

**ORDINANCES
AND
OUTLINES OF TESTS,
SYLLABI AND COURSE OF READING
FOR
B.SC. (COMPUTER, STATISTICS, MATHEMATICS)
B.Sc. (CSM)
(2021-22)**

COURSE CODE: BCSM



**General Shivdev Singh Diwan Gurbachan Singh
KHALSA COLLEGE PATIALA**

**An Autonomous College
NAAC Accredited 'A' Grade
College with Potential for Excellence Status by UGC
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Preamble:

General Shivdev Singh Diwan Gurbachan Singh Khalsa College Patiala, accredited 'A' grade by NAAC (2015), recognized as "College with Potential for Excellence" status by UGC, New Delhi (2016) and an Autonomous College (2016), is a premier institute of higher education in the state of Punjab since 1960. Being concordant with the need to the creation of a self-sustaining, global knowledge society, the college has undertaken several measures initiated by UGC to bring equity, efficiency and excellence in the Higher Education System of the country.

The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation system, besides governance and other matters.

The UGC has formulated various regulations and guidelines from time to time to improve the higher education system and maintain minimum standards and quality across the Higher Educational Institutions in India. The academic reforms recommended by the UGC in the recent past have led to overall improvement in the higher education system. However, due to lot of diversity in the system of higher education, there are multiple approaches followed by Higher Educational Institutions towards examination, evaluation and grading system. While the Higher Educational Institutions must have the flexibility and freedom in designing the examination and evaluation methods that best fits the curriculum, syllabi and teaching-learning methods, there is a need to devise a sensible system for awarding the grades based on the performance of students. Presently, the performance of the students is reported using the conventional system of marks secured in the examinations or grades or both. Then there is conversion from marks to letter grades as the letter grades are used widely across the Higher Educational Institutions in the country. This creates difficulty for the academia and the employers to understand and infer the performance of the students graduating from different universities and colleges based on grades.

The grading system is considered to be better than the conventional marks system and hence, it has been followed in the top institutions in India and abroad. So, it is desirable to introduce uniform grading system. This will facilitate student mobility across institutions within and across countries and will also enable potential employers to assess the performance of students. To bring in the desired uniformity in grading system and method for computing the cumulative grade point average (CGPA) based on the performance of students in the examinations, the UGC has formulated CBCS guidelines.

Outlines of Choice Based Credit System:

1. Core Course: A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

2. Elective Course: Generally, a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

2.1 Discipline Specific Elective (DSE) Course: Elective courses offered under the main discipline/subject of study is referred to as Discipline Specific Elective.

2.2 Dissertation/Project: An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.

2.3 Generic Elective (GE) Course: An elective course chosen from an unrelated discipline/subject, with an intention to seek exposure beyond discipline/s of choice is called a Generic Elective. The purpose of this category of papers is to offer the students the option to explore disciplines of interest beyond the choices they make in Core and Discipline Specific Elective papers.

P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

3. Ability Enhancement Courses (AEC): The Ability Enhancement (AE) Courses may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement; i. Environmental Science and, ii. English/Hindi/Modern Indian Language (MIL) Communication. These are mandatory for all disciplines. SEC courses are value-base and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

3.1 Ability Enhancement Compulsory Courses (AECC): Environmental Science, English Communication/Hindi Communication/MIL Communication.

3.2 Skill Enhancement Courses (SEC): These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

4. **Practical/tutorials:** The practicals/tutorials will be conducted keeping in view the spirit of UGC guidelines as per the needs and requirements of the concerned subject.

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

DEFINITIONS

- a. **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
- b. **Course:** Usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/tutorials/laboratory work/field work/outreach activities/ project work/vocational training/viva/seminars/term papers /assignments/ presentations/self study etc. or a combination of some of these.
- c. **Credit Based Semester System (CBSS):** Under the CBSS, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.
- d. **Credit Point (CP):** The numerical value obtained by multiplying the grade point (GP) by the no. of credit(C) of the respective course i.e. $CP = GP \times C$.
- e. **Credit(C):** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week, i.e. a course with assigned L-T-P: 3-0-2 or 3-1-0 will be equivalent to 4 credits weight-age course.
- f. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.
- g. **Grade Point (GP):** It is a numerical weight allotted to each letter grade on a 10 point scale.
- h. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.
- i. **Programme:** An educational programme leading to award of a degree, diploma or certificate.
- j. **Semester Grade point Average (SGPA):** It is a measure of performance of work done in a semester. It is ratio of total credit points (CPs) secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed upto two decimal places.
- k. **Semester:** Each semester will consist of 15-18 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June.
- l. **Transcript or Grade Card (GC) or Certificate:** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, no. of credits, grades secured) along with SGPA of that semester and CGPA earned till date semester.
- m. **Semester Examinations:** The comprehensive examinations conducted for summative evaluation of course. The duration of these examinations shall be 3 and 4 hours for theory and practical courses respectively; and the weight shall be as per the ordinance of relevant programme.
- n. **L-T-P:** The prescribed hours/week during a semester for Lecture-Tutorial-Practical to a particular course, in accordance with curriculum prescriptions based on respective nature.

ORDINANCES FOR B.Sc. (COMPUTER, STATISTICS, MATHEMATICS)

Applicability of Ordinances for the time being in force.

Notwithstanding the integrated nature of a course spread over more than one academic year, the Ordinances in force at the time a student joins a course shall hold good only for the examination held during or at the end of the academic year. Nothing in these Ordinances shall be deemed to debar the College from amending the ordinances subsequently and the amended ordinances, if any, shall apply to all the students whether old or new.

