# Study & Evaluation Scheme

# of

# Bachelor of Science (Hons.) (Mathematics)

**[Applicable for Academic Session 2017-18]**

**[Approved by Hon'ble VC dated August 08, 2017]**

**[With revision approved by VC date July 23, 2018, August 14, 2018, January 23, 2019 & November 29, 2019]**


## TEERTHANKER MAHAVEER UNIVERSITY

**N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001**

**Website: www.tmu.ac.in**

# TEERHANKER MAHAVEER UNIVERSITY

**(Established under Govt. of U. P. Act No. 30, 2008)**
**Delhi Road, Bagarpur, Moradabad (U.P)**

## Study & Evaluation Scheme
## Bachelor of Science (Hons.)
## SUMMARY

| | | |
|---|---|---|
| Programme | : | B.Sc. (Hons.) – Mathematics |
| Duration | : | Three-year full time (Six Semesters) |
| Medium | : | English |
| Minimum Required Attendance | : | 75 % |
| Credit | : | |
| Maximum Credit | : | 145 |
| Minimum credit required for the degree | : | 140 |

Assessment :

| Internal | External | Total |
|---|---|---|
| 40 | 60 | 100 |

Internal Evaluation (Theory Papers) :

| Class Test I | Class Test II | Class Test III | Assignment(s) | Attendance | Total |
|---|---|---|---|---|---|
| Best two out of three | | | | | |
| 10 Marks | 10 Marks | 10 Marks | 10 Marks | 10 Marks | 40 Marks |

Evaluation of Practical :

| Internal | External | Total |
|---|---|---|
| 50 | 50 | 100 |

Evaluation of Seminar/Viva :

| Internal | External | Total |
|---|---|---|
| 50 | 50 | 100 |

Duration of Examination :

| External | Internal |
|---|---|
| 3 hrs. | $1\frac{1}{2}$ hrs |

*(To qualify the course a student is required to secure a minimum of 45% marks in aggregate in each course including the semester-end examination and the teacher's continuous evaluation shall be essential for passing the course and earning its assigned credits. A candidate, who secures less than 45% marks in a course, shall be deemed to have failed in that course.)*

***Question Paper Structure***

1. *The question paper shall consist of six questions. All six are compulsory. First question shall be of short answer type (not exceeding 50 words). Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 2 marks each).*
2. *Remaining five questions will be one from each unit with internal choice. The student has to answer one of the two in each question. The weightage of Question No. 2 to 6 shall be 10 marks each.*
3. *Usually each question in the examination should be designed to have a numerical component, where part of syllabus.*

**Note 1:**

## Evaluation Scheme for MOOC, Short Term Courses:

University allows students to undertake additional subjects/course(s) (In-house offered by the university through collaborative efforts or courses in the open domain by various internationally recognized universities) and to earn additional credits on successful completion of the same. Each course will be approved in advance by the University following the standard procedure of approval and will be granted credits as per the approval.

Keeping this in mind the Academic Council in its 10th meeting on February 13, 2016, approved the University proposal and allowed a maximum of two credits to be allocated for MOOC courses. In the pilot phase it is proposed that a student undertaking and successfully completing a MOOC course through edX, Coursera, IIRS and NPTEL could be given a maximum credit of two with 1 credit for credit with 30-60 contact hours and 2 credits for courses having more than 60 credit hours.

For smooth functioning and monitoring of the scheme the following shall be the guidelines for MOOC courses, Add-on courses carried out by the College from time to time.

1. There shall be a MOOC co-ordination committee in the College with a faculty at the level of Professor heading the committee and all Heads of the Department being members of the Committee.
2. The Committee will list out courses to be offered during the semester, which could be requested by the department or the students and after deliberating on all courses finalise a list of courses to be offered with credits defined for each course and the mode of credit consideration of the student. The complete process including the approval of the Vice Chancellor shall be obtained by the College before end of June and end of December for Odd and Even semester respectively of the year in which the course is being offered. In case of MOOC course the approval will be valid only for the semester on offer.
3. A student can opt for a maximum of two MOOC courses for credit during the complete duration of the course other than offered under SWAYAM.
4. College can offer upto 20% credit through courses offered by SWAYAM. However, if the college is offering courses on other MOOC platforms, the total credit offered under MOOC will not exceed 20% including those offered under SWAYAM.
5. Students will register for the course and the details of the students enrolling under the course along with the approval of the Vice Chancellor will be forwarded to the Examination department within fifteen days of start of the semester by the Co-ordinator MOOC through the Principal of the College.

6. Where the MOOC course or Add-on on courses are only offering certificate of successful completion, and credit has been assigned to the course, the University examination division will conduct a MCQ examination for the course with 50 MCQ with 100 marks to facilitate inclusion of the courses in CPI computation.
7. College will define whether the credits are regular credits or to be considered only in case a student fails to secure minimum required credits then the additional subject(s) shall be counted for calculating the minimum credits required for the award of degree.
8. In case the College wants the additional course to be shown in the mark sheet as additional course completed by the students the same shall also be mentioned by the College and the student will opt for the same at the time of taking admission to the course.

# Study & Evaluation Scheme

## Semester I

| *S. No.* | *Subject Code* | *Subject* | *Periods* | | | *Credit* | *Evaluation Scheme* | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *L* | *T* | *P* | | *Internal* | *External* | *Total* |
| **1** | BAS115 | General Chemistry-I | 4 | - | - | 4 | 40 | 60 | 100 |
| **2** | BAS116 | Algebra & Matrices | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **3** | BAS117 | Trigonometry & Differential Calculus | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **4** | BCS111/ ECS212 | Computer System & Programming in C++ | 3 | - | - | 3 | 40 | 60 | 100 |
| **5** | BHM199/ EHM199 | English communication & soft skill -I | 1 | 1 | 2 | 2 | 50 | 50 | 100 |
| **6** | BAS167 | General Chemistry-I (Lab) | - | - | 3 | 2 | 50 | 50 | 100 |
| **7** | BCS161/ ECS262 | Computer System & Programming in C++ (Lab) | - | - | 2 | 1 | 50 | 50 | 100 |
| **8** | BGP111 | Discipline & General Proficiency | - | - | - | - | 100 | - | 100 |
| | **Total** | | **16** | **3** | **7** | **22** | **410** | **390** | **800** |

## Semester II

| *S. No.* | *Subject Code* | *Subject* | *Periods* | | | *Credit* | *Evaluation Scheme* | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *L* | *T* | *P* | | *Internal* | *External* | *Total* |
| **1** | BAS215 | General Chemistry- II | 4 | - | - | 4 | 40 | 60 | 100 |
| **2** | BAS216 | Vector calculus & Geometry | 4 | - | - | 4 | 40 | 60 | 100 |
| **3** | BAS217 | Integral Calculus | 4 | - | - | 4 | 40 | 60 | 100 |
| **4** | BAS213/ BAS114 | Mechanics | 4 | - | - | 4 | 40 | 60 | 100 |
| **5** | BAS214/ EAS115/ BAS328/ BAS428 | Environmental Studies | 1 | 2 | - | 2 | 40 | 60 | 100 |
| **6** | BHM249/ EHM249 | English Communication & Soft Skill-II | 1 | 1 | 2 | 2 | 40 | 60 | 100 |
| **7** | BAS264 | General Chemistry- II (Lab) | - | - | 3 | 2 | 50 | 50 | 100 |
| **8** | BAS267/ BAS166 | Mechanics (Lab) | - | - | 3 | 2 | 50 | 50 | 100 |
| **9** | BGP211 | Discipline & General Proficiency | - | - | - | - | 100 | - | 100 |
| | **Total** | | **18** | **3** | **8** | **24** | **440** | **460** | **900** |

## Semester III

| S. No. | Subject Code | Subject | Periods | | | Credit | Evaluation Scheme | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Internal | External | Total |
| 1 | BAS314 | Elements of Modern Physics | 4 | - | - | 4 | 40 | 60 | 100 |
| 2 | BAS315 | Partial Differential Equation | 4 | 1 | - | 5 | 40 | 60 | 100 |
| 3 | BAS316 | Modern Algebra | 4 | 1 | - | 5 | 40 | 60 | 100 |
| 4 | BAS317 | Statistical Method | 4 | 1 | - | 5 | 40 | 60 | 100 |
| 5 | BHM349/ EHM349/449 | English Communication & Soft Skill-III | 1 | 1 | 2 | 2 | 40 | 60 | 100 |
| 6 | BCS311/ ECS511/ 611/411/ MSC014 | Database Management System | 3 | 1 | - | 4 | 40 | 60 | 100 |
| 7 | BGP311 | Discipline & General Proficiency | - | - | - | 1 | 100 | - | 100 |
| | **Total** | | **20** | **5** | **2** | **26** | **340** | **360** | **700** |

## Semester IV

| S. No. | Subject Code | Subject | Periods | | | Credit | Evaluation Scheme | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Internal | External | Total |
| 1 | BAS415 | Ordinary Differential Equation | 4 | 1 | - | 5 | 40 | 60 | 100 |
| 2 | BAS416 | Real Analysis | 4 | 1 | - | 5 | 40 | 60 | 100 |
| 3 | BAS417 | Discrete Mathematics | 4 | 1 | - | 5 | 40 | 60 | 100 |
| 4 | BAS418 | Introduction to Probability | 4 | - | - | 4 | 40 | 60 | 100 |
| 5 | BHM499/ EHM599/699 | English Communication & Soft Skill-IV | 1 | 1 | 2 | 2 | 50 | 50 | 100 |
| 6 | MOOC12 | MOOC Program-I (Mandatory) | - | - | - | 1/2 | - | 100 | 100 |
| 7 | BGP411 | Discipline & General Proficiency | - | - | - | 1 | 100 | - | 100 |
| | **Total** | | **17** | **4** | **2** | **23/24** | **310** | **390** | **700** |

## Semester V

| *S. No.* | *Subject Code* | *Subject* | *Periods* | | | *Credit* | *Evaluation Scheme* | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *L* | *T* | *P* | | *Internal* | *External* | *Total* |
| **1** | BAS516 | Numerical Analysis | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **2** | BAS517 | Applied Statistics | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **3** | BAS518 | Complex Analysis | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **4** | BAS519 | Operations Research | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **5** | BAS565 | Introduction to MATLAB | - | 2 | 2 | 2 | 50 | 50 | 100 |
| **6** | MOOC22 | MOOC Program-II (Optional) | - | - | - | 1/2 | - | 100 | 100 |
| **7** | BGP511 | Discipline & General Proficiency | - | - | - | 1 | 100 | - | 100 |
| | **Total** | | **16** | **6** | **2** | **23** | **310** | **290** | **600** |

## Semester VI

| *S. No.* | *Subject Code* | *Subject* | *Periods* | | | *Credit* | *Evaluation Scheme* | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *L* | *T* | *P* | | *Internal* | *External* | *Total* |
| **1** | BAS616 | Fourier & Laplace Transform | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **2** | BAS617 | Differential Geometry and Tensor | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **3** | BAS618 | Number Theory | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **4** | BAS619 | Graph theory | 4 | 1 | - | 5 | 40 | 60 | 100 |
| **5** | **Open Elective** | | | | | | | | |
| | BAS011 | Introduction to Statistical Package for Social Sciences | 3 | - | - | 3 | 40 | 60 | 100 |
| | BAS012 | Industrial Chemistry | | | | | | | |
| | BAS013 | Introduction to Nano Science and Technology | | | | | | | |
| **6** | BAS698 | Seminar, Viva & Presentation | - | - | 4 | 2 | 50 | 50 | 100 |
| **7** | BGP611 | Discipline & General Proficiency | - | - | - | 1 | 100 | - | 100 |
| | | **Total** | **19** | **4** | **4** | **26** | **350** | **350** | **700** |

## Semester-I
## General Chemistry-I

**Course Code: BAS115** **L T P C**
**4 0 0 4**

**Course Contents:**

**Unit I** **(08 Lectures)**

**Atomic Structure:**

Schrödinger's wave equation, significance of $\psi$ and $\psi^2$. Quantum numbers and their significance. Normalized and orthogonal wave functions. Sign of wave functions. Radial and angular wave functions for hydrogen atom. Radial and angular distribution curves. Shapes of *s, p, d* and *f* orbitals.

Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau's principle and its limitations.

**Unit II** **(08 Lectures)**

**Periodicity of Elements:**

Effective nuclear charge, shielding or screening effect, Atomic & ionic radii, Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization energy. Applications of ionization enthalpy, Electron gain enthalpy, Electronegativity, trends in periodic table and applications in predicting and explaining the chemical behaviour.

**Unit III** **(08 Lectures)**

**Chemical Bonding:**

Covalent bond: Valence Bond theory & its limitations. Hybridization & shapes of simple inorganic molecules & ions, Valence shell electron pair repulsion theory (VSEPR), shapes of simple molecules and ions containing lone pairs and bond pairs of electrons, Resonance and resonance energy, Molecular orbital theory & MO diagrams of Homo & heteronuclear (CO, NO) diatomic molecules.

**Unit IV** **(08 Lectures)**

**Basics of Organic Chemistry I:**

Organic Compounds: Classification, and Nomenclature, Hybridization, Shapes of molecules, Influence of hybridization on bond properties.

Electronic Displacements: Inductive, electrometric, resonance and mesmeric effects, hyperconjugation and their applications; Dipole moment; Organic acids and bases; their relative strength.

