY**
**Course Code: MT 301**
**Objective:**
• Develop capabilities with an axiomatic treatment of mathematics
• Develop an understanding of the structure of sets with operations on them
• Acquire knowledge of the language and basic properties of these algebraic structures
• Read and understand mathematical results and proofs as well as formulate his/her own proof to various problems
• Enhance communication of mathematical findings in writing and through oral communication
**Course outcome:**
- **CO1**- Define a *group*, give examples of groups, list properties that hold in every group
- and state definitions of particular features of groups
- **CO2**- Define a *ring*, give examples of rings, list properties that hold in every ring and
- state definitions of particular features of rings
- **CO3**- Define a *field*, give examples of fields, list properties that hold in every field and
- state definitions of particular features of fields
- **CO4**- Prove statements about these mathematical structures
- **CO5**- Form strong fundamentals of Abstract Algebra

**Pedagogy**:  Lectures, Seminars and Assignments
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: STATISTICAL INFERENCE I**
**Course Code: ST 301**
**Objective:**
To perform point estimation, hypothesis testing and interval estimation under a large variety of discrete and continuous probability models
**Course outcome:**
- **CO1**- The student has basic theoretical knowledge about fundamental principles for statistical inference using Point Estimation, Interval Estimation and Testing of Hypothesis
- **CO2**- Students can explain the concept of Estimation of Parameters
- **CO3**- Students can explain the concepts of Testing of Hypothesis
- **CO4**- Understanding of  Large Sample Tests
- **CO5**- Evaluate and analyse Confidence Intervals

**Pedagogy**:  Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: STATISTICAL QUALITY CONTROL**
**Course Code: ST 302(a)**
**Objective:** To understand the purpose and function of statistical control and its wide and necessary applications
**Course outcome:**
Students will able to

- **CO1**- Understand the philosophy and basic concepts of Quality Improvement and Total Quality Management
- **CO2**- Describe the DMAIC process (define, measure, analyze, improve, and control)
- **CO3**- Use measures of Quality Control to keep a process in check, be it in production or after, and maintain a quality check of raw materials and machinery
- **CO4**- Confidently use data to record and read various control charts
- **CO5**- Describe any process that is out of control and use measure to minimize loss

**Pedagogy**: Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: PRACTICAL BASED ON ST 301 AND ST 302**
**Course Code: ST 303**
**Objective:** Demonstrate the ability to use the methods of Statistical Quality Control and Perform Analysis of Estimates and Intervals
**Course outcome:**

- **CO1**- Selection and practical application of qualitative and quantitative tools and methods of estimation
- **CO2**- Finding Point Estimates and Interval Estimates and Confidence intervals
- **CO3**- Selection and practical application of qualitative and quantitative tools and methods of Quality Control
- **CO4**- Solving problems based on control charts
- **CO5**- Usage of theory in real world situations

**Pedagogy**: Problem solving
**Evaluation Method:** One internal examination and One end-semester examination

**SEMESTER:VI**

**Course name:VISUAL BASIC .NET PROGRAMMING**
**Course code:CS351**
**Objective:**

- To introduce event driven, object oriented programming techniques in VB.NET
- To design, code, and debug Graphic User Interface (GUI) programs and apply the techniques to business applications

**Course outcome:**

Upon completion of this course, students are able to
- **CO1**- Design and develop Graphical User Interfaces
- **CO2**- Understand and code Event-Driven procedures
- **CO3**- Understand and code Event-Driven procedures CO2
- **CO4**- Program Visual Basic controls proficiently
- **CO5**- Access database from VB.NET programs
- **CO6-**Design, develop and test Visual Basic programs

**Pedagogy**:  Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: NETWORKS AND WEB DESIGN**
**Course Code: CS352E2.1**

- **Objective:** To Understand the concepts, vocabulary and techniques currently used in the area of computer networks**.**
- Getting acquainted with wireless networking concepts
- Understanding classification of network, transmission impairments, Data transmission methods etc.,
- Understanding methods and tools to design, implement, test web pages and develop Web Application

**Course outcome:**
Students are able to
- **CO1**- Master the terminology and concepts of the OSI reference model and the TCP-IP reference model
- **CO2**- Master the concepts of protocols, network interfaces, and identify design/performance issues in local area networks and wide area networks
- **CO3**- Familiarize with wireless networking concepts
- **CO4**- Familiarize with contemporary issues in networking technologies
- **CO5**- Familiarize with network tools and network programming

**Pedagogy**:  Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: VISUAL BASIC.NET LAB**
**Course Code: CS353**
**Objective:** To Design and develop Graphical User Interfaces
**Course outcome:**
Students are able to
- **CO1**- Design and develop Graphical User Interfaces
- **CO2**- Access database from VB.NET programs

- **CO3**- Design, develop and test Visual Basic programs
- **CO4**- Create front and back ends of Interfaces
- **CO5**- Efficiently troubleshoot code of the back end processes