1. B.Sc. (CSM) is an integrated course comprising of three parts spread over three years. Each part will consist of two semesters. The course of study of B.Sc. (CSM) shall be divided in six semesters and the final examination will be held at the end of every semester in the months of November/December (for semester I, III & V) and April/May (for semester II, IV & VI) or as fixed by the College.

2. The examination in B.Sc (CSM) Part-I shall be open to a student who produces the following certificates to the Principal of the college.

(i) of having passed at least +2 examination with Mathematics as one of the subjects of Punjab School Education Board / C.B.S.E. / I.C.S.E. or any other examination recognized as equivalent thereto with at least 50% marks in aggregate.

Note: Candidate placed under reappear in one or more subjects in 10+2 examination of Punjab School Education Board or any other examination, recognized as equivalent thereto shall not be eligible for admission to B.Sc. (CSM) Part-I Course.

(ii) of having remained on the rolls of a School/college admitted to the privileges of the College for the academic year preceding the examinations.

(iii) of having good character.

(iv) A student will produce proof for opting Elementary Punjabi. This can be opted only under the following conditions:

(a) Those students who have passed their Matric Examination outside the State of Punjab and have not opted for Punjabi Subject.

(b) Wards of Defense Personnel/Para-Military Personnel can opt for Elementary Punjabi.

(c) Children of NRI, NRE and Foreign Students.

2.1 To qualify for admission to 3rd semester of the course, the candidate must have passed 50% of total papers of the two semesters of the 1st year. In case, the result of 2nd semester is not declared at the time of admission to 3rd semester, the student may be admitted provisionally and will be allowed to take examination of 3rd semester if he/she has passed in 50% of the total papers of first year (i.e. 1st and 2nd semester). Similarly, to qualify for admission to 5th semester of the course, the student may be admitted provisionally if the result of the previous semester has not been declared and will be allowed to take examination of 5th semester, if he/she has passed 50% of the total papers of previous semesters.

2.2 A student who joins B.Sc. (CSM) Part II course after having passed B.Sc. (CSM) Part I or any other Equivalent examination from any other statutory University shall be required to qualify all the deficient papers as provided in the syllabus prescribed by the College for B.Sc. (CSM) Part I examination along with Part II examination.

A student who joins B.Sc. (CSM) Part III course after having passed B.Sc. (CSM) Part II or any other equivalent examination from any other statutory University shall be required to qualify all the deficient paper as provided in the syllabus prescribed by this college for B.Sc. (CSM) Part I and Part II examination along with Part III examination. However, Mid Semester migration will not be allowed.

3 A candidate must complete and pass the whole course of three years within a maximum of six years from the date of admission in B.Sc. (CSM) First semester. If the candidate does not clear the lower examination within stipulated period, the higher result of the candidate will stand automatically cancelled.

4 Semester examination will be open to regular candidates who have been on the rolls of the college and meet the attendance and other requirements as prescribed in the ordinances of the course.

5 Examination Rules

5.1 Paper Setting/Evaluation will be done by an External Examiner or as decided by the Examination Cell.

5.2 Viva Voce/ Practical examination shall be conducted by a Committee consisting of the following:

(i) One external examiner

(ii) One internal examiner

5.3 The supplementary examination will be held along with the routine End Semester Tests. The supplementary paper would be from the syllabi prescribed for that session in which the

candidate is appearing. The student can appear in the theory/practical paper on the payment of the required fee. The candidate will have consecutive two attempts to clear the Supplementary Examination, marks of practical and internal assessment will be carried forward as original.

- 5.4** Re-evaluation of answer sheet in two subjects is allowed after paying the requisite fee. The application for Re-evaluation should be submitted within 15 days of the declaration of the results. In case there is a difference of more than 10% between the marking of the first evaluator and the second evaluator, then the paper would be sent to a third evaluator. The mean of the marks of the second and third evaluators is then considered as the final marks. The re-evaluated marks will be considered final irrespective of the increase or decrease in marks.
- 5.5** A Candidate placed under reappear in any paper, will be allowed two chances to clear the reappear, which should be availed within consecutive two year/chances i.e. to pass in a paper the candidate will have a total of three chances, one as regular student and two as reappear candidate.
- 5.6** The examination of reappear papers of odd semester will be held with regular examination of the odd semester and reappear examination in even semester with the even semester. But if a candidate is placed under reappear in the last semester of the course, he/she will be provided chance to pass the reappear with the examination of the next semester, provided his/her reappear of lower semester does not go beyond next semester.
- 5.7** The students who have reappear in the Vth semester only of three year degree course at undergraduate level, will be allowed to appear in their Reappear examination along with the Final Semester Examinations of their respective courses.
- 5.8** The Principal can provide Golden Chance (with special chance fee) to students who have been unable to clear their exams even after two attempts.
- 5.9 IMPROVEMENT EXAMINATIONS:**
- I.** A student who has been declared 'pass' in the Undergraduate course he/she was admitted to, may apply for improvement within a year from the declaration of the result of the final semester and he/she can take maximum of 50% of the total papers for that course for improvement.
 - II.** A student shall have to appear in End semester examination of the paper chosen for improvement along with the regular students. No special exam shall be held for him/her.
 - III.** If a student fails to improve upon the original marks obtained in the paper chosen for improvement, his/her original marks shall be retained and he/she shall not get a second chance for improvement.
 - IV.** Improvement examination in practical/MST paper shall not be allowed.
 - V.** A student taking improvement examination shall have to pay a fee decided by the college.
- 5.8 Grading System:**
The grades and their description, along with equivalent numerical grade points are listed in the Grading Assignment Table below:

Grade Assignment Table

Range of Marks	Description	Grade	Grade Point
91-100	Outstanding	O	10

81-90	Excellent	A+	9
71-80	Very Good	A	8
61-70	Good	B+	7
51-60	Above Average	B	6
41-50	Average	C	5
35-40	Pass/Fair	P	4
0-34	Fail	F	0
Otherwise	Absent/Detained	Ab/D	0

- A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.
- For non credit courses '**Satisfactory**' or '**Unsatisfactory**' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

5.9 Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$\text{SGPA (Si)} = \frac{\sum(\text{Earned Credits } C_i \times \text{Grade Point } G_i)}{\sum \text{Earned Credits } C_i};$$

Where C_i is the number of credits of the i th course and G_i is the Grade Point Scored by the student in the i th course.

- The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$\text{CGPA (Ci)} = \frac{\sum(\text{Earned Credits } C_i \times \text{SGPA } S_i)}{\sum C_i};$$

Where S_i is the SGPA of the i th semesters and C_i is the total number of credits in that semester.

- The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration of the computation of SGPA and CGPA and Format for Transcripts

i. Computation of SGPA and CGPA

Illustration for SGPA

Course	Credits	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139

Thus, **SGPA = 139/20 = 6.95**

Illustration for CGPA

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 4
Credit : 20 SGPA : 6.9	Credit : 22 SGPA : 7.8	Credit : 25 SGPA : 5.6	Credit : 26 SGPA : 6.0	Credit : 26 SGPA : 6.3	Credit : 25 SGPA : 8.0

$$\text{Thus, CGPA} = \frac{20 \times 6.9 + 22 \times 7.8 + 25 \times 5.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0}{144} = 6.73$$

144

ii. Transcripts (Format):

Based on the above recommendations on Letter grades, grade points, SGPA and CGPA, the College may issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

5.10 Division and Position:

Division shall be awarded in the following manner, to the candidates on the basis of their respective CGPA:

CGPA 7.5 or more	1st	Division with Distinction
CGPA 6.0 or more but less	1st	Division
CGPA 5.0 or more but less	2nd	Division
CGPA 3.5 or more but less	3rd	Division
Otherwise	Fail	

However, First, Second or Third position shall be awarded to the candidates, provided they meet the following conditions:

- a) Rank shall be solely decided on the final CGPA, on completion of degree credit requirement.
- b) The candidate has completed all the prescribed requirements, in the prescribed programme duration.
- c) The candidate has passed / secured valid grades in all the prescribed courses, in the first attempt.
- d) No disciplinary action is pending or has ever been lodged against him/her.
- e) In case of an exceptional tie, both candidates shall be awarded the same rank.

5.11 Grade Card:

At the end of each semester, a student will be given a 'Grade Card' which will contain Course Code, Title, Credits, Grades Awarded, Earned Credits and Earned Point secured by him/her in each course, together with his/her SGPA in that semester. On the completion of the programme, a Final Grade Card will be issued to the student, giving full semester-wise details about the absolute marks and grades obtained by him/her in each course together with his/her SGPA and also the CGPA and Division awarded to him/her.

5.12 Equivalence:

Percentage (P) equivalent to CGPA earned by a candidate may be calculated using the following formula:

$$P = \text{CGPA} \times 10$$

5.13 MALPRACTICES/UNFAIR MEANS

5.13.1 The following shall be deemed to be unfair means:

- I. Leaving the Examination Hall without submitting the answer book to the invigilator or taking away, tearing off or otherwise disposing off the same or any part thereof.
- II. Using abusive language in the examination hall or writing the same in the answer sheet.
- III. Making an appeal to the evaluator through answer sheet.
- IV. Possession by examinee or having access to books, notes, papers, mobile or any other electronic material which can prove to be helpful in the exam.
- V. Any action on the part of candidate at an examination trying to get undue advantage in the performance at examinations or trying to help another, or derive the same.
- VI. Case of Impersonation in the examination.
- VII. Intimidating, threatening, manhandling, using violence, show of force in any form against any invigilator or any person on duty, creating disturbance to the smooth conduct of the examination.
- VIII. Any other action which the Controller Examination / Chief Controller deem fit to be a case of UMC.

5.13.2 In case the student is found to have used any of the above Unfair means:

- I. His/her answer book shall be seized and He/She will be given a new answer sheet.
- II. Invigilator shall submit a detailed report along with the answer book of the student and the related material, if any, to the Centre Superintendent who will subsequently hand it over to Controller Examination.

- III. Written statement to this effect shall be obtained from the student by the Centre Superintendent. In case the student refuses to do the same, the fact of refusal must be recorded.
 - IV. The student reported to have used unfair means shall be allowed to appear in the subsequent papers. However, no marks would be awarded for the paper in which unfair means were used.
 - V. The Principal shall refer the cases of malpractices in Mid Semester tests, House Tests and End Semester Examinations, to an Unfair Means Committee, constituted by him/her for the purpose. Such committee shall follow the approved scales of punishment. The Principal shall take necessary action, against the erring students based on the recommendations of the committee.
- 5.13.3 The involvement of the Staff, who are in charge of conducting examinations, evaluating examination papers and preparing/keeping records of documents relating to the examinations if involved in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and recommended for award of appropriate punishment after enquiry.