**Unit V** **(08 Lectures)**

**Basics of Organic Chemistry II:**

Homolytic and Heterolytic fission. Curly arrow rules, formal charges; Electrophiles and Nucleophiles; Nucleophlicity and basicity; Types, shape and their relative stability of Carbocations, Carbanions, Free radicals and Carbenes.

Introduction to types of organic reactions and their mechanism: Addition, Elimination and Substitution reactions with examples.

**Text & Reference Books:**


1. Svehla, G. Vogel's Qualitative Inorganic Analysis, Pearson Education.
2. Mendham, J. Vogel's Quantitative Chemical Analysis, Pearson.
3. Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry, Oxford University Press.
4. Castellan, G. W. Physical Chemistry, Narosa.
5. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.


*** Latest editions of all the suggested books are recommended.**

## Semester-I
## Algebra & Matrices

**Course Code: BAS116** **L T P C**
**4 1 0 5**

**Objective**-To understand the topics like Matrices and determinants, Eigen values and eigen vectors, Matrices, Isomorphism and Homomorphism and Elementary Number systems. The stress is on the development of problem solving skills.

**Course Contents:**

**Unit I** **(Lectures 08)**

Matrices and determinants, Elementary row and column transformation, Linear transformations, Rank of matrix.

**Unit II** **(Lectures 08)**

Consistency of linear system of equations, Linear dependence and independence, Hermitian and skew Hermitian matrices, general form of matrices.

**Unit III** **(Lectures 08)**

Inverse of matrix by elementary operations, Solutions of simultaneous equations, Characteristic equation, Caley-Hamilton theorem (without proof), Eigen values and eigen vectors, Diagonalization.

**Unit IV** **(Lectures 08)**

Sets, Relations, Functions, Binary operations, Permutation, Groups and subgroup its elementary properties.

**Unit V** **(Lectures 08)**

Isomorphism and Homomorphism of Groups, Caley's theorem, Order of an element, Rings, Fields and integral domains.

**Text Books:**

**1.** "Matrices" by Dr. J. K. Goel and K. P. Gupta, Students Friends & Co.
**2.** "Modern Algebra" by A. R. Vashisth, Krishana Prakshan Mandir.

**Reference Books:**

**1.** "Matrices" by Shanti Narain, S Chand &Co.
**2.** "Matrices" by N. Saran and J. K. Goyal, Pragati Prakashan
**3.** "Modern algebra" by I N Herstein, Wiley Eastern Ltd.

**4.** "Modern algebra" by Surjeet Singh and Qazi Zameesuddin, Vikash Publishing House Pvt Ltd.
**5.** "Modern algebra" by D. C. Agarwal and H. N Nigam, Shiksha Sahitya Prakshan
**6.** "Modern algebra" by Harsh Swaroop Sharma and H. S. Seth, Ram Prashad & Sons
**7.** "Elements of Matrices" by Dr. M. Ray and S.S. Sethi Ram Prasad &Sons.
**8.** "Matrices" by A.R. Vashistha, Krishna Prakashan Mandir.

*** Latest editions of all the suggested books are recommended.**

## Semester-I
## Trigonometry & Differential Calculus

**Course Code: BAS117** **L T P C**
**4 1 0 5**

**Objective-**To understand the topics on the expansions of trigonometric functions, hyperbolic functions, inverse circular, inverse hyperbolic, Expansion of functions and it aims to and knowledge in the areas of Differential Calculus.

**Course Contents:**

**Unit I** **(Lectures 08)**

Circular and hyperbolic functions of complex quantities, Separation of real and imaginary parts of trigonometric, logarithmic, and exponential functions.

**Unit II** **(Lectures 08)**

Gregory's series, summation of series, Expansion of Functions.

**Unit III** **(Lectures 08)**

Successive differentiation, Leibnitz theorem (without proof), Euler's theorem, Mean value theorems, tangent and normal, maxima and minima, limit and its properties.

**Unit IV** **(Lectures 08)**

Mac Laurin's and Taylor's expansion of functions, errors and approximation, Asymptotes and curvature of curves in Cartesian and polar coordinates, Partial differentiation.

**Unit V** **(Lectures 08)**

Tracing of curves in Cartesian, parametric and polar coordinates (conics, asteroid, hypocycloid, Folium of Descartes, Cycloid, Circle, Cardioids, Lemniscates, equiangular spiral), Jacobian, Indeterminate forms, Envelop and Evolutes.

**Text Books:**

**1.** "Differential Calculas" by Gorakh Prasad, Pothishala Pvt Ltd.
**2.** "Trigonometry" by A. K. Saxena, Aeykay Prakashan, Bareilly

**Reference Books:**

**1.** "Trigonometry" by A.R. Vashistha and R. K. Gupta, Krishna Prakashan Mandir.
**2.** "Differential Calculus" by N. Pishkunor, Peace Publishers Moscow
**3.** "Differential Calculus" by Khalil Ahmed, Anamya Publication, New Delhi

*** Latest editions of all the suggested books are recommended.**

## Semester I
## Computer System & Programming in C++

**Course Code: BCS111 /ECS212** **L T P C**
**3 0 0 3**

**Objective:** To learn the basics of computers & C++ programming language.

**Course Contents:**

**Unit I** **(Lectures 08)**

**Problem Solving**: Phases of problem solving, Algorithms, Structure Chart, Flow chart, Practice of solving Sequence Problems, Selection Problems, Repetition problem.
**Statements for problem solving:** if, switch, while, for, do, break, continue, go to statements.

**Unit II** **(Lectures 08)**

**Concepts in Computer Application:** Generations, Characteristic and Application of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory.
Translators: Assembler, Compiler, and Interpreter; Number System: Decimal, Octal, Binary and Hexadecimal &their Conversions; Various Codes: BCD, ASCII and EBCDIC and Gray Code.

**Unit III** **(Lectures 08)**

**Concepts in Operating System**: Purpose, Services, Types, Functions.
**Data Communication & Networks:** Types, Topology, IP address classes.
C++ Basics: Data types, Variables, Constants, Keywords, Identifiers, Types of Operators, Memory Allocation operators, Expressions, Pre-processor directives, Introduction to Array, Pointers, Structures and Strings.

**Unit IV** **(Lectures 08)**

**Functions:** Scope of variables; Parameter passing; Default arguments; Inline functions; Recursive functions; Pointers to functions.
**C++ Classes and Data Abstraction: Class** Structure, Objects; this pointer; Friend function; Static class members; Constructors and Destructors; Data abstraction.
**Inheritance:** Types, Access to the base class members; Virtual base class.

**Unit V** **(Lectures 08)**

**Polymorphism:** Function overloading; Operator overloading; Static Binding and Dynamic bindings; Virtual function: Definition, Call mechanism, Pure virtual functions; Virtual destructors; Abstract Classes.

**C++ I/O:** Stream classes hierarchy; Stream I/O; File streams; Overloading << and >> operators; File Modes, Reading and Writing to a file; Formatted I/O.

**Text Books-**


1. Bjarne Stroutrup, The C++ Programming Languge, Adison Wesley.
2. Object-Oriented Programming with C++, Balagurusamy, TMH
3. C++ The Complete Reference, Schildt, TMH
4. Programming in C++, Shah & Thaker, ISTE/EXCEL


**Reference Books-**


1. Beginning C++, The Complete Language, Horton,SPD/WROX
2. Programming with C++, Radhaganesan, Scitech
3. Projects using C++, Varalaxmi, Scitech
4. Object Oriented modelling & Design, RumBaugh, PHI


***Latest editions of all the suggested books are recommended.**

# Semester I
# English Communication and Soft Skills – I

**Course Code: BHM199/EHM199** **L T P C**

**1 1 2 2**

**Objectives:**

1. To remove the phobia of conversing in English.
2. To make the learners enable to express themselves among peers & teachers.
3. To enable learners, improve their vocabulary.
4. To introduce them with basic communicative skills in real life situations

## Course Contents:

**Unit – I Fear of Failure, Reasons of Fear of Failure & How to overcome it (12 hours)**

- Self-Introduction
- Identifying strengths and weakness
- Fear of Failure: Signs of Fear of Failure, Reasons of Fear of Failure, Strategies to overcome Fear of Failure
- Positive Attitude
- Motivation
- Building Self Confidence

**Unit – II Confidence, Presentability, Etiquettes & Manners (10 hours)**

- Body Language: Facial Expression, Eye Contact, Gesture, Posture, Tips to have appropriate body language
- Grooming & Dressing Sense
- Etiquette & Manners: Social Etiquettes, Telephonic Etiquettes, Dining Etiquettes, Etiquettes to handle cultural differences, Etiquettes of Effective Conversation.
- Problem Sounds (s-sh,j-z,v-b)

**Unit – III Conversation Practice, commonly made mistake & Initiating a conversation (10 hours)**

- Vocabulary of commonly used words (50 Words)
- Conversation Practice: At College, At Bank, At Ticket Counter (Railway Station & Movie Theatre)
- How to initiate a conversation
- Commonly made mistakes in conversation
- Basic of Communication: 7Cs of Communication

**Unit – IV Application writing (08 hours)**

- Format & Style of Application Writing
- Practice of Application writing on common issues.

**Reference Books:**


- Mitra, Barun. K. "*Personality Development and Soft skills*" New Delhi: Oxford University Press.
- Kumar, Sanjay. & Pushp Lata. "*Communication Skills"* New Delhi: Oxford University Press.
- Carnegie Dale. "*How to win Friends and Influence People*" New York: Simon & Schuster.
- Harris, Thomas. A. "*I am ok, You are ok*" New York: Harper and Row.
- Coleman, Daniel. "*Emotional Intelligence*" Bantam Book.


**Methodology:**

1. Language Lab software.
2. The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion.
3. Conversational Practice will be effectively carried out by Face to Face & Via Media (Telephone, Audio-Video Clips)
4. Modern Teaching tools (PPT Presentation, Tongue-Twisters & Motivational videos with sub-titles) will be utilized.

**Note:**

- 2 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning.
- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.

**Evaluation Scheme**

<table>
<tr><th colspan="2">Internal Evaluation</th><th colspan="2">External Evaluation</th><th>Total Marks</th></tr>
<tr><td colspan="2">50 Marks</td><td colspan="2">50 Marks</td><td rowspan="2">100</td></tr>
<tr><td>40 Marks<br>(Progressive Evaluation)<br>After each unit-completion:<br>Assignments / oral Presentation</td><td>10 Marks<br>(Attendance)</td><td>25 Marks<br>Midway external assessment<br>(Viva)*</td><td>25 Marks<br>(External Viva) **</td></tr>
</table>

**Note:** *Midway external assessment of 25 marks will be submitted and considered with external evaluation with a total of 50 marks.*

***Parameters of Midway external assessment (Viva)**

| **Content** | **Dressing sense & Grooming** | **Confidence** | **Pronunciation** | **Question responsiveness** | **TOTAL** |
|---|---|---|---|---|---|
| 05 Marks | 05 Marks | 05 Marks | 05 Marks | 05 Marks | 25 Marks |

**Note:** *To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 25 marks obtained by the students after two units are completed.*

****Parameters of External Viva**

| Content | Dressing sense & Grooming | Confidence | Pronunciation | Question responsiveness | TOTAL |
|---|---|---|---|---|---|
| 05 Marks | 05 Marks | 05 Marks | 05 Marks | 05 Marks | 25 Marks |

***Note**: External Viva will be conducted by 3-member committee comprising*

- ***a)*** *Faculty teaching the class*
- ***b)*** *English faculty from other college of the University (As approved by VC).*
- ***c)*** *T&P officer of other colleges of the University (As approved by VC).*

*Each member will evaluate on a scale of 25 marks and the average of three would be the 25 marks obtained by the students.*

## Semester I
## General Chemistry-I (Lab)

**Course Code: BAS167** **L T P C**
**0 0 3 2**

**List of Experiments:**

1. Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements)
2. Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (-COOH, phenolic, aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative.
3. Estimation of Fe (II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator.
4. Estimation of Cu (II) ions iodometrically using $Na_2S_2O_3$.
5. Estimation of oxalic acid by titrating it with $KMnO_4$.
6. Estimation of total hardness of a given sample of water by complexometric titration.
7. Preparation of Potash alum.
8. Preparation of Chrome Alum.

**Text & Reference Books:**


1. Svehla, G. Vogel's Qualitative Inorganic Analysis, Pearson Education.
2. Mendham, J. Vogel's Quantitative Chemical Analysis, Pearson.
3. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall.
4. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry Orient-Longman.


*** Latest editions of all the suggested books are recommended**

**Evaluation Scheme of Practical Examination:**

**Internal Evaluation (50 marks)**
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

**Evaluation scheme:**

| PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS) | | | | ON THE DAY OF EXAM (15 MARKS) | | TOTAL INTERNAL (50 MARKS) |
|---|---|---|---|---|---|---|
| EXPERIMENT (5 MARKS) | FILE WORK (10 MARKS) | VIVA (10 MARKS) | ATTENDANCE (10 MARKS) | EXPERIMENT (5 MARKS) | VIVA (10 MARKS) | |

**External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

| EXPERIMENT (20 MARKS) | FILE WORK (10 MARKS) | VIVA (20 MARKS) | TOTAL EXTERNAL (50 MARKS) |
|---|---|---|---|

## Semester I
## Computer System & Programming in C++ (Lab)

**Course Code: BCS161/ECS262** **L T P C**
**0 0 2 1**

**List of Experiments:**
**Note: Minimum 15 experiments should be performed from the following:**

1. Write a Program (WAP) to calculate Sum & average of N numbers.
2. WAP to convert integer arithmetic to a given number of day and month.
3. WAP to find maximum and minimum out of 3 numbers a, b & c.
4. WAP to find factorial of positive integer.
5. WAP to find sum of series up to n number, 2+5+8+.....+n.
6. WAP to print all the number between 1 to 100 which are dividing by 7.
7. WAP to generate Fibonacci series up to n.
8. WAP to calculate area of circle using Functions.
9. WAP to calculate factorial of given number using Recursion function.
10. WAP to find whether number is prime or not.
11. WAP to find that the enter character is a letter or digit.
12. WAP to find addition of two matrix of n*n order.
13. WAP to find multiplication of two matrix of n*n order.
14. WAP to find even or odd up to a given limit n.
15. WAP to find whether a given no is palindrome or not.
16. WAP to Swap two numbers using third Variable and without using third variable.
17. WAP to Swap two numbers using call by value and call by reference.
18. WAP illustrating overloading of various operators.
19. WAP illustrating use of Friend.
20. WAP illustrating use of Inline Function.
21. WAP illustrating use of destructor and various types of constructor.
22. WAP illustrating various forms of Inheritance.
23. WAP illustrating use of virtual functions, virtual Base Class.