**Pedagogy**: Laboratory Practicals

**Evaluation Method:** One internal examination and One end-semester examination

**Course Name: WEB DESIGNING LAB**

**Course Code: CS353**

**Objective:** To Understand methods and tools to design, implement, test web pages and develop Web Application

**Course outcome:**
- **CO1**- Students will be able to design web pages and web applications
- **CO2**- Students will be able to use HTML to develop web pages
- **CO3**- To become more familiar with website designing
- **CO4**- Students can create blogs and websites
- **CO5**- Connect DBMS with Visual Basics

**Pedagogy**: Laboratory Practicals

**Evaluation Method:** One internal examination and One end-semester examination

**Course Name: PARTIAL DIFFERENTIAL EQUATIONS, FOURIER SERIES AND LINEAR ALGEBRA**

**Course Code: MT 351**

**Objective:**
- The objective of this subject is to present the main results in the context of partial differential equations that allow learning about these models and to study numerical methods for the approximation of their solution.
- To expose the students to the basic of partial differential equations required for their subsequent course.

**Course outcome:**
- **CO1**- Study of algorithms that are used in numerical approximation
- **CO2**- Computation the trajectory of a spacecraft requires the accurate numerical solution of a system of ordinary differential equations
- **CO3**- Use matrix algebra to analyze and solve equations arising in many applications that require a background in linear algebra
- **CO4**- Utilize vector space terminology and describe how closely other vector spaces resemble $R^n$
- **CO5**- Dissect the action of a linear transformation into elements that are easily visualized using the basic concepts of Eigen vectors and Eigen values

**Pedagogy**: Lectures, Seminars and Assignments

**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: LINEAR PROGRAMMING AND ITS APPLICATIONS**
**Course Code: MT 352**
**Objective:**
Linear programming is used for obtaining the most optimal solution for a problem with given constraints. In linear programming, we formulate our real life problems into a mathematical model. It involves an objective function, linear inequalities with subject to constraints.
**Course outcome:**
  - **CO1**- Formulation of real world problems into mathematically solvable models
  - **CO2**- Checking the Feasibility an Infeasibility of problems
  - **CO3**- Use the simplex method to solve maximum and minimum linear programming problems from everyday life involving two or more variables and interpret the solution
  - **CO4**- Optimizing the given problems using Hungarian Method, Big M Method and Game Theory
  - **CO5**- Solving Transportation problems using the Transportation Method to find the best result
**Pedagogy**: Lectures, Seminars and Assignments
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: STATISTICAL INFERENCE II**
**Course Code: ST 351**
**Objective:** To learn to use Non-Parametric Inference, Sequential Ratio Tests and Testing and Analysis.
**Course outcome:**
  - **CO1**- Student can evaluate the properties of the Estimators and perform Testing and Analysis of Variance
  - **CO2**- Testing of Non-Parametric Inference, Sequential Ratio Tests
  - **CO3**- Student can design experiment and develop factorial experiments
  - **CO4**- Student can use application of all accumulated basic concepts to device experiments for real world situations
  - **CO5**- Student is able to perform research based on concepts of Statistical Inference
**Pedagogy**: Lectures, Seminars, Assignments, Practicals
**Evaluation Method:** Two internal examinations and One end-semester examination

**Course Name: OPERATIONS RESEARCH**
**Course Code: ST 352(a)**
**Objective:** To successfully use optimization techniques and game theory for everyday occurrences.
**Course outcome:**
  - **CO1**- Student is able to Formulate real world problems in mathematical form

- **CO2**- Student is able to use efficient solving techniques to find feasibility of problems
- **CO3**- Familiarity with Game Theory, Linear Programming Problems using Simplex Method, Big M Method, Transportation Problems, Game Theory, Inventory Problems
- **CO4**- Students is trained to find the best optimal answer to these problems
- **CO5**- Analyze results and propose recommendations in understandable-language to the decision making entity

**Pedagogy**: Lectures, Seminars, Assignments, Practicals

**Evaluation Method:** Two internal examinations and One end-semester examination


**Course Name: PRACTICAL BASED ON ST 351 AND ST 352**

**Course Code: ST 353**

**Objective:** In conjunction with theory, to apply experiments on Non-Parametric Inference, Sequential Ratio Tests, Designs and Factorial Experiments and to use optimization techniques.

**Course outcome:**
- **CO1**- In conjunction with theory, experiments on Non-Parametric Inference, Sequential Ratio Tests, Designs and Factorial Experiments are described
- **CO2**- Formulation, and solutions based on Simplex Method, Big M Method, Transportation Problems, Game Theory, Inventory Problems
- **CO3**- Students have the knowledge to solve real world problems dealing with Optimization
- **CO4**- Students can formulate and solve mathematical model for physical situations like production, distribution of goods and economics
- **CO5**- Maximize profits and Minimize losses of a mathematical model requiring optimization

**Pedagogy**: Problem solving

**Evaluation Method:** One internal examination and One end-semester examination