6 Attendance Regulations & Condonation:

- 6.1 A student shall be eligible to appear for end semester examinations, if he/she acquires a minimum of 75% of attendance in each subject.
- 6.2 Request to the Principal for Condonation of shortage of attendance after the recommendation of the HOD will be forwarded to Lecture Shortage Condonation Committee. The committee can finally condone the shortage in aggregate up to 15% on medical grounds in each semester.
- 6.3 Any student representing the Institute/ University/ State/ Nation in any Academic/ Sports/ Cultural/Extra Co curricular/ NSS/NCC or any other event shall be considered on duty. His/ Her shortage of lectures shall be condoned, provided that the student is permitted in writing by the Principal/HOD concerned and a certificate to this effect signed by the competent authority where the student attended the event is taken.
- 6.4 A Student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester as applicable.
- 6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end semester examination of that particular semester and their registration for examination shall stand cancelled and no fee shall be refunded.
- 7. Late college students: A candidate, who has completed the prescribed course of instructions for a semester but has not appeared in the examination or having appeared, has failed in the examination, may appear as a late college student within the prescribed period.
- 8. Applications for admission to the examination shall be made on the prescribed form attested by the competent authority as per the college rules.
- 9. Amount of examination fee to be paid by a candidate for each semester shall be as fixed by the College from time to time.
- 10. The last date by which examination forms and fees must reach the College Office shall be as follows.

Semester	Without late fee	With late fee of Rs. 800/-	With late fee of Rs.1200/-	With late fee of Rs.5000/-	With late Fee of Rs. 10,000
Nov./Dec. (Odd)	Sept. 30	Oct.15	Oct. 21	Oct. 31	Nov. 10*
April/May(Even)	Feb. 28	March 15	March 21	March 31	April 15*

***Note: No Examination Form will be accepted after the prescribed date.**

- 11. College medal will be awarded to a candidate who secures first position in the College on the basis of the marks of all the six semesters taken together. The general rules and

conditions of the College/University for the Award of medal/prizes etc. will be applicable in the award of College medal to the topper of this examination.

- 12.** All the question papers except Punjabi Language Paper and English Language Paper will be set in English language and candidates will answer the questions in English language only.
- 13.** The minimum number of marks required to pass each semester examination will be 35% in each paper and 35% in the aggregate of the semester examination. Provided, that in papers with practicals, the percentage shall be required separately in written and practical/lab work.

14. Assessment:

14.1 B.Sc. (CSM) Course will be run on Choice Based Credit System (CBCS) as described in the Introduction.

14.2 The Assessment in each semester of B.Sc. (CSM) Course will be 30% internal and 70% external for each Theory paper. The result of the Internal Assessment shall be conveyed to the students/examination branch by the Head of the Department according to prescribed schedule.

14.3 There shall be Two Mid Semester tests in each Semester.

14.4 Internal Assessment of 30% will be based on Continuous Comprehensive Assessment (CCA) pattern and the breakup of 30% will be as under:

(i)	Average of Two mid Semester Tests	:		40%
(ii)	Assignment/Seminar/Class Test/Tutorial/Quiz etc.	:	40%	
(iii)	Attendance	:		20%

Papers having practical/viva, the marks of theory and practical/viva will be reduced equally percentage wise to make room for 30% internal assessment.

Note: If a case comes to notice of Controller of Examinations where the marks awarded by the Teacher are on a very Higher/Lower side, the award will be got moderated by the following committee.

- I. Paper Evaluator
- II. Head of the Department
- III. Controller of Examination

14.5 A candidate is required to secure at least 35% marks both in external examination (Theory and Practical/Project work) and in internal assessment separately in each paper in order to qualify in an examination.

14.6 In case the student is dissatisfied with the marks awarded to him/her in internal assessment; he/she can approach the concerned teacher. If the student is still not satisfied, he/she may approach the head of department and the Principal subsequently.

15. End-Semester Examination:

End-semester examination(s) of each theory course shall be of three hours duration and will be conducted as per norms and schedule notified by the Controller of Examination. The end semester examinations of laboratory/practical courses and other courses such as seminar, colloquium, field work, project, dissertation etc. shall be conducted as notified by the HOD.

16. Degree Requirement:

16.1 An undergraduate degree with Honours in a discipline may be awarded if a student completes atleast 14 core papers in that discipline, 2 Ability Enhancement Compulsory Courses (AECC), minimum 2 Skill Enhancement Courses (SEC) and 4 papers each from a list of Discipline Specific Elective and Generic Elective papers, respectively.

An undergraduate degree in Science disciplines may be awarded if a student completes 14 core papers each in three disciplines of choice, 2 Ability Enhancement Compulsory Courses (AECC), minimum 4 Skill Enhancement Courses (SEC) and 2 papers each from a list of Discipline Specific Elective papers based on three disciplines of choice selected above, respectively.

An Undergraduate degree in Humanities/ Social Sciences/ Commerce may be awarded if a student completes atleast 4 core papers each in two disciplines of choice, 2 core papers each in English and Hindi/MIL, respectively, 2 Ability Enhancement Compulsory Courses (AECC), minimum 4 Skill Enhancement Courses (SEC), 2 papers each from a list of Discipline Specific Elective papers based on the two disciplines of choice selected above, respectively, and two papers from the list of Generic Electives papers.

16.2 The result of all the examinations will be declared through the College website.

16.3 The grace marks shall be allowed according to the general ordinances relating to 'Award of Grace Marks'. These ordinances will apply to all examinations.