**Evaluation Scheme of Practical Examination:**

**Internal Evaluation (50 marks)**
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

**Evaluation scheme:**

| PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS) | | | | ON THE DAY OF EXAM (15 MARKS) | | TOTAL INTERNAL (50 MARKS) |
|---|---|---|---|---|---|---|
| EXPERIMENT (5 MARKS) | FILE WORK (10 MARKS) | VIVA (10 MARKS) | ATTENDANCE (10 MARKS) | EXPERIMENT (5 MARKS) | VIVA (10 MARKS) | |

**External Evaluation (50 marks)**
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

| EXPERIMENT (20 MARKS) | FILE WORK (10 MARKS) | VIVA (20 MARKS) | TOTAL EXTERNAL (50 MARKS) |
|---|---|---|---|
| | | | |

# Semester I
## DISCIPLINE & GENERAL PROFICIENCY

**Course Code: BGP111**

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

**2.** Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

**4.** Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

**7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

**8.** General behavior

**9.** Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

| **S No** | | Enroll No. | Student Name | Dress code | Participation in Conferences /Workshops / Seminars | Participation in guest lectures, invited talks and special technical sessions | Participation in community Services | Participation in Culture & extra curriculum activities, Department Club Activities | Participation in sports/ co-curricular activities | General Behavior | Any Extra Achievement |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **(5)** | **(15)** | **(20)** | **(10)** | **(20)** | **(20)** | **(5)** | **(5)** |
| | **Responsible for marks** | | | Mentor | Head | Head | Mentor | Cultural Events Coordinator & Department Club Coordinator | Sports Coordinator | Mentor | Director or Principal |

## Semester II
## General Chemistry-II

**Course Code: BAS215** **L T P C**
**4 0 0 4**

**Course Contents:**

**Unit – I** **(8 Lectures)**

**Gaseous stat**e: Postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path, including their temperature and pressure dependence. Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor, Z, Causes of deviation from ideal behaviour. Van der Waals equation of state, its derivation and application in explaining real gas behaviour, virial equation of state; van der Waals equation expressed in virial form and calculation of Boyle temperature.

**Unit – II** **(8 Lectures)**

**Liquid state:** Qualitative treatment of the structure of the liquid state; Radial distribution function; physical properties of liquids; vapor pressure, surface tension and coefficient of viscosity, and their determination. Effect of addition of various solutes on surface tension and viscosity. Explanation of cleansing action of detergents. Temperature variation of viscosity of liquids and comparison with that of gases.

**Unit – III** **(8 Lectures)**

**Solid state:** Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative idea of point and space groups, seven crystal systems and fourteen Bravais lattices; Bragg's law, Analysis of powder diffraction patterns of NaCl, CsCl and KCl. Defects in crystals.

**Unit – IV** **(8 Lectures)**

**Ionic equilibria I:** Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono-, di-and triprotic acids (exact treatment).

**Unit – V** **(8 Lectures)**

**Ionic equilibria II:**

Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications; buffer capacity, buffer range, buffer action and applications of buffers

Solubility and solubility product of sparingly soluble salts – applications of solubility product principle

Theory of acid–base indicators; selection of indicators and their limitations.

**Text & Reference Books:**


1. Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry., Oxford University Press.
2. Castellan, G. W. Physical Chemistry, Narosa.
3. Mortimer, R. G. Physical Chemistry, Elsevier: NOIDA, UP.
4. Engel, T. & Reid, P. Physical Chemistry, Pearson.


*** Latest editions of all the suggested books are recommended**

## Semester-II
## Vector Calculus & Geometry

**Course Code: BAS216**

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

**Objective-**

- We, as instructors, often have a good idea of what we want to accomplish in a given course.
- We want to cover certain topics, or we want to teach students certain ideas and skills.
- We should also think in terms of what we want the students to be able to do at the end of the course.
- It is very helpful to articulate learning objectives by completing this prompt**.**

**Course Contents:**

**Unit I** **(Lectures 08)**

Scalar and vector product, multiple product of vectors, simple geometrical application of plane straight line and spheres.

**Unit II** **(Lectures 08)**

Differentiation and Integration of vectors, gradient divergence and curl operators, Gauss divergence theorem, Stoke and Green's theorem (without proof), simple applications.

**Unit III** **(Lectures 08)**

2-dimensional coordinate geometry, Tracing of conics, Polar equations of conics.

**Unit IV** **(Lectures 08)**

(3- dimensional coordinate geometry). System of coordinates in three dimensions, Straight lines in symmetrical and non-symmetrical forms, coplanar lines, Shortest distance between two skew lines, Equation of plane in different forms, Intersection of three planes, Volume of tetrahedron.

**Unit V** **(Lectures 08)**

Equation of Sphere, tangent plane, Radical plane, Equation of cylinder, enveloping cylinder, rigid circular cylinder, tangent plane with given vertex and given conic, enveloping, rigid circular cone, tangent planes.

**Text Books:**


1. "Co-ordinate Geometry of 2D" by P.K. Jain and Khalid Ahemad, Wiley Eastern Co.
2. "Analytic Solid Geometry" by A.R Vashisth and S. C. Agarwal, Krishana Prakahan Mandir
3. "Vector Analysis" by H. S. Sharma and G. C. Sharma, Students Friends & Co.


**Reference Books:**


1. "Co-ordinate Geometry of 2D" by S. L. Loney, Maemillan and Co.
2. "Co-ordinate Geometry of 2D" by S. C. Gupta, B. M. L. Tiwari and P.C. Jain, Pragati Prakashan.
3. "Co-ordinate Geometry of 2D" by N. Saran and R. S. Gupta, Pothishala Pvt Ltd.
4. "Co-ordinate Geometry of 2D" by A. K. Saxena, Aeykay Publication Bareilly
5. "Co-ordinate 3D Geometry" by R. J. T Bell, Maemillan & Co.
6. "Co-ordinate 3D Geometry" by Gorakh Prasad and H. C. Gupta, Pothishala Pvt Ltd.
7. "Co-ordinate Geometry of 3D" by S. C. Mittal and S. K. Mittal, Pragati Prakashan.
8. "Co-ordinate Geometry of 3D" by P. K. Jain and Khalid Ahemad, New Age International New Delhi
9. "Vector Analysis" by M. R. Speegel, Schaum Publishing Co. New Delhi.
10. "Vector Analysis" by Shanti narayan, S Chand & Co
11. "Vector Analysis" by N. Saran and S. N. Nigam, Pothishala Pvt Ltd


*** Latest editions of all the suggested books are recommended.**

## Semester-II
## Integral Calculus

**Course Code: BAS217**

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

**Objective-**To introduce the students with fundamental principles, concepts and knowledge in the areas of Integral Calculus and prepare them to apply these fundamental concepts and working knowledge to other courses.

**Course Contents:**

**Unit I** **(Lectures 08)**

Definite integration (Miscellaneous Examples), integration as the limit of sum, Reduction Formula.

**Unit II** **(Lectures 08)**

Multiple integration, Beta and gamma functions and applications, length of curves, Areas bounded by the curves.

**Unit III** **(Lectures 08)**

Drichlet's integral, Volume and surfaces of revolutions

**Unit IV** **(Lectures 08)**

Differential equation of first order and first degree, Differential equation of first order but not of first degree. Miscellaneous differential equations.

**Unit V** **(Lectures 08)**

Linear differential equation of second order with constant coefficient, Linear differential equation of other types.

**Text Books:**

1. "Integral Calculus" by Gorakh Prasad, Pothishala Pvt. Ltd.
2. "Integral Calculus"by M. Ray, Shiv Lal Agarwal & Co Agra.
3. "Integral Calculus"by P. V. Pishkuno, Peace Publishers Mascow.

**Reference Books:**

**1.** "Integral Calculus" by Shanti Narayan and P. K Mittal, S.Chand & Company Ltd
**2.** "Integral Calculus" by Brahmanand, B. S. Tyagi, and B. D. Sharma, Kedarnath Ram Nath.
**3.** "Integral Calculus by" Shani Narayan, S.Chand & Company Ltd

*** Latest editions of all the suggested books are recommended.**

## Semester-II
## Mechanics

**Course Code: BAS213/BAS114** **L T P C**
**4 0 0 4**

**Objective:** To understand the fundamentals of physics like Linear Momentum, Rotational Dynamics, Motion under Central Forces, Properties of Matter etc.

**Course Contents:**

**Unit – I** **(Lectures 08)**

**Rotational Dynamics**: Centre of Mass and Laboratory frames. Angular momentum of a particle and system of particles. Torque. Principle of conservation of angular momentum. Rotation about a fixed axis. Moment of Inertia. Calculation of moment of inertia for rectangular, cylindrical and spherical bodies. Kinetic energy of rotation, Motion involving both translation and rotation.

**Unit – II** **(Lectures 08)**

**Fluid Motion:** Kinematics of Moving Fluids: Poiseuille's Equation for Flow of a Liquid through a Capillary Tube.

**Gravitation and Central Force Motion:** Law of gravitation. Gravitational potential energy. Inertial and gravitational mass. Potential and field due to spherical shell and solid sphere.

**Non-Inertial Systems:** Non-inertial frames and fictitious forces. Uniformly rotating frame. Centrifugal force. Coriolis force.

**Unit – III** **(Lectures 08)**

**Elasticity:** Relation between Elastic constants. Twisting torque on a Cylinder or Wire.

**Central Forces:** Motion of a particle under a central force field. Two-body problem and its reduction to one-body problem and its solution. Kepler's Laws. Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS).

**Unit – IV** **(Lectures 08)**

**Oscillations:** SHM: Simple Harmonic Oscillations. Differential equation of SHM and its solution. Kinetic energy, potential energy, total energy and their time-average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor.

**Unit – V** **(Lectures 08)**

**Special Theory of Relativity:** Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Massless Particles. Lorentz Transformations: Simultaneity, Length contraction, Time dilation, Twin Paradox, Relativistic addition of velocities, Variation of mass with velocity. Mass energy Equivalence.

**Text & Reference Books:**


1. An introduction to mechanics, D. Kleppner, R. J. Kolenkow, McGraw-Hill.
2. Mechanics, Berkeley Physics, C.Kittel, W.Knight, Tata McGraw-Hill. Physics, Resnick, Halliday and Walker, Wiley.
3. Analytical Mechanics, G.R. Fowles and G.L. Cassiday, Cengage Learning.
4. Feynman Lectures, Vol. I, R. P. Feynman, R. B. Leighton, M. Sands, Pearson Education.
5. Introduction to Special Relativity, R. Resnick, John Wiley and Sons. University Physics, Ronald Lane Reese, Thomson Brooks/Cole.
6. Mechanics, D.S. Mathur, S. Chand and Company Limited, University Physics.
7. J.W. Jewett, R.A. Serway, Cengage Learning Theoretical Mechanics, M.R. Spiegel, Tata McGraw Hill.


*** Latest editions of all the suggested books are recommended**

# Semester II
# Environmental Studies

**Course Code: BAS214/EAS115/BAS328/BAS428** **L T P C**
**1 2 0 2**

**Objective:** To create awareness among students about environment protection.

**Course Content:**

**Unit I** **(Lectures 08)**

Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development.

**Ecology and Environment**: Concept of an Ecosystem- its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid & Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.

**Unit II** **(Lectures 08)**

**Natural Resources:** Renewable & Non-Renewable resources; Land resources and landuse change; Land degradation, Soil erosion & desertification. **Deforestation**: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources**: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies.

**Biodiversity:** Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Biogeographical Classification of India

**Unit III** **(Lectures 08)**

**Environmental Pollutions:** Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies

**Unit IV** **(Lectures 08)**

**Environmental policies & practices: Climate change & Global** Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context

**Unit V** **(Lectures 08)**

**Human Communities & Environment:** Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study,

Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case study

**Field Work:**

1. Visit to an area to document environmental assets; river/forest/flora-fauna etc.
2. Visit to a local polluted site: urban/ rural/industrial/agricultural.
3. Study of common plants, insects, birds & basic principles of identification.
4. Study of simple ecosystem; pond, river etc.

**Text Books:**


1. "Environmental Chemistry", De, A. K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters, G. M., Prentice Hall India Pvt. Ltd.
3. "Fundamentals of Ecology", Odem, E. P., W. B. Sannders Co.