- (i) Grace marks to be given shall be calculated on the basis of 1% of total aggregate marks of all the written and practical papers of the examination concerned. Marks for viva-voice/internal assessment/sessional work/skill in teaching/any additional /optional /deficient subject shall not be taken into account for this purpose. If a fraction works out to half or more, it shall count as one mark and fractional less than half shall be ignored
- (ii) To pass in one or more written papers or subjects, and/or to make up the aggregate to pass the examination but not in sessional work, internal assessment, viva-voice and skill in teaching.
- 16.4** The College may from time to time revise, amend and change the regulations or the curriculum, if found necessary.
- 16.5** The students will be given the facilities of transfer of Credits earned in different recognized/approved Institutions of Higher Education in India and Abroad.
- 16.6** A student who earns total specified credits according to the curriculum and fulfills such other conditions as may be mentioned in the curriculum of the programme, shall be issued the DMC and shall be awarded degree by Punjabi University Patiala. He/she must also pay all College dues as per rules. Moreover, there should be no case of indiscipline pending against him/her.
- 17.** If any student gets admission after concealing any fact or his/her certificates are found fake after verification or he/she misleads the institution as any front or because of any other reason, his/her admission will stand cancelled/ his/her result cancelled though he/she may have been declared pass.
- 18.** In case the ordinance is silent about any issue, it will be decided by the College Principal in consultation with the Academic Advisory Committee of the college in the anticipation of approval of the same by Academic Counsel of the College.

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B.Sc. (CSM)-I Semester- I, II		
Course No.	Course Title	Credit Hours
Semester-I		
BCSM 101	Algebra & Trigonometry	4:4H(L)
BCSM 102	Differential Calculus	4:4H(L)
BCSM 103	Descriptive Statistics and Introductory Probability	5:5H(L)
BCSM 104	Statistics lab –I	1: 2H(P)
BCSM 105	Fundamentals of Information Technology	3:3H(L)
BCSM 106	Programming Using C	3:3H(L)
BCSM 107	Software Lab-I (Based on BCSM 105 & BCSM 106)	2:4H(P)
BCSM 108	English Communication Skills	4:3H(L)+2H(P)
BCSM 109	Punjabi Compulsory	4:3H(L)+2H(P)
BCSM 109A	Punjabi Compulsory(Elementary Punjabi/Mudla Gyan)	
Semester –II		
BCSM 201	Sequence & Series	4:4H(L)
BCSM 202	Plane and Solid Geometry	4:4H(L)
BCSM 203	Probability Theory	5:5H(L)
BCSM 204	Statistics Lab- II	1: 2H(P)
BCSM 205	Data Structures	3:3H(L)
BCSM 206	Data Base Management System	3:3H(L)
BCSM 207	Software Lab-II(Based on BCSM 205 & BCSM 206)	2:4H(P)
BCSM 208	English Communication Skills	4:3H(L)+2H(P)
BCSM 209	Punjabi Compulsory	4:3H(L)+2H(P)
BCSM 209 A	Punjabi Compulsory(Elementary Punjabi/Mudla Gyan)	
GN 201	Drugs Abuse:Problem, Management and Prevention	-:4H(L)

APPROVED

Member Secretary
Academic Council

APPROVED

Principal
General Shivdev Singh Diwan Gurbachan Singh
Khalsa College Patiala

BCSM-101: ALGEBRA AND TRIGONOMETRY
Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75

Internal Assessment: 23

External Examination: 52

Course Objectives: The Primary objective of this course is

-) To recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix.
-) To find eigenvalues and corresponding eigenvectors for a square matrix.
-) To understand the importance of roots of real and complex polynomials
-) To learnt various methods of obtaining roots.
-) To understand the application of De Movire's Theorem to solve numerical problems.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section - A

Hermitian, Skew-Hermitian, Orthogonal and Unitary Matrices, Elementary Operations on Matrices, Linear Independence of row and column vectors, Row Rank, Column Rank and their equivalence. Eigen Values, Eigen Vectors and the characteristic equation of a matrix, Properties of eigen values for special type of matrices, Diagonalization, Cayley-Hamilton theorem, Consistency of a system of linear equations.

Section B

Relations between roots and coefficients of a general polynomial, Transformation of equation, Descarte's rule of signs, Solution of cubic equations (Cardon's method) and Biquadratic equations (Descarte's and Ferrari's method).

De Moivre's theorem and its application, Direct and inverse circular functions, hyperbolic and logarithmic functions, Summation of series.

Books Recommended

1. T. Andreescu and D. Andrica, *Complex Numbers from A to Z*, Birkhauser, 2006.
2. E. G. Goodaire and M. M. Parmenter, *Discrete Mathematics with Graph Theory*, 3rd Edition, Pearson Education (Singapore) Pvt. Ltd., Indian Reprint, 2005.
3. David C. Lay, *Linear Algebra and its Applications*, 3rd Edition, Pearson Education Asia, Indian Reprint, 2007.
4. S. L. Loney, *Plane Trigonometry Part-II*, New Age International Publisher, 2016.

BCSM-102: DIFFERENTIAL CALCULUS

Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75

Internal Assessment: 23

External Examination: 52

Course Objectives: The Primary objective of this course is

Course Objectives: The Primary objective of this course is

-) To understand the concept of functions of one and two variables.
-) To understand the concept of the nth order derivative using Leibnitz theorem.
-) To familiarize with concavity convexity and Asymptotes.
-) To understand the concept of two or more variables for differential calculus.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Functions of one variable: Successive differentiation, nth order derivative of functions, Leibnitz rule and its problems, Cauchy's Mean Value theorem, Taylor's Theorem with Lagrange's and Cauchy's form of remainder, Maclaurian series.

Concavity, Convexity and Points of Inflexion, Asymptotes, Multiple Points, Curvature, Curve Tracing.

Section B

Functions of two variables: Limit and Continuity, Partial Derivatives, Interchange of order of differentiation, Schwarz's and Young's theorems, Differentiability, Homogenous functions, Euler's theorem, Total Derivatives, Taylor's Theorem, Jacobians, Maxima and Minima.

Books Recommended

1. G. B. Thomas, D. M. Weir and J. Hass, *Thomas's Calculus*, 13th Edition, Pearson Education, Delhi, Indian Reprint, 2017.
2. M. J. Strauss, G. L. Bradley and K. J. Smith, *Calculus*, 3rd Edition, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, Indian Reprint, 2011.
3. H. Anton, I. Bivens and S. Davis, *Calculus*, 6th Edition, John Wiley and Sons (Asia) Pvt. Ltd., Singapore, Indian Reprint, 2016.
4. G. Prasad, *Differential Calculus*, 19th Edition, Pothishala Pvt. Ltd., Allahabad, 2016.

BCSM 103: DESCRIPTIVE STATISTICS AND INTRODUCTORY PROBABILITY

Credit: 5:5H (L)

Duration: 3 Hrs.

Max.Marks: 100

Internal Assessment: 30

External Examination: 70

Course Objectives: The Primary objective of this course is

-) To learn various techniques for graphical representation of data.
-) To understand the concept of correlation and regression of data.
-) To study the basic concepts of associated results.
-) To learn the four descriptive measures of frequency distribution: Central tendency, Dispersion, Skewness and Kurtosis.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 10 marks each and section C will consist of 1 compulsory question of short-answer type having 10 parts of 3 marks each covering the entire syllabus uniformly. Scientific non-programmable calculator is allowed.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Concepts of a population and sample, quantitative and qualitative data, nominal, ordinal and time-series data, discrete and continuous data, Diagrammatic representation of data, frequency distributions for discrete and continuous data, graphical representation of a frequency distribution by histogram, frequency polygon, frequency curve and ogives. Measures of central tendency and dispersion, moments, measures of skewness and kurtosis.

Bivariate data: Scatter diagram, principle of least-square and fitting of polynomials and exponential curves.

Section B

Bivariate data: Scatter diagram, Correlation and regression. Karl Pearson coefficient of correlation, principle of least-square, Lines of regression, Spearman's rank correlation coefficient and definition of partial correlation.

Random experiment, sample space, random events, Definition of Probability - classical, relative frequency and axiomatic approaches to probability, merits and demerits of these approaches (only general ideas to be given). Theorems on probability (Additive and multiplicative), conditional probability, independent events, Theorems on total probability, Baye's theorem and its applications.

Books Recommended

1. J.E. Freund, *Mathematical Statistics with Applications*, 8th Edition, Pearson Education, 2014.
2. A.M. Goon, M.K. Gupta and B. Dasgupta, *Fundamentals of Statistics*, Vol. 1, 8th Edition, World Press, Kolkatta, 2005.
3. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 11th Edition, Sultan Chand and Sons, 2014.
4. R.V. Hogg, A.T. Craig and J.W. Mckean, *Introduction to Mathematical Statistics*, 8th Edition, Pearson Education, 2018.
5. A.M. Mood, F.A. Graybill and D.C. Boes, *Introduction to the Theory of Statistics*, 3rd Ed., Tata McGraw Hill Publication, 2007.

BCSM 104: STATISTICS LAB-I

Credit: 1:2H (P)

Duration: 3 hrs

Max Marks: 50

Course Objectives: The Primary objective of this course is to enable students to solve problem based on frequency distribution and construction of histogram, frequency polygon and frequency curve.

Instructions for Paper Setter and Candidates

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the examination will be as under:

Lab. Record: 10

Viva-voce: 10

Exercises: 30

Lab Course:

The exercises will be based on the syllabus of the paper BCSM 103: Descriptive Statistics and Introductory Probability.

BCSM 105: FUNDAMENTALS OF INFORMATION TECHNOLOGY

Credit: 3:3H (L)

Duration: 3 Hrs.

Max.Marks:50

Internal Assessment:15

External Examination: 35

Course Objective

The objective of the course is to understand the basics of Computer, its terminology and different office tools.

Course Learning Outcomes:

After completion of this course students will able to:

CO1: To understand the basic concepts, terminology of IT and familiar with the use of IT tools.

CO2: To Learn and explore new IT techniques in various applications and to identify the issues related to security.

CO3: To learn working knowledge of hardware and software of computer.

CO4: To learn the various features of MS-Office.

Instructions for PaperSetter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short- answer type having 5 questions of 1 mark each and 5 questions of 2 mark each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory questions of section C.

SECTION- A

Basic Concepts: Block diagram of Computer, Characteristics and Types of Computers. Number System: Non-positional and positional number systems, Base conversion, Concept of Bit and Byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other.

Input and Output Devices: Keyboard, Mouse, Joystick, Track Ball, Touch Screen, Light Pen, Scanners– (OMR, MICR, OCR), Displays – CRT, LCD, LED, Printers (Impact and Non-Impact), Speakers and Plotters.

Memories: Types, Units of memory, Primary and Secondary Memory, RAM, ROM, Cache, Storage Device: Hard disk, Compact disk, DVD and Pen Drive.