**Reference Books:**


1. "Biodiversity and Conservation", Bryant, P. J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication


***Latest editions of all the suggested books are recommended.**

## Semester II
## English Communication and Soft Skills-II

**Course Code: BHM249/EHM249** **L T P C**
**1 1 2 2**

**Objectives:**

1. To enhance the vocabulary of learners to address competitive exams like PGT & TGT.
2. To develop ability of sentence construction.
3. To enhance learner's writing ability.
4. To make the learner effective in presenting himself/herself.

**Course Contents:**

**Unit – I Vocabulary & Grammar** **(14 hours)**

- Homophones, Homonyms, Synonyms, Antonyms and one-word substitution.
- Parts of Speech, Modals, Tenses and Simple sentence construction.

**Unit – II Listening Skills** **(05 hours)**

- Difference between listening & hearing, Types of Listening, Process
- Importance and Barriers to listening

**Unit – III Writing Skills** **(08 hours)**

- Letters and Email writing
- Story Narration

**Unit – IV Strategies & Structure of Presentation and Problem Sounds** **(13 hours)**

- Managing Time, Audience & Locale, Structure and Organization of Content and 5 W's
- Problem Sounds: S- Sh, J-Z and V-B*

**Reference Books:**


1. Nesfield J.C. "*English Grammar Composition & Usage*" Macmillan Publishers
2. Sood Madan "*The Business letters"* Goodwill Publishing House, New Delhi
3. Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.

**Methodologies:**

1. Words and exercises, usage in sentences.
2. Sentence construction on daily activities and conversations.
3. Format and layout to be taught with the help of samples and preparing letters on different subjects.
4. JAM sessions and Picture presentation.
5. Tongue twisters, Newspaper reading and short movies.

**Note:**

- 3 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning.
- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.
- Repeated practice of sound.

**Evaluation Scheme**

| Internal Evaluation | | External Evaluation | | Total Marks |
|---|---|---|---|---|
| 40 Marks | | 60 Marks | | 100 |
| 30 Marks (Progressive Evaluation) After each unit-completion: Assignments / oral Presentation | 10 Marks (Attendance) | 20 Marks Midway external assessment (Oral Presentation) * | 40 Marks (Written Examination) | |

*** Parameters of Midway external assessment Oral Presentation**

| Content | Pronunciation | Delivery of Content | Question responsiveness | TOTAL |
|---|---|---|---|---|
| 05 Marks | 05 Marks | 05 Marks | 05 Marks | 20 Marks |

**Note:**

***Midway Assessment**: To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 20 marks obtained by the students after two units are completed. The marks in sealed envelope will be send to Examination Department.*

***Written Examination**: There would be four questions with internal choice one from each unit of 10 marks.*

## Semester II
## General Chemistry- II (Lab)

**Course Code: BAS264** **L T P C**
**0 0 3 2**

**List of Experiments:**

**Thermochemistry**

1. Determination of heat capacity of calorimeter for different volumes.
2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
3. Determination of enthalpy of ionization of acetic acid.
4. Determination of integral enthalpy of solution of salts (KNO3, NH4Cl).
5. Determination of enthalpy of hydration of copper sulphate.
6. Determination of the surface tension of a liquid or a dilute solution using a stalagmometer.
7. Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer.
8. Chemical Kinetics Study the kinetics of the following reactions.
   a). Initial rate method: Iodide-persulphate reaction
   b). Integrated rate method:
9. Acid hydrolysis of methyl acetate with hydrochloric acid.

**Text & Reference Books:**


1. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall.
2. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry Orient-Longman.
3. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi.


***Latest editions of all the suggested books are recommended.**

**Evaluation Scheme of Practical Examination:**
**Internal Evaluation (50 marks)**
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

**Evaluation scheme:**

| PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS) | | | | ON THE DAY OF EXAM (15 MARKS) | | TOTAL INTERNAL (50 MARKS) |
|---|---|---|---|---|---|---|
| EXPERIMENT (5 MARKS) | FILE WORK (10 MARKS) | VIVA (10 MARKS) | ATTENDANCE (10 MARKS) | EXPERIMENT (5 MARKS) | VIVA (10 MARKS) | |

**External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

| EXPERIMENT (20 MARKS) | FILE WORK (10 MARKS) | VIVA (20 MARKS) | TOTAL EXTERNAL (50 MARKS) |
|---|---|---|---|

## Semester-II
## Mechanics (Lab)

**Course Code: BAS267/BAS166**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

**List of Experiments:**

**Note:** Select any ten experiments from the following list.

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To study the random error in observations.
3. To determine the height of a building using a Sextant.
4. To study the Motion of Spring and calculate (a) Spring constant, (b) **g** and (c) Modulus of rigidity.
5. To determine the Moment of Inertia of a Flywheel.
6. To determine **g** and velocity for a freely falling body using Digital Timing Technique
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young's Modulus of a Wire by Optical Lever Method.
9. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
10. To determine the elastic Constants of a wire by Searle's method.
11. To determine the value of g using Bar Pendulum.
12. To determine the value of g using Kater's Pendulum.

**Text & Reference Books:**


1. Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, Heinemann Educational Publishers
3. A Text Book of Practical Physics, I. Prakash & Ramakrishna, Kitab Mahal.
4. Engineering Practical Physics, S. Panigrahi & B. Mallick, Cengage Learning India Pvt. Ltd.
5. Practical Physics, G.L. Squires, Cambridge University Press.


*** Latest editions of all the suggested books are recommended**

**Evaluation Scheme of Practical Examination:**

**Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

**Evaluation scheme:**

| PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS) | | | | ON THE DAY OF EXAM (15 MARKS) | | TOTAL INTERNAL (50 MARKS) |
|---|---|---|---|---|---|---|
| EXPERIMENT (5 MARKS) | FILE WORK (10 MARKS) | VIVA (10 MARKS) | ATTENDANCE (10 MARKS) | EXPERIMENT (5 MARKS) | VIVA (10 MARKS) | |

**External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

| EXPERIMENT (20 MARKS) | FILE WORK (10 MARKS) | VIVA (20 MARKS) | TOTAL EXTERNAL (50 MARKS) |
|---|---|---|---|

## Semester II
### DISCIPLINE & GENERAL PROFICIENCY

**Course Code: BGP211**

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

**2.** Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

**4.** Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

**7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

**8.** General behavior

**9.** Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

| **S No** | | Enroll No. | Student Name | Dress code | Participation in Conferences /Workshops / Seminars | Participation in guest lectures, invited talks and special technical sessions | Participation in community Services | Participation in Culture & extra curriculum activities, Department Club Activities | Participation in sports/ co-curricular activities | General Behavior | Any Extra Achievement |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **(5)** | **(15)** | **(20)** | **(10)** | **(20)** | **(20)** | **(5)** | **(5)** |
| | **Responsible for marks** | | | Mentor | Head | Head | Mentor | Cultural Events Coordinator & Department Club Coordinator | Sports Coordinator | Mentor | Director or Principal |

## Semester-III
## Elements of Modern Physics

**Course Code: BAS314**

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

**Objective:** To learn basics of modern Physics, Planck's quantum and fundamental of quantum relations.

**Course Contents:**

**Unit-I** **(08 Lectures)**

**Planck's quantum-I:** Planck's constant and light as a collection of photons; Blackbody Radiation: Quantum theory of Light; Photo-electric effect and Compton scattering. De Broglie wavelength and matter waves. Two-Slit experiment with electrons.

**Unit-II** **(08 Lectures)**

**Planck's quantum-II:** Two slit interference experiment with photons, atoms and particles; linear superposition principle as a consequence; Matter waves and wave amplitude; Schrodinger equation for non-relativistic particles

**Unit-III** **(08 Lectures)**

**Schrodinger Equations:** Schrodinger equations, Size and structure of atomic nucleus and its relation with atomic weight; Impossibility of an electron being in the nucleus as a consequence of the uncertainty principle. Nature of nuclear force

**Unit-IV** **(08 Lectures)**

**Fission and fusion:** Mass deficit, relativity and generation of energy; Fission - nature of fragments and emission of neutrons. Fusion and thermonuclear reactions driving stellar energy.

**Unit-V** **(08 Lectures)**

**Radioactivity:** stability of the nucleus; Law of radioactive decay; Mean life and half-life; Alpha decay; Beta decay- energy released, spectrum and Pauli's prediction of neutrino; Gamma ray emission, energy-momentum conservation: electron-positron pair creation by gamma photons in the vicinity of a nucleus.

**Reference Books:**


1. Concepts of Modern Physics, Arthur Beiser, McGraw-Hill.
2. Introduction to Quantum Mechanics, David J. Griffith, Pearson Education.

3. Physics for scientists and Engineers with Modern Physics, Jewett and Serway, Cengage Learning.
4. Modern Physics, G.Kaur and G.R. Pickrell, McGraw Hill.
5. Quantum Mechanics: Theory & Applications, A.K.Ghatak & S.Lokanathan, Macmillan.
6. Theory and Problems of Modern Physics, Schaum`s outline, R. Gautreau and W. Savin, Tata McGraw-Hill Publishing Co. Ltd.
7. Six Ideas that Shaped Physics: Particle Behave like Waves, T. A. Moore, McGraw Hill.

*** Latest editions of all the suggested books are recommended**

## Semester-III
## Partial Differential Equation

**Course Code: BAS315**

| L | T | P | C |
|---|---|---|---|
| 4 | 1 | 0 | 5 |

**Objective –**To acquaint the students with various mathematical techniques viz. variable separable method, Monge's form of solution, Classification and application of Partial Differential Equation.

**Course Contents:**

**Unit I** **(Lectures 08)**

Partial differential equation of first order and first degree, Origin of partial differential equation, Lagrange's method for P.p +Q.q = R.

**Unit II** **(Lectures 08)**

Partial differential equation of second order, Linear partial differential equation, its complete integral, particular integral and general solution, general solution of linear partial differential equation with constant coefficients.

**Unit III** **(Lectures 10)**

Monge's form of solution of form Rr + Ss + Tt = V

**Unit IV** **(Lectures 06)**

Classification of Partial Differential Equation

**Unit V** **(Lectures 08)**

Application of Partial Differential Equation

**Text Books:**


1. "Partial differential Equation" by M. D. Raisinghania, S. Chand & Company.
2. "Partial differential Equation" by P. P. Gupta, G. S. Malik and S. K. Mittal, Pragati Prakshan.


**Reference Books:**


1. "Partial differential Equation" by I. N. Sneddon, Mc graw Hill & Company.
2. "Partial Differential with Boundary Value Problems" S Singh, J. P. Chauhan Shikaha Sahitiya Prakasha


*** Latest editions of all the suggested books are recommended.**

## Semester-III
## Modern Algebra

**Course Code: BAS316**

| L | T | P | C |
|---|---|---|---|
| **4** | 1 | **0** | **5** |

**Objective-**

- Understand the nature and purpose of axiomatic systems.
- Appreciate the power of mathematical abstraction and symbolism.
- Follow logical arguments and judge their validity.

**Course Contents:**

**Unit I** **(Lectures 10)**

Groups, sub-groups, Costes, Lagranges theorem, permutation group, Cayley's theorem, Isomorphism of groups.

**Unit II** **(Lectures 10)**

Basic concepts of Rings, Subrings, Integral domain and fields

**Unit III** **(Lectures 08)**

Automorphism, Normaliser, Centre of a group, Syllabus theorem

**Unit IV** **(Lectures 06)**

Homomorphism of rings and its properties, Rings of Polynomials etc.

**Unit V** **(Lectures 06)**

Vector Space, properties and theorem of vector space

**Text Books:**


1. "Algebra" by I. N. Hertein, Wiley and Company.
2. "Modern Algebra" by Shanti Narayan, S. Chand and Company.
3. "Algebra" J. K. Goyal and K. P. Gupta, Pragati Prakashan.


**Reference Books:**


1. "Algebra" by M. Jacobson, Banz, W. H. Erconma New Delhi.
2. "Abstract Algebra" by D. S. Malic, J. N Mordesas and M. K. Sen, Pragati Prakashan.
3. "Modern Algebra" by Saran and Goyal, Pothishala Publication.
4. "Modern Algebra" by A. R. Vasistha, Krishana Prakashan Mandir.


*** Latest editions of all the suggested books are recommended.**

## Semester-III
## Statistical Method

**Course Code: BAS317**

| L | T | P | C |
|---|---|---|---|
| 4 | 1 | 0 | 5 |

**Objective**-The objective of this course is to provide an understanding for the graduate business student on statistical concepts to include measurements of location and dispersion, sampling, estimation, hypothesis testing, regression, and correlation analysis, multiple regression and business/economic forecasting.

**Course Contents:**

**Unit I** **(8 Lectures)**

Introduction: Definition and scope of Statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, variables, scales of measurement - nominal, ordinal, interval and ratio. Presentation: tabular and graphic, including histogram and ogives.

**Unit II** **(8 Lectures)**

Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, moments, skewness and kurtosis.

**Unit III** **(8 Lectures)**

Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple linear regression, principle of least squares and fitting of polynomials and exponential curves.

**Unit IV** **(8 Lectures)**

Hypothesis Testing: Types of Hypothesis, level of significance, Critical Region, Power of a test, Types of Error, t-test, z-test, f-test, Chi- Square Test

**Unit V** **(8 Lectures)**

Theory of attributes, consistency of data, independence and association of attributes, measures of association and contingency,

**Text & Reference books:**


1. Goon A.M., Gupta M.K. and Dasgupta B.: Fundamentals of Statistics, The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees : John E. Freund's Mathematical Statistics with Applications, Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C.: Introduction to the Theory of Statistics, Tata McGraw-Hill Pub. Co. Ltd.


*** Latest editions of all the suggested books are recommended.**

## Semester-III
## English Communication and Soft Skills-III

[BHM349/EHM349/449 amended vide approval dt. July 23, 2018 of V.C]

**Course Code: BHM349/EHM349/449** **L T P C**
**1 1 2 2**

**Objectives:**

1. To enable the learners to upgrade their knowledge of grammar and vocabulary to address competitive exams like GATE.
2. To enable the learner to improve their listening.
3. To enable the learners to improvise their voice modulation in reading and speaking.
4. To enable the learners to enhance their writing and comprehensive skills in English
5. To enable the learners to proactively participate in activities in situational context.

**Course Contents:**

**Unit – I Grammar & Vocabulary** **(14 hours)**

- Correction of Common Errors (with recap of English Grammar with its usage in practical context.)
- Transformation of sentences
- Commonly used Idiom & Phrases (Progressive learning whole semester)

**Unit – II Essence of Effective listening & speaking** **(12 hours)**

- Listening short conversation/ recording (TED talks / Speeches by eminent personalities)

*Critical Review of these abovementioned*

- Voice Modulation: Five P's - Pace, Power, Pronunciation, Pause, and Pitch.
- Impromptu
- Power Point Presentation (PPt) Skills**:** Nuances of presenting PPTs

**Unit – III Reading and Comprehension Skills** **(08 hours)**

- Strategies of Reading comprehension: Four S's
- How to solve a Comprehension (Short unseen passage: 150-200 words)
- Reading Newspaper (Progressive learning whole semester)

**Unit – IV Writing Skills** **(06 hours)**

- Essentials of a paragraph
- Paragraph writing (100-120 words)

**Reference Books:**


1. Allen, W. *"Living English Structure*" Pearson Education, New Delhi.
2. Joseph, Dr C.J. & Myall E.G. "*A Comprehensive Grammar of Current English*" Inter University Press, Delhi
3. Wren & Martin "*High School English Grammar and Composition*" S. Chand & Co. Ltd., New Delhi.
4. Norman Lewis "*Word Power Made Easy*" Goyal Publications & Distributers, New Delhi.
5. Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi.
6. Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.
7. Agrawal, Malti "*Professional Communication*" Krishana Prakashan Media (P) Ltd. Meerut.


**Methodologies:**

1. Idiom & Phrases and exercises, usage in sentences.
2. Sentence transformation on daily activities and conversations.
3. Power Point presentation.
4. Newspaper reading, short articles from newspaper to comprehend and short movies.

**Note:**

- For effective communication practice, groups will be changed weekly
- Class (above 30 students) will be divided in to two groups for effective teaching.

**Evaluation Scheme**

| Internal Evaluation | | External Evaluation | | Total Marks |
|---|---|---|---|---|
| 40 Marks | | 60 Marks | | 100 |
| 30 Marks (Progressive Evaluation) After each unit-completion: Assignments / PPt Presentation *(Best three assignments)* | 10 Marks (Attendance) | 20 Marks Midway external assessment (viva) * | 40 Marks (Written Examination) | |

**Note:** *Midway external assessment of 20 marks will be submitted and consider with external evaluation with a total of 60 marks.*

*** Parameters of Midway external assessment Viva**

| Content | Voice Modulation | Body Language | Question responsiveness | TOTAL |
|---|---|---|---|---|
| 05 Marks | 05 Marks | 05 Marks | 05 Marks | 20 Marks |

**Note:**

***Midway Assessment****: To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 20 marks obtained by the students after two units are completed. The marks in sealed envelope will be sent to Examination Department.*

***Written Examination****: There will be questions only from Unit-I, III & IV*

## Semester III

## Database Management System

| Course Code: BCS311/ECS611/411/511/MSC014 | L | T | P | C |
|---|---|---|---|---|
| | 3 | 1 | 0 | 4 |

**Objective:** Introducing the fundamental concepts necessary for designing, using, and implementing database systems and applications. The goal of this course is for students to become well-grounded in basic concepts necessary for understanding DB and their users, DBMS concepts, architecture, the concepts of the Entity Relationship(ER) model, the data abstraction and semantic modeling concepts leading to EER data model, describe the basic relational model, its integrity constraints and update operations, and the operation of relational algebra, describe relational schema design, and it covers the normalization and functional dependency algorithm.

**Course Contents:**

**Unit I:** **(Lectures 08)**

**Introduction:** Scope and purpose of database system, view of data, relational databases, database architecture, transaction management, database system Vs filesystem, Database system concept and architecture, data definitions language, DML.

**Data Models**: The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction

**Unit II:** **(Lectures 08)**

**Database design and ER Model**: overview, ER-Model, Constraints, ER-Diagrams, ERD Issues, weak entity etc, Codd's rules, Relational Schemas, Introduction to UML, Relational database model: Logical view of data, keys, integrity rules.

Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF)

**Unit III:** **(Lectures 08)**

**Relational data Model and Language**: Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, Relational comparison. Calculus: Tuple relational calculus,

Domain relational Calculus, calculus vs algebra, Computational capabilities, constraints, Views.

**Introduction on SQL**: Characteristics of SQL, advantage of SQL. SQL data type and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, and Procedures in SQL/PL SQL.

**Unit IV:** **(Lectures 08)**

Usage of Oracle:

1. Installing oracle
2. Creating Entity-Relationship Diagram using case tools.
3. Writing SQL statements Using ORACLE
4. MYSQL: a) Writing basic SQL SELECT statements.
   b) Restricting and sorting data.
   c) Displaying data from multiple tables.
   d) Aggregating data using group function.
   e) Manipulating data.
   f) Creating and managing tables.
5. Normalization in ORACLE.
6. Creating cursor in oracle.
7. Creating procedure and functions in oracle.
8. Creating packages and triggers in oracle.

**Unit V:** **(Lectures 08)**

Transaction management: ACID properties, serializability and concurrency control Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management.

**Text Books:**


1. Elmasri, R., Navathe, S., Fundamentals of Database Systems, Addison-Wesley.
2. G. K. Gupta, "Data Base Management", Tata Mc Graw Hill.
3. Atul Kahate, "Introduction to Database Management Systems" Pearson Education, New Delhi, 2006.


***Latest editions of all the suggested books are recommended.**

# Semester III
## DISCIPLINE & GENERAL PROFICIENCY

**Course Code: BGP311** **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

**2.** Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

**4.** Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

**7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

**8.** General behavior

**9.** Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

| **S No** | | Enroll No. | Student Name | Dress code | Participation in Conferences /Workshops / Seminars | Participation in guest lectures, invited talks and special technical sessions | Participation in community Services | Participation in Culture & extra curriculum activities, Department Club Activities | Participation in sports/ co-curricular activities | General Behavior | Any Extra Achievement |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **(5)** | **(15)** | **(20)** | **(10)** | **(20)** | **(20)** | **(5)** | **(5)** |
| | **Responsible for marks** | | | Mentor | Head | Head | Mentor | Cultural Events Coordinator & Department Club Coordinator | Sports Coordinator | Mentor | Director or Principal |

## Semester-IV
## Ordinary Differential Equation

**Course Code: BAS415** **L T P C**
**4 1 0 5**

**Objective:** Differential equations arise in every field of science and engineering. So, the solutions of these DEs are of great interest in understanding various physical phenomena.

**Course Contents:**

**Unit I** **Lectures 08)**

Linear Equation of second order finding general solution of $d^2y/dx^2 + P(dy/dx) + Q.y=0$ by removing first derivative; Changing independent variable; Method of Variation of parameters, Normal form and Method of operational operators

**Unit II** **(Lectures 08)**

Ordinary Simultaneous linear differential Equation, Linear differential Equation of the form $dx/P = dy/Q = dz/R$

**Unit III** **(Lectures 08)**

Pfaffian differential forms and equations, Necessary and sufficient condition for Inerrability of $Pdx + Qdy + Rdz = 0$

**Unit IV** **(Lectures 08)**

Integration in series

**Unit V** **(Lectures 08)**

Picards' Iteration method, Uniqueness and existence theorems

**Text Books:**

1. "Differential Equation" by Zill, Cengage Learning.
2. "Differential Equation" by R. K. Gupta and J. N. Sharma, Krishana Prakashan Mandir.
3. "Differential Equation" by Zafar Ahsan, Prentice Hall of India.

**Reference Books:**

1. "Differential Equation" by M. D. Raisinghania, S. Chand & co.
2. "A Treatise on diff. Equation" by A. R. Forsyth, Macmillan & company Ltd.
3. "Introduction on Differential Equation" by D.A. Murray, Orient Longman India.

*** Latest editions of all the suggested books are recommended.**

# Semester-IV
# Real Analysis

**Course Code: BAS416**

| L | T | P | C |
|---|---|---|---|
| 4 | 1 | 0 | 5 |

**Objective**-To understand various limiting behaviour of sequences & series; limiting processes viz. continuity, uniform continuity; Sequence of real numbers, Tests and to enhance the mathematical maturity and to work comfortably with concepts.

**Course Contents:**

**Unit I** **(Lectures 08)**

Limits, left and right-hand limit, Theorems on limit, Concept of Continuity and discontinuity, Types of continuity and discontinuity, properties of continuous function, A necessary and sufficient conditions of discontinuity, Darboux's theorem, Mean Value theorems, differentiability.

**Unit II** **(Lectures 08)**

Sequence of real numbers convergent and non-convergent, Sequence algebra of sequences, Theorem on limit on limit of sequence, Monotone Sequence, Real sequence, Bounded sequence, convergent sequence, Least upper bound and greatest lower bound, limit of a sequence, theorem on convergent sequence, Subsequence.

**Unit III** **(Lectures 08)**

Infinite Series and its convergences, Test for convergences of positive term series, comparison test, Ratio test, Cauchy's Root test, Raab's test, Logarithmic test, Integral test.

**Unit IV** **(Lectures 08)**

Definition existence and properties of Riemann integral of a bounded function, Darboux theorem, Condition of integrability, Integral as limit of sum, Fundamental Theorem of Calculus.

**Unit V** **(Lectures 08)**

Definition of uniform convergence, Cauchy's criterion for uniform convergence Weirstress test, M-test, Uniform convergence and continuity, Definition of improper integral and convergence of improper integral.

**Text Books:**


1. "A course of Mathematical Analysis" by Shanti Narayan, S. Chand & Co.
2. "Mathematical Analysis" by S. C. Malik, Willy. Eastern Co.
3. "Real Analysis" by M. L. Khanna and L. S. Varshney, Jay Prakash Nath & Co.


**Reference Books:**


1. "Real Analysis" by P. K. Mittal, S. J. Prakashan.
2. "Real Analysis" by P. K. Gupta and Sharada Gupta, S. Chand & Co.


*** Latest editions of all the suggested books are recommended.**

## Semester-IV
## Discrete Mathematics

**Course Code: BAS417** **L T P C**
**4 1 0 5**

**Objective-**

- To prepare students to apply their knowledge and multifaceted skills to be employed and excel in IT professional careers
- To provide students with Core Competence in mathematical, scientific and basic engineering fundamentals necessary to formulate, analyze and solve hardware/software engineering problems.
- To train students with good breadth of knowledge in core areas of Information Technology by using concepts of Discrete Mathematics.
- In this course several fundamental areas of discrete mathematics and algebra, with important applications in computer science
- Introduce Mathematical Logic, especially First Order Logic to students intending to graduate in Computer Science.
- Introduce proof techniques such as Mathematical Induction and Contradiction These techniques will come in handy for courses such as Analysis of Algorithms and Automata Theory.
- Develop an understanding of counting, functions and relations

**Course Contents:**

**Unit I** **(Lectures 08)**

Definition of set, countable and uncountable sets, venn diagrams, proof of some general identity of sets, relation, types of relation, composition of relation, pictorial representation of relation, equivalence relation, function, types of function, one to one, into and onto function, inverse function, composition of function, mathematical induction (simple and strong).

**Unit II** **(Lectures 08)**

Introduction to algebraic structure, properties, semi-grouped, monoid, groups, abelian groups, properties of groups, subgroups, cyclic groups, cosets, factor group, normal

subgroups, homomorphism and isomorphism of groups, ring and fields, definition and standard results.

**Unit III** **(Lectures 08)**

Posets, hass diagram of posets, isomorphism of ordered sets, well ordered sets, properties of lattice, Boolean algebra, SOP and POS form, logic gates, K-maps.

**Unit IV** **(Lectures 08)**

Propositional logic, basic logic operator, truth tables, tautology, contradiction, algebra of proposition, logical implications, logical equivalence, predicates.

**Unit V** **(Lectures 08)**

Recurrence relations, generating function, graph definition, types of graphs, representation of graphs, graph coloring, chromatic number, isomorphism and homomorphism of graphs.

**Text & Reference books:**

1. Discrete mathematics by Vinaya Rawol and bhakti Raul, Techmax publications.
2. Discrete mathematics and its applications by Kenneth H Rosen.

*** Latest editions of all the suggested books are recommended.**

## Semester-IV
## Introduction to Probability

**Course Code: BAS418** **L T P C**
**4 0 0 4**

**Objective –**The objective of this course is to understand the meaning of probability and probabilistic experiment, distinguish between discrete, continuous and mixedrandom variables and be able to represent them using probability mass, probability density and cumulative distribution functions

**Course Contents:**

**Unit I** **(8 Lectures)**

Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability – classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem and its applications.

**Unit II** **(8 Lectures)**

Random Variables: Discrete and continuous random variables, p.m.f., p.d.f., c.d.f. Illustrations of random variables and its properties. Expectation, variance, moments and moment generating function.