Languages: Machine, Assembly, High-Level, Translators (Assembler, Compiler and Interpreter), Algorithm and Flow Chart, Application and System Software.

SECTION- B

Windows: Introduction and features of Windows, Installing Windows with set-up, Basic elements of Windows, Starting and Quitting Windows, Windows Explorer, Files, Folders, Flash Drives, Finding Lost or Misplaced Files, Folders, and Programs, Control Panel, Customizing Windows.

MS-WORD: Introduction to Microsoft Word, Basic Editing, Formatting, Templates, Working with Graphics and Pictures, Tables, Desktop Publishing, Mail Merge, Proofing, Printing, and Publishing, Comparing, Merging, and Protecting Documents.

MS-POWERPOINT: Introduction to Microsoft PowerPoint, Using Themes and Layouts, Inserting Text and Using WordArt, Inserting Graphics (Tables, Charts, Shapes, Clip-Art), Working with Videos, Movie-Clips, Animations, and Transitions, Sounds, Editing, Saving, Printing and Publishing Tools, Help.

MS-EXCEL: Introduction to MS Excel, Worksheets and Workbooks, Entering Information into MS Excel, Formatting a Worksheet, Adding Elements to a Workbook, Charts, Formulas and Calculations, Statistical and financial functions.

Suggested Readings:

1. *P.K. Sinha and P. Sinha, Computer Fundamentals, BPB Publications.*
2. *Turban Mclean and Wetbrete, Information Technology and Management, Wiley Publications.*
3. *Satish Jain, Information Technology, BPB Publications.*
4. *Ed Bott and Woody Leonhard, Special Edition Using Microsoft Office.*

BCSM 106: PROGRAMMING USING C

Credit: 3:3H (L)

Duration: 3 Hrs.

Max.Marks:50

Internal Assessment:15

External Examination: 35

Course ObjectiveThe objective of the course is to understand the basics of 'C' Programming and to make students capable enough to do programming with 'C'.

Course Learning Outcomes:

After completion of this course students will able to:

CO1: Describe basics, various Data types, operators in C.

CO2: Explain, Control Structures, Functions in C.

CO3: Understand the concepts of different user-defined data types such as arrays, structures etc.

CO4: Learn pointers and summarize the different File handling operations

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short- answer type having 5 questions of 1 mark each and 5 questions of 2 mark each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory questions of section C.

SECTION-A

Fundamentals of C: Introduction to C, Historical Development, Problem Solving Process, Character Set, Keywords, Identifiers, Constants, Variables, Rules for defining variables, Data Types.

Operators and expressions: Arithmetic, Relational, Logical, Assignment, Conditional, Unary, Bitwise, Comma Operators, Expressions, Type Conversion, Operator Precedence, Associativity, Library functions, Input/Output Statements.

Control Statements: Decision Control statements-if, if-else, nested if else, switch statement, Jumping Statements-break statement, continues statement, goto statement, Loops Control Statements-while loop, for loop, do-while loop, nested loops.

Functions: Need of Function, Declaration, Definition and calling Function, Methods of Parameter Passing-Call by Value and Call by Reference.

SECTION- B

Pre-Processor directives: #include, #define, #undef, #ifdef, #ifndef, #if, #else, #elif and #endif. Storage Classes-Automatic, Static, Register and External.

Array: Definition, Declaration, Initialization, Types of Array, One Dimensional Array, Multi- Dimensional Array, Strings- Input/Output of Strings, String Handling Functions (strlen, strcpy, strcmp, strcat and strrev), Table of Strings.

Structure and Union: Definition and Declaration, Using Structures, Array in Structure, Array of Structure, union, Differences between Structure and Union.

Pointer: Definition, Pointer Declaration, Pointer Arithmetic, Pointer and Array, Pointer and Function, Pointer and Structure.

Suggested Readings:

1. *Yashwant Kanetkar, Let Us C, BPB Publications*
2. *E. Balagurusamy, Programming in C, Tata McGrawHill.*
3. *Kamthane, Programming with ANSI and Turbo C, Pearson Education*
4. *Dennis Ritchie, The C Programming Language Prenticehall.*

BCSM 107: SOFTWARE LAB-I (BASED ON BCSM 105 & BCSM 106)
Credit: 2:4H (P)

Maximum Marks: 50

Internal Assessment:15

Pass Marks: 35%

This laboratory course will comprise of exercises to supplement what is learnt under paper BCSM 105 and BCSM 106. Students are required to develop the programs with internal documentation. The breakup of external 35 marks for the final practical will be asunder:-

)	Viva Voce (External Evaluation)	15Marks.	
)	Lab Record, Program Development and Execution (ExternalEvaluation)		20Marks.

List of Activities (Based on BCSM 105) MS-Excel

Activity 1:

1. Create, open, save and close workbook.
2. Create a new worksheet, renaming and movingsheet.
3. Entering, copying, moving and deleting data in cells andworksheets.
4. Insert and delete cells, columns and rows inMS-Excel.

Activity 2:

Formatting of data in cells:-

1. Text formatting (font size, font style, font color, Cell borderetc.)
2. Text Alignment.
3. Text Orientation, Text Direction, TextControl.

Activity 3:

1. Find and replace data in asheet.
2. Perform data sorting and data filtering inMS-Excel.
3. Protect your Worksheet andWorkbook?
4. Enter and perform some basic formulas inms-excel.