**Unit III** **(8 Lectures)**

Mathematica Expectation- Expectation of a Random Variable, Addition & Multiplication Theorem of Expectation, Moments-Moment Generating Function, Limitations of mgf, uniqueness theorem of mgf, cumulants- additive property.

**Unit IV** **(8 Lectures)**

Continuous probability distributions: Uuniform-Momemts, M.G.F, Characteristic function; Normal-Moments, M.G.F, Mean, Median, Mode, exponential- MGF. Laplace Double Exponential Distribution.

**Unit V** **(8 Lectures)**

Discrete Probability Distributions: Bernoulli Distribution, Moments of Bernoulli Distribution, Binomial-Moments, Recurrence relation, mode, MGF, cumulants; Poisson-poison process, Moments, Mode, MGF, cumulants; Geometric-Lack of Memory, Moments, mgf.

**Text & Reference books:**


1. Mathematical Statistics" by S.C. Gupta, S. Chand & co.
2. Hogg, R.V., Tanis, E.A. and Rao J.M.: Probability and Statistical Inference, Pearson Education, New Delhi.
3. Miller, Irwin and Miller, Marylees : John E. Freund's Mathematical Statistics with Applications, Pearson Education, Asia.
4. Myer, P.L.: Introductory Probability and Statistical Applications, Oxford & IBH Publishing, New Delhi


*** Latest editions of all the suggested books are recommended.**

## Semester IV

## English Communication and Soft Skills – IV

[BHM499/EHM599/699 amended vide approval dt. July 23, 2018 of V.C]

**Course Code: BHM499/EHM599/699**

| L | T | P | C |
|---|---|---|---|
| 1 | 1 | 2 | 2 |

**Objectives:**

1. To enable the learners to inculcate the skills of technical writing.
2. To enable the learners to proactively participate in Job Oriented activities.
3. To enable the learners to be aware of corporate Skills.

**Course Contents:**

**Unit – I: Job Oriented Skills** **(10 Hours)**

- Cover Letter
- Preparing Resume and Curriculum-Vitae
- Writing Joining Report

**Unit – II: Technical Communication** **(12 Hours)**

- Technical description of engineering objects
- Data Interpretation: Tables, Charts, & Graphs
- Preparing Agenda & Minutes of the Meeting
- Technical Proposal: Types, Significance, Structure & AIDA
- Report Writing: Types, Structure& Steps towards Report writing

**Unit- III: Interview Skills** **(10 Hours)**

- Branding yourself
- Interview: Types of Interview, Tips for preparing for Interview and Mock Interview
- Group Discussion: Do's and Don'ts of Group Discussion
- Negotiation skills

**Unit – IV: Corporate Skills** **(8 Hours)**

- Corporate Expectation
- Service mindset: Selling a product - Ad made shows
- Goal setting
- Team Building & Leadership
- Professional Ethics

**Reference Books:**


- Raman Meenakshi & Sharma Sangeeta, *"Technical Communication-Principles & Practice"* Oxford University Press, New Delhi.
- Mohan K. & Sharma R.C., "*Business Correspondence of Report Writing",* TMH, New Delhi.
- Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi.
- Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.
- Agrawal, Malti "*Professional Communication*" Krishana Prakashan Media (P) Ltd. Meerut.

**Methodology:**

1. The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion.
2. Conversational Practice will be effectively carried out by Face to Face & Via Media (Audio-Video Clips)
3. Modern Teaching tools (PPT Presentation & Motivational videos with sub-titles) will be utilized.

**Note:**

- For effective communication practice, groups will be changed weekly.
- Class (above 30 students) will be divided in to two groups for effective teaching.

# Evaluation Scheme

| Internal Evaluation | | External Evaluation | | Total Marks |
|---|---|---|---|---|
| 50 Marks | | 50 Marks | | 100 |
| 40 Marks (Progressive Evaluation) After each unit-completion: Assignments /Oral Presentation | 10 Marks (Attendance) | 25 Marks Midway external assessment (Viva) * | 25 Marks (External Viva)* * | |

**Note: 1.** *Midway external assessment of 25 marks will be submitted and considered with external evaluation with a total of 50 marks.*
**2.** Assignments & Oral Presentation (Progressive Evaluation) will be designed to test learning outcomes unit wise.

## *Parameters of Midway external assessment (Viva)

| Knowledge of frequently asked questions | Body Language | Communication skills | Confidence | Voice Modulation | TOTAL |
|---|---|---|---|---|---|
| 05 Marks | 05 Marks | 05 Marks | 05 Marks | 05 Marks | 25 Marks |

**Note***: To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 25 marks obtained by the students after two units are completed.*

## **Parameters of External Viva

| Knowledge of frequently asked questions | Body Language | Communication skills | Confidence | Voice Modulation | TOTAL |
|---|---|---|---|---|---|
| 05 Marks | 05 Marks | 05 Marks | 05 Marks | 05 Marks | 25 Marks |

**Note:** *External Viva will be conducted by 3-member committee comprising*

***a)*** *Faculty teaching the class*
***b)*** *English faculty from other college of the University (As approved by VC).*
***c)*** *T&P officer of other colleges of the University (As approved by VC).*

*Each member will evaluate on a scale of 25 marks and the average of three would be the 25 marks obtained by the students.*

# Semester IV
## DISCIPLINE & GENERAL PROFICIENCY

**Course Code: BGP411** **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

**2.** Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

**4.** Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

**7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

**8.** General behavior

**9.** Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

| **S No** | | Enroll No. | Student Name | Dress code | Participation in Conferences /Workshops / Seminars | Participation in guest lectures, invited talks and special technical sessions | Participation in community Services | Participation in Culture & extra curriculum activities, Department Club Activities | Participation in sports/ co-curricular activities | General Behavior | Any Extra Achievement |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **(5)** | **(15)** | **(20)** | **(10)** | **(20)** | **(20)** | **(5)** | **(5)** |
| | **Responsible for marks** | | | Mentor | Head | Head | Mentor | Cultural Events Coordinator & Department Club Coordinator | Sports Coordinator | Mentor | Director or Principal |

## Semester-V
## Numerical Analysis

**Course Code: BAS516** **L T P C**
**4 1 0 5**

**Course Contents:**

**Unit I** **(Lectures 08)**

Calculus of finite differences, Finite differences and difference formulae operators E, properties and relation between operators, difference table, Factorial Notation.

**Unit II** **(Lectures 08)**

Interpolation with equal intervals and Unequal Intervals; Newton Gregory Forward and Backward Formula, Newton's divide difference Formula, Lagrange's Interpolation Formula, Hermit Interpolation formulas using differences. Different interpolation methods, curve fittings use of calculus of finite difference, divided difference. Newton's formula of unequal intervals, Lagranges interpolation formula for unequal intervals. Iterative Methods

**Unit III** **(Lectures 06)**

Central difference formulae, Gaussian formula Bessel's and Strling formula, Gauss Evertt formula

**Unit IV** **(Lectures 08)**

Numerical differentiation and Integration, derivative using forward and backward difference interpolation formula, Trapezoidal Formulae, Simposon's Formula, Cotes formula.

**Unit V** **(Lectures 10)**

Numerical solution of first order differential equation using Kutta & Runge Kutta method and solution of algebraic and Transcedental Equations using Newton Raphson method & Graff's squaring method.

**Text Books:**


1. Numerical analysis", by Burden, Cengage Learning.
2. "Numerical Analysis" by B. S. Grewal, Khanna Publishing.
3. "Numerical Analysis" by Pradeep Niyosi, Tata Mcgraw Hell.


**Reference Books:**


1. "Numerical Analysis" by P.P. Gupta and Sanjay Gupta, Krishana Prakashan Mandir
2. "Numerical Analysis" by S.S. Sastry, Prentice Hall of India.
3. "Introduction to Numerical Analysis" by C. E. Froberg, Addition –Welly Publishing Co.


*** Latest editions of all the suggested books are recommended.**

# Semester-V
# Applied Statistics

**Course Code: BAS517** **L T P C**

**4 1 0 5**

**Objective:** To apply Statistics Methods for Mathematical Problems with the help of Quality control, Time Series, Index Number and Decision Theory.

**UNIT I** **( 8 Lectures)**

Economic Time Series: Components of time series, Decomposition of time series-Additive and multiplicative model with their merits and demerits, Illustrations of time series. Measurement of trend by method of free-hand curve, method of semi-averages and method of least squares (linear, quadratic and modified exponential). Measurement of seasonal variations by method of ratio to trend.

**UNIT II** **(8 Lectures)**

Index numbers: Definition, Criteria for a good index number, different types of index numbers. Construction of index numbers of prices and quantities, consumer price index number. Uses and limitations of index numbers.

**UNIT III** **(8 Lectures)**

Statistical Quality Control: Importance of statistical methods in industrial research and practice. Determination of tolerance limits. Causes of variations in quality: chance and assignable. General theory of control charts, process & product control, Control charts for
variables: X- bar and R-charts. Control charts for attributes: p and c-charts

**UNIT IV** **(8 Lectures)**

Demand Analysis: Introduction, Price Elasticity of Demand, Partial Elasticities of Demand, Leontief's Method Pigou's Method, Engel's Curve and Engel's Law, Pareto's Law of Income Distribution, Formulation of the problem, Curve's of Concentration, Utility Function.

**UNIT V** **(8 Lectures)**

Decision Analysis: Introduction, Classification of decision, Decision making under Uncertainty, Decision making under Risk, Uncertainty Criterion of optimism, Pessimism, Regret or equal Probability, Decision making under conflict & Competition, Hurwicz Criterion, Decision Tree Analysis.

**Text & Reference books:**


1. Mukhopadhyay, P.: Applied Statistics, New Central Book Agency, Calcutta.
2. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): Fundamentals of Statistics, World Press, Kolkata.
3. Gupta, S. C. and Kapoor, V.K.: Fundamentals of Applied Statistics, Sultan Chand & Sons.
4. Montogomery, D. C.: Introduction to Statistical Quality Control, Wiley India Pvt. Ltd.
5. Sharma, J. K.: Business Statistics, Pearson Education Ltd.


*** Latest editions of all the suggested books are recommended.**

## Semester-V
## Complex Analysis

**Course Code: BAS518** **L T P C**
**4 1 0 5**

**Objective –**To Study Cauchy integral formula, local properties of analytic functions, general form of Cauchy's theorem and evaluation of definite integral and harmonic functions, Residue and Conformal.

**Course Contents:**

**Unit I** **(Lectures 07)**

Analytic functions, conjugate function, Harmonic function, N.S.C. for Cauchy Remann equations, construct conjugate analytic functions.

**Unit II** **(Lectures 10)**

Complex Integration, Complex line integral, Cauchy integral function, Poisson integral, Lioville's theorem, Taylor theorem, Lorentz theorem.

**Unit III** **(Lectures 07)**

Zero's & Singularity, Zero's of a function, singular point, poles and different types of singularities, limiting point of zero's and poles, Weirstress theorem.

**Unit IV** **(Lectures 08)**

The Calculus of Residue, Residue of a pole at infinity Residue theorem Integration around unit circle, evaluation of integral $\int_{\square\square}^{\square} f(z)dz$

**Unit V** **(Lectures 08)**

Conformal mappings, transformation $w = z^2$, $w = z$, $z = c \sin w$

**Text Books:**

1. "Complex Variable" by T Pati, Pothishala Pvt Ltd.
2. "Complex Variable" by J. K. Goyal and K. P. Gupta, Pragati Prakashan.
3. "Complex Variable" by J. C. Chaturvedi and S.S. Seth, Student Friends & Co.

**Reference Books:**

1. "Complex Variable" by L. V. Alfors, Mc-Graw Hill &Co,
2. "Complex Variable" by R. K. Gupta, R. V. Churchiland J.W. Browin, Mc-Graw Hill & Co,
3. Complex Variable by Shanti Narayan, S.Chand &Company

*** Latest editions of all the suggested books are recommended.**

## Semester-V
## Operations Research

**Course Code: BAS519** **L T P C**
**4 1 0 5**

**Objective -**This course aims to introduce OR, LPP, Transportation, Assignment, Sequencing and game problems.

**Course Contents:**

**Unit I** **(Lectures 06)**

History and Back ground of subject, Different meaning of O.R. and Phases, characteristic and Models of O.R.

**Unit II** **(Lectures 10)**

Linear Programming, Mathematical formation of LPP, Graphical solution of LPP, general linear programming problem, simplex methods, duality.

**Unit III** **(Lectures 08)**

Transportation Problem, Assignment Problem, matrix form of: Transportation Problem. Initial basic physible solution, Optimality and transportation algorithms, balanced and unbalanced transportation problem and assignment problem.

**Unit IV** **(Lectures 08)**

Job sequencing, Replacement model, sequencing method of two machine three machine and n machine problem, graphic solution, Replacement of item deterioting with time, Replacement of item that fails continuously, and general replacement problem.

**Unit V** **(Lectures 08)**

Game Theory, two-person zero sum game, saddle point maximin and minimax, game of type $2 \times 2, n \times 2$ game graphic solution and with dominance property.

**Text Books:**


1. "Operation Research" by Winston, Cengage Learning
2. "Operation Research" by S. D. Sharma, Kedarnath Ramnath & Company
3. "Operation Research" by Kanti Swroop, P. K. Gupta and Man Mohan, Sultan Chand & Sons

**Reference Books:**


1. "Operation Research" by H.A Tata, Maemillar & Company
2. "Operation Research" by P. K. Gupta and D.S. Hira, S Chand & Company
3. "Operation Research" by R. K. Gupta, Krishna Prakasha


*** Latest editions of all the suggested books are recommended**

## Semester-V

## Introduction to MATLAB

[BAS565 amended vide approval dt. November 29, 2019 of V.C]

**Course Code: BAS565** **L T P C**

**0 2 2 2**

**Objective:** How to use MATLAB as a programming tool and how to write a program that is well documented and easy to read.

**Course Contents:**

**Unit-I** **(Lectures 08)**

**MATLAB Software Working Environment:** MATLAB Initializing & Ending, Quick Access Tool Bar, Command Window, Command History, Workspace Browser, Current folder window, Editor Window, Help Browser, Figure Window, Simulink Window, Creating Command Shortcuts, MATLAB Path Options MATLAB Programming, Debugging MATLAB codes**.**

**Unit-II** **(Lectures 08)**

**MATLAB Input Entry & Executing Commands & Methods:** Input and Output, Symbolic Mathematics, Arithmetic, Algebra, Symbolic Expressions, Variable Precision and Exact Arithmetic, Errors in Input, Variables and Assignments, Predefined Variables, Operators & Special Characters, Control Structures, Input & Output Commands.

**Matrices**: Arrays, Matrix representation, Matrix & Inverse of Matrix, Entry Retrieving, Matrix Division, Eigen values and vectors, Special matrices.

**Unit-III** **(Lectures 08)**

**Polynomials**: Polynomial Overview, Representing Polynomials, Arithmetic operations on polynomials, Polynomial Roots, Polynomial coefficients, Polynomial Evaluation, Convolution and De-convolution.

**Solving Equations:** Solution to first order differential Equations, Solving Second Order Differential Equations, Partial Fraction Expansion

**Unit-IV** **(Lectures 08)**

**MATLAB Graphics:** 2-D Plot, Plotting Process, Creating a Graph, Exploring Data, Editing the Graph Components, Annotating Graphs, Printing and Exporting Graphs, Accessing Properties with the Property Inspector, Plotting Two Variables with Plotting Tools, Changing the Appearance of Lines and Markers, Placing Markers at Every Tenth Data Point, Adding More Data to the Graph, To add data using the Plot Browser, Changing the Type of Graph, Modifying the Graph Data Source, Providing New Values for the Data Source, Figure Windows, Clearing the Figure for a New Plot, Controlling the Axes, Setting Axis Limits, Setting the Axis Aspect Ratio - Setting Axis Visibility, Setting Grid Lines**.**

**Unit-V** **(Lectures 08)**

Application Tools: Partial Differential Equation (PDE), Curve fitting

**Text Books-**


1. Amos Gilat, "MATLAB: An Introduction with Applications", Wilay Publication
2. J. Chakrabarty "Introduction to Matlab" Universities Press.
3. R. Pratap, "Getting Started with MATLAB A Quick Introduction for Scientists and Engineers" Oxford University Press


*** Latest editions of all the suggested books are recommended**

**List of Experiments:**
**Note: Minimum 15 experiments should be performed:**

1. To find the Local Environment for MATLAB programming.
2. Enter the m*n order matrix
3. Find the matrix transpose
4. Find the inverse of matrix
5. Find the addition, subtraction & multiplication of matrix
6. If $V_1 = 5v$, $V_2 = 6v$, $Z_{11}=2$, $Z_{12}=1$, $Z_{21}=3$ $Z_{22}=4$, get the value of $I_1$ and $I_2$?
7. If A1 = [2 7 6 8 9 10] and B1 = [6 4 3 2 3 4], Find
   a. C1 = A1.*B1
   b. D1 = A1./B1
8. If r1 = [ 7 3 5] and s1 = [ 2 4 3], get
   i. q1 = r1.^s1

   ii. q2 = r1.^2
9. State if the following statements are true or false,
   i. If a MATLAB statement ends with a semicolon (;) MATLAB evaluates the statement but suppresses the display of the results.
   ii. The end of each row in entering a matrix, is indicated by a semicolon (;)
   iii. MATLAB is case sensitive in naming variables only.
10. Enter the following matrix,

**A =**

| | | | |
|---|---|---|---|
| **1** | **3** | **4** | **2** |
| **2** | **0** | **1** | **6** |
| **4** | **1** | **2** | **7** |
| **0** | **3** | **6** | **4** |

a. Get the diagonal of the matrix A

b. Get the sum of each column in the matrix A

c.Get the sum of each row in the matrix A

d. Get the sum of all elements in the matrix A

e. Add 2 to the element in the 2nd row and 3rd column

**11.** Enter the following complex number, z = 2-j3 then

a. Get the real and the imaginary parts of z

b. Get the magnitude and the phase angle of z

c. If y = 3+j5, calculate the following: y+z, y-z, y×z

**12.** If w = [1+j 5-2*j; 3+2*j 4+3*j]

a. Get the conjugate transpose

b. Get the point transpose

c. Type the elements of 2nd row only

**13.** Reshape matrix.

**14.** Eliminate Rows of matrix.

**15.** Sorting a matrix

**16.** Plot, xlabel, ylabel, title, and axis commands;

**17.** Find difference between plot, semilogy, semilogx, logog commands

**18.** Bar plot, Pie chart, 3D plots command

**19.** Creating and performing symbolic computations.

**Text Books-**


**1.** Amos Gilat, "MATLAB: An Introduction with Applications", Wilay Publication

**2.** J. Chakrabarty "Introduction to Matlab" Universities Press.

**3.** R. Pratap, "Getting Started with MATLAB A Quick Introduction for Scientists and Engineers"

Oxford University Press


*** Latest editions of all the suggested books are recommended**

**Evaluation Scheme of Practical Examination:**

**Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

**Evaluation scheme:**

| PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS) | | | | ON THE DAY OF EXAM (15 MARKS) | | TOTAL INTERNAL (50 MARKS) |
|---|---|---|---|---|---|---|
| EXPERIMENT (5 MARKS) | FILE WORK (10 MARKS) | VIVA (10 MARKS) | ATTENDANCE (10 MARKS) | EXPERIMENT (5 MARKS) | VIVA (10 MARKS) | |

**External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

| EXPERIMENT (20 MARKS) | FILE WORK (10 MARKS) | VIVA (20 MARKS) | TOTAL EXTERNAL (50 MARKS) |
|---|---|---|---|

# Semester V
## DISCIPLINE & GENERAL PROFICIENCY

**Course Code: BGP511** **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

**2.** Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

**4.** Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

**7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

**8.** General behavior

**9.** Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

| **S No** | | Enroll No. | Student Name | Dress code | Participation in Conferences /Workshops / Seminars | Participation in guest lectures, invited talks and special technical sessions | Participation in community Services | Participation in Culture & extra curriculum activities, Department Club Activities | Participation in sports/ co-curricular activities | General Behavior | Any Extra Achievement |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **(5)** | **(15)** | **(20)** | **(10)** | **(20)** | **(20)** | **(5)** | **(5)** |
| | **Responsible for marks** | | | Mentor | Head | Head | Mentor | Cultural Events Coordinator & Department Club Coordinator | Sports Coordinator | Mentor | Director or Principal |

## Semester-VI
## Fourier & Laplace Transform

**Course Code: BAS616** **L T P C**
**4 1 0 5**

**Objective-** The Laplace and Fourier Transforms aim to take a differential equation in a function and turn it into an algebraic equation involving its transform. Such an equation can then be solved by algebraic manipulation, and the original solution determined by recognizing its transform or applying various inversion methods.

**Unit I** **(Lectures 08)**

**Laplace Transform:** Definition of Laplace Transform, Linearity property - Piecewise continuous function, Existence of Laplace transform, First and second shifting theorems of Laplace transform, Change of scale property, Laplace transform of derivatives, Initial value problems, Laplace transform of Integrals, Laplace transform of Multiplication by t, Laplace transform of Divison by t, Laplace transform of periodic functions and error function.

**Unit II** **(Lectures 08)**

**Inverse Laplace Transform:** Inverse Laplace Transform, Linearity property, First and second shifting theorems of Inverse L.T., Change of scale property, Division by p, Convolution theorem, Heaviside's expansion formula, Solution of Ordinary Differential Equations with constant coefficients by L.T., Solution of Simultaneous Ordinary Differential Equations.

**Unit III** **(Lectures 08)**

**Fourier Series**: Fourier Series, Dirichlet's conditions Fourier Series for even and odd functions, Determination of Fourier coefficients Periodic functions, Orthogonality of sine and cosine functions, Half range Fourier series Other forms of Fourier series, Parseval's theorem.

**Unit IV** **(Lectures 08)**

**Fourier Transforms**: Fourier Integral and Fourier transform, Properties of Fourier transform, Fourier complex transformation and it's properties, Fourier sine and cosine transformations and application to simple heat transfer equation.

**Unit V** **(Lectures 08)**

**Fourier Inverse Transforms:** Fourier transform Inverse Theorem for Fourier Transform Fourier Sine and Cosine transforms and their inversion formula, Linearity property of Fourier transforms, Change of Scale property, shifting theorem, Modulation theorem, Convolution theorem of Fourier transforms, Parseval's identity, Solution of Partial Differential Equations Applications of Fourier transforms to initial and boundary value problems.

**Test Books:**

1. A. R. Vasistha & Dr. R. K. Gupta, Integral Transforms, Published by Krishna Prakashan Media Pvt. Ltd, Meerut.
2. S. Ranganatham & Dr. V. Ramesh Babu, Fourier Series and Integral Transforms, S. Chand & Co., New Delhi, 2014.

**Reference Books:**


1. Shanthi Narayan and P. K. Mittal, A Course of Mathematical Analysis S. Chand & Co., New Delhi.
2. R. V. Churchill, Operational Mathematics, Mc Graw Hill Company.


*** Latest editions of all the suggested books are recommended**

## Semester-VI
## Differential Geometry and Tensor

**Course Code: BAS617** **L T P C**
**4 1 0 5**

**Objective:** To introduce space curves and their intrinsic properties of a surface. Further the non-intrinsic properties of surface Tensor law of transformation and the differential geometry of surfaces are explored

**Course Contents:**

**Unit I** **(Lectures 08)**

Curves in space, space curves, are lengths, tangent plane lines, osculating plane, normal plane, unit vectors t, n, b, serret fernet formula, curvature and torsion of curves helix, osculating circle and osculation sphere.

**Unit II** **(Lectures 08)**

Fundamentals of surfaces, definition of surface, class of a surface, regular and singular point, tangent and normal planes, fundamental form and relation between E, F, G, Fundamental magnitude of slandered surface.

**Unit III** **(Lectures 08)**

Envelopes and Developable surfaces, characteristics envelop, edge of regression, developable surface, envelops of a plane etc.

**Unit IV** **(Lectures 08)**

Contra variant & Covariant Vectors & Tensors, Contraction, Tensor algebra, Associated Vectors and Tensors.

**Unit V** **(Lectures 08)**

Christoffel Symbols, Tensor law of transformation, Covariant derivative of Tensors.
Riemann Christoffel Tensor.

**Text Books:**


1. "Differential Geometry" by A. R. Vasistha and J. N. Sharma, Kedarnath Ramnath.
2. "Tensor Calculus" by G. C. Sharma and S.K. Singh Laxmi Narayan Publisher Agra.


**Reference Books:**


1. "Differential Geometry" by A.B. Chandra Moule and J. B. Chauhan, Siksha Sahitya Prakashan.
2. "Differential Geometry" by P. P. Gupta and G. S. Malik, Pragati Prakashan.
3. "Differential Geometry" by S. C. Mittal and D. C. Agarwal, Krishna Pracashan.
4. "Differential Geometry" by T. J. Willmore Oxford University Press, New Delhi.


*** Latest editions of all the suggested books are recommended.**

## Semester-VI
## Number Theory

**Course Code: BAS618** **L T P C**
**4 1 0 5**

**Objective-**This course presents the theory and application of Number theory and to show how certain number theoretical theorems can be applied within cryptography and to use the theory to solve simple Diophantine equations. It extents the theory of optimization methods to more realistic problems.

**Course Contents:**

**Unit I** **(Lectures 08)**

Unit, Primes, Composite numbers and Co-prime integers, Division Algorithms, Greatest Common divisor, Induction Method, Fundamental Theorem of Arithmetic, Standard Form, Least Common Multiple, Bracket Function.

**Unit II** **(Lectures 08)**

Congruence, Equivalence Relation, Linear Congruence and their theorems

**Unit III** **(Lectures 08)**

Fermat Theorem, Fermat's factorization Method, Fermat's little theorem, Wilson Theorem, Euler's factorization Method.

**Unit IV** **(Lectures 08)**

Euler's Function, Mobius function, Euler's theorem, Some properties of Euler's functions.

**Unit V** **(Lectures 08)**

Perfect Numbers, Mersenne primes, Fermat number, Pythagorean triples, Lagrange's theorem**.**

**Subject Outcome**-After completing this course students will be able to solve the number system and find their optimization.

**Text Books:**


1. Davis M. Burton, Elementary Number Theory, USB.
2. Hari Kishan, Number theory, Krishna Prakashan Media, Meerut.
3. Prakash Om, Theory of Numbers, Laxmi Publications.


**Reference Books:**


1. U. Dudley, Elementary Number Theory, Freeman & Co.
2. George Andrews, Number Theory, Courier Dover Publications.


*** Latest editions of all the suggested books are recommended.**

## Semester-VI
## Graph Theory

**Course Code: BAS619** **L T P C**
**4 1 0 5**

**Objective:** Graph theory find applications in many fields, including computer science, physics, chemistry, psychology and sociology. In this course, we teach basic topics in graph theory such as Trees, Directed graphs, Connectivity, Euler tours, Hamilton cycles etc.

**Course Contents:**

**Unit I** **(Lectures 08)**

Definition of Graph and their properties, types of graph, homomorphism, isomorphism, automorphism of graph, subgraph, Walk, trail and path, connected and disconnected graph Eular's Graph, Operation on graph.

**Unit II** **(Lectures 08)**

Definition of Trees, Pendent vertex, center of a tree, binary tree, spanning tree, Fundamental Circuits, Connectivity and separability, preorder and post order.

**Unit III** **(Lectures 08)**

Planar and dual graphs, Kuratowski's two graphs, different representations of planer graphs, detection of planarity, Geometric dual, Combinatorial dual, Thickness and Crossing.

**Unit IV** **(Lectures 08)**

Vectors and vector spaces, Vector space associated with a graph, Basis vectors of a graph, circuit and cut-set subspace, Orthogonal vectors and spaces, Intersection and join of $v$ and $vs$.

**Unit V** **(Lectures 08)**

Matrix representation of graphs, Incidence matrix, Sub matrix of $A(G)$ , Circuit matrix, Fundamental circuit matrix and Rank of $B$ , Cut-set matrix, Path matrix, Adjacency Matrix.

**Text Books:**

**1.** "Graph Theory" by Narsingh Deo, Printice Hall of India.
**2.** "Graph Theory" by P.k.Mittal & P.K. Shukla, S. J. publication.

**Reference Books:**

1. "Graph Theory" by S.B. Singh, Khanna book Publishing co.

*** Latest editions of all the suggested books are recommended.**

## Semester-VI
## Open Elective

# Introduction to Statistical Package for Social Sciences

**Subject Code: BAS011**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives:** This course is intended for students with limited or no experience with the statistical package SPSS. This course is designed to give students the necessary skills to analyze research projects.

**Course Contents-**

**Unit-I** **(Lectures 08)**

**Introduction to SPSS:** Overview of statistical packages; Data analysis with SPSS: General aspects, workflow, and critical issues; SPSS interface: data, variable, output, and syntax view; General description, functions, menus, and commands.

**Unit-II** **(Lectures 08)**

**Input and data management:** Defining variables; Entering and modifying data: manual and automated input of data, and file import; Data Management: Listing cases, replacing missing values, computing new variables, exploring data, selecting cases, sorting cases, merging files etc.; Data Transformation; Output management.

**Unit-III** **(Lectures 08)**

**Descriptive analysis of data:** Frequencies; Descriptive Statistics: measures of central tendency, variability, deviation from normality; Crosstabs and chi-square analyses; Charts: creating &editing graphs (Bar; histograms; scatter diagram; percentiles etc.).

**Unit-IV** **(Lectures 08)**

**Statistical tests:** Parametric Tests: Means; t-test (Independent samples, paired samples, and one sample tests);One-way ANOVA; Non parametric tests: Mann-Whitney U, Wilcoxon signed-rank, Kruskal-Wallis.

**Unit-V** **(Lectures 08)**

**Correlation and regression**: Correlation: Bivariate and Partial correlation; correlation matrix; Regression: Simple linear regression; Multiple regression analysis; Factor analysis, Cluster analysis.

**Text and References Books:**


1. Field, Andy. "Discovering Statistics Using SPSS." 3rd Ed., Sage Publishers.
2. Pallant, Julie. "SPSS Survival Manual." 4th Ed., McGraw-Hill.
3. Cronk, Brian. "How to Use SPSS: A Step-By-Step Guide to Analysis and Interpretation." 5thEd.
4. Kiran Pandya, Smruti Bulsari, Sanjay Sinha, "SPSS in simple steps" Wiley/Dreamtech Press.


***Latest editions of all the suggested books are recommended.**

# Industrial Chemistry

**Course Code: BAS012** **L T P C**
**3 0 0 3**

**Objective:** Industrial chemistry course content include silicate technology, glass manufacturing, nitogenous & phosphate fertilizers and application of lubricants. The other industrial preparations are soap, detergents, paints, insecticides & drug.

**Course Contents:**

**Unit I** **(08 Lectures)**

**Silicate Industries:**

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses). Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass.

Ceramics: Important clays and feldspar, ceramic, their types and manufacture. Hightechnology ceramics and their applications.

Cements: Classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.

**Unit II** **(08 Lectures)**

**Fertilizers:**

Different types of fertilizers. Need for fertilizers, Straight and mixed fertilizers, Sources offertilizers, Artificial fertilizers, Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, Ammonium sulphate, ammonium phosphates; polyphosphate, superphosphate, compound and mixed fertilizers, potassium chloride, potassium sulphate. NPK fertilizers**.**

**Unit III** **(08 Lectures)**

**Alloys:**

Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon decarbonization, demagnetization, desulphurization dephosphorisation) and surface treatment (argon treatment, heat treatment, nitriding, carburizing). Composition and properties of different types of steels.

**Unit IV** **(08 Lectures)**

**Paints and Pigments:** Introduction, : Characteristic of the pigments Classification of paints, Manufacture of paints, for example white lead, Sublimed white lead (Basic sulphate), Zinc oxide, Lithophone, Titanium dioxide, manufacture, Ultramarine blue , Read lead, Chrome green, Guignet's green , Reinmann's green , Setting of the paints Requirements of a good paint Emulsion paints, Constituents of emulsion paints. Advantages, Luminescent paints. Heat resistant paints, Varnishes, Manufacturing of varnishes, Lacquers, Solvents and thinners.

**Unit V** **(08 Lectures)**

**Soaps & Detergents:**

Introduction to oils and fats; common fatty acids present in oils and fats, Hydrogenation of fats and oils, Saponification value, acid value, iodine number. Reversion and rancidity.

Soap: Soap and its manufacture, Toilet and transparent soap, Other soaps, Oil to be used for soap, Cleansing action of soap.

Detergents: Principal groups of synthetic detergents, Classification of surface active agents, Anionic detergents, Cationic detergents. Non-ionic detergents. Amphoteric detergents.

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**Text & Reference Books:**


1. E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.
2. R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas Publications, New Delhi.
3. Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut.


*** Latest editions of all the suggested books are recommended**

## Introduction to Nanoscience & Technology

**Course Code: BAS013** **L T P C**
**3 0 0 3**

**Objective:** To study physical properties of nanoscale systems, QDs, Synthesis of various nanomaterials, characterization & applications of nanomaterials etc.

**Course Contents:**

**Unit I** **(08 Lectures)**

**Nanoscale Systems:** Length, energy, and time scales - Quantum confinement of electrons in semiconductor nanostructures: Quantum confinement in 3D, 2D, 1D and zero dimensional structures-Size effect and properties of nanostructures- Landauer-Buttiker formalism for conduction in confined geometries - Top down and Bottom up approach.

**Unit II** **(08 Lectures)**

**Quantum Dots:** Excitons and excitonic Bohr radius – difference between nanoparticles and quantum dots - Preparation through colloidal methods - Epitaxial methods- MOCVD and MBE growth of quantum dots - current-voltage characteristics - magneto tunneling measurements -spectroscopy of Quantum Dots: Absorption and emission spectra - photo luminescence spectrum -optical spectroscopy - linear and nonlinear optical spectroscopy.

**Unit III** **(08 Lectures)**

**Synthesis of Nanostructure Materials:** Gas phase condensation – Vacuum deposition - Physical vapor deposition (PVD) - chemical vapor deposition (CVD) – laser ablation- Sol-Gel- Ball milling –Electro deposition- electroless deposition – spray pyrolysis – plasma based synthesis process (PSP) - hydrothermal synthesis.

**Unit IV** **(08 Lectures)**

**Characterization:** Principle and working of Atomic Force Microscopy (AFM) and Scanning tunneling microscopy (STM) - near-field Scanning Optical Microscopy – Principle of Transmission Electron Microscopy (TEM) – applications to nanostructures – nanomechanical characterization – nanoindentation.

**Unit V** **(08 Lectures)**

**Nanotechnology Applications:** Applications of nanoparticles, quantum dots, nanotubes and nanowires for nanodevice fabrication – Single electron transistors, coulomb blockade effects in ultra-small metallic tunnel junctions - nanoparticles based

solar cells and quantum dots based white LEDs – CNT based transistors – principle of dip pen lithography.

**Text & References Books:**


1. Hand book of Nanoscience, Engineering and Technology (The Electrical Engineering handbook series), Kluwer Publishers.
2. "Sol-Gel Science", C.J. Brinker and G.W. Scherrer, Academic Press, Boston.
3. Nanoscale characterization of surfaces & interfaces, N John Dinardo, Weinheim Cambridge: Wiley-VCH.
4. "Nanotechnology" G. Timp. Editor, AIP press, Springer-Verlag, New York.
5. "Nanostructured materials and nanotechnology'', Concise Edition, Editor:-Hari Singh Nalwa; Academic Press, USA.


*** Latest editions of all the suggested books are recommended**

## Semester-VI
## Seminar, Viva & Presentation

**Course Code: BAS698**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 4 | 2 |

For students to enter into preliminary research field both in theory and experiment the concept of Seminar, Presentation & Viva has been introduced in the final Semester. In this report, student will explore new developments from the books and journals, collecting literature / data and prepare the report in form of power point presentation based on his / her work and studies, and submit in concern department.

**General guidelines are as follows-**

1. Students will make seminar report which should be preferably a working of third thoughts based on their subject.
2. The student will be assigned a faculty guide who will be the supervisor of the students. The faculty would be identified at the end of the $V^{th}$ semester.
3. Internal assessment of the students should be done at least twice in the semester.
4. The students shall present the final presentation live using overhead projector PowerPoint presentation on LCD to the internal committee and the external examiner.
5. The internal evaluation committee shall consist of faculty members constituted by the college which would be comprised of at least three members comprising of the department Coordinator's, Class Coordinator and a nominee of the Director/Principal. The students guide would be special in invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each members of the committee.

The Marking shall be as follows.

**Internal:** 50 marks

By the Faculty Guide – 25 marks

By Committee appointed by the Director/Principal – 25 marks

**External:** 50 marks

By External examiner appointed by the University – 50

Top Cover- The sample top cover shall be as under:

# TITLE (18 pt Times New Roman CAPS)

**SEMINAR REPORT (14)**

**Submitted in Partial Fulfillment of the Requirements for the Degree of (14)**

## BACHELOR OF SCIENCE (16)

## In (16)

## Mathematics (16)

Submitted by (12)

Name

Enrollment No

Under the guidance of (12)

Name of Guide & Designation (14)


**Department of Mathematics (14)**
**Faculty of Engineering**
**Teerthanker Mahaveer University (14)**
**Moradabad-244001(14)**

**(December, 2017) (14)**

**EVALUATION SHEET**

(To be filled by the GUIDE & Internal Examiners only)

**Name of Candidate:**
**Roll No:**

**Class and Section:**

Please evaluate out of Five marks each.

| S. No. | Details | Marks (5) Guide | Marks (5) Int. Exam. 1 | Marks (5) Int. Exam. 2 |
|---|---|---|---|---|
| **1.** | Objective Identified &Understood | | | |
| **2.** | Literature Review / Background Work (Coverage, Organization, Critical Review) | | | |
| **3.** | Discussion/Conclusions (Clarity, Exhaustive) | | | |
| **4.** | Slides/Presentation Submitted (Readable, Adequate) | | | |
| **5.** | Frequency Of Interaction (Timely Submission, Interest Shown, Depth, Attitude) | | | |
| | **Total (Out of 25)** | | | |
| | **Average out of 50** | | | |

Signature: Signature: Signature:
Date: Date: Date:

**EVALUATION SHEET FOR EXTERNAL EXAMINER**

(To be filled by the External Examiner only)

**Name of Candidate:**

**Roll No:**

**I.** For use by **External Examiner ONLY**

| S. No. | Details | Marks (10) each |
|---|---|---|
| **1.** | Objective Identified & Understood | |
| **2.** | Literature Review / Back ground Work<br>(Coverage, Organization, Critical Review) | |
| **3.** | Discussion/Conclusions<br>(Clarity, Exhaustive) | |
| **4.** | Power Point Presentation<br>(Clear, Structured) | |
| **5.** | Slides<br>(Readable, Adequate) | |
| | **Total (Out of 50)** | |

Signature:

Date:

**EVALUATION SUMMARY SHEET**

(To be filled by External Examiner)

| Name and Roll No. | Internal Examiners (50) | External Examiner (50) | Total (100) | Result (Pass/Fail) |
|---|---|---|---|---|
| | | | | |

**Note:** The summary sheet is to be completed for all students and the same shall also be Compiled for all students examined by External Examiner. The Format shall be provided by the course coordinator.

## Semester VI
### DISCIPLINE & GENERAL PROFICIENCY

**Course Code: BGP611** **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

**2.** Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

**4.** Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

**7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

**8.** General behavior

**9.** Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

| **S No** | | Enroll No. | Student Name | Dress code | Participation in Conferences /Workshops / Seminars | Participation in guest lectures, invited talks and special technical sessions | Participation in community Services | Participation in Culture & extra curriculum activities, Department Club Activities | Participation in sports/ co-curricular activities | General Behavior | Any Extra Achievement |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **(5)** | **(15)** | **(20)** | **(10)** | **(20)** | **(20)** | **(5)** | **(5)** |
| | **Responsible for marks** | | | Mentor | Head | Head | Mentor | Cultural Events Coordinator & Department Club Coordinator | Sports Coordinator | Mentor | Director or Principal |