Activity 4:

1. Perform some basic Functions inMS-Excel.
2. Create a chart inMS-Excel.
3. Create different types of Charts inexcel.
4. Set a size, margin, orientation of page inMs-Excel.
5. The print properties of a worksheet inMS-Excel.16

Activity 5:

1. Hide and unhide row and column inMS-Excel.
2. Set column width and row height inMS-Excel.
3. Adding text Box, header/footers, pictures and special symbols in yourworksheet.
4. Arranging, splitting and hiding windows in MS-Excel. And also freezingpanes
5. Create and run Macros inMS-Excel.

MS-Word

Activity 1:

1. Create, open, save and close a document.
2. Typing, copying, moving and deleting data in a word document.
3. Perform Save and Save as, Cut and Copy, Paste and Paste Special.

Activity 2:

Formatting of data in word Document:-

1. Text formatting (font size, font style, font color, subscript, superscript, upper/lowercase etc.)
2. Text Alignment and characterspacing.
3. Indention and linespacing.
4. Border and shading.
5. Bullets and Numbering

Activity 3:

1. Find and replace and data sorting in a document.
2. Protect your document.
3. Add chart in word document. Create different types of Charts in word.
4. Set a size, margin, orientation of page, Hyphenation, Columns and Line Numbers in MS-Word.

Activity 4:

1. Set Page Color, Page Border, Themes, and Watermarks in MS-Word.
2. Adding Tables, header/footers, pictures, page numbers and special symbols, Text Box in your word document.
3. Showing Ruler, Gridlines, Document Map, Thumbnails, Inserting Word Art, Drop Cap, Hyperlink, Equation etc. in word document

Activity 5:

1. Arranging, splitting windows in MS-word?
2. Perform Mail-merge in MS-word.
3. Create and run Macros in MS-Word.
4. Set the print properties of a word document.

MS-PowerPoint

Activity 1:

1. Create, open, save and close a Presentation.
2. Typing, copying, moving and deleting data in presentation.
3. New Slide, understanding Slide Layout, adding and deleting slides.

Activity 2:

Formatting of data in slides:-

1. Text formatting (font size, font style, font color, subscript, superscript, upper/lower case etc.)
2. Text Alignment and characterspacing.
3. Indention and linespacing.
4. Border and shading.
5. Bullets and Numbering

Activity 3:

1. Set a size, margin, orientation of slides in PowerPoint.
2. Adding Tables, header/footers, pictures, page numbers and special symbols, Text Box etc. in your presentation.

Activity 4:

1. Adding Animation and Transition Effects in Slides, Understanding Slide Show
2. Presentation Views, Understanding Formatting commands in PowerPoint

Activity 5:

1. Create and run Macros in PowerPoint.
2. Arranging, splitting windows in MS-PowerPoint.

List of Programs (Based on BCSM 106)**Write a Program....**

1. To convert temperature from Fahrenheit to Celsius.
2. To find simple interest and compound interest.
3. To check whether the given number is even number or odd.
4. To accept three numbers and find the largest among them.
5. To find factorial of a number.
6. To check whether a number is prime or not.
7. To print all the Armstrong numbers between any 2 given limits.
8. To find largest element in an array.
9. To check whether a string is a Palindrome.
10. To perform matrix addition.
11. To perform matrix multiplication.
12. To swap two numbers using function.
13. To find the factorial of a number.
14. To find the nth Fibonacci number.
15. To create an employee structure and display the same.
16. To swap two numbers using pointers.

BCSM 108: ENGLISH COMMUNICATIONS SKILL

Credit:4:4H(L)

Time:3 hour

Periodsperweek:5

PassMarks:35%

MaximumMarks:100

Theory:70marks

InternalAssessment:30 marks

Course Outcome (CO1) English Communication Skills

After the successful completion of this course, the students will be able to:

- Gain wide understanding about the value of the play and their attitudes towards play
- Explore and describe their feelings and emotions when moving in different situations
- Gain proper knowledge about a useful revision document or study aid for future
- Understand how to select, organize and connect data and information that is particularly relevant and important to a deeper understanding of the subject
- Enrich their knowledge of writing complete, concise, concrete and clear business or official letters
- Recognize and incorporate proper grammar and mechanics of writing including parts of speech, verb tense, subject-verb agreement, word choice, spelling, commas, and other punctuation

Section-A

PrescribedText:*DiverseVoices*,Department ofEnglish, Khalsa College Patiala,2017

The speeches of thefollowingspeakers areto bestudied:

1. Helen Adams Keller
2. Jawaharlal Nehru
3. Subhas ChandraBose
4. Nelson Mandela
5. MartinLuther KingJr.
6. A.P.JAbdul Kalam
7. DalaiLama
8. Ratan Tata
9. SteveJobs
10. Aisha Chaudhary

Testing:

Q1. (a) One essaytype question withaninternal alternative on summaryand centralidea in about 250 words. 12 marks

(b)Fiveshort answertype questions to be attempted out of thegiveneightfrom the prescribedtext inabout30-40 words each. 5X3=15marks

Section-B

Q.2. WritingSkills:

(a)ReportWriting: Analyticaland Action Report

Testing: Onereport to beattempted out of the giventwo. 10 marks

(b)Developing astoryfrom the given hints. 7 marks

Q.3. Grammar and Vocabulary

(a)Grammar

PrescribedText:*OxfordPracticeGrammar*byJohn Eastwood, Oxford UniversityPress, 2006

1. Ex. 1-20 10marks

Testing:Attempt any10sentences out of the given 12

2. Ex.21-39 10 marks

Testing: Attempt any10 sentences out of the given 12

(b)Vocabulary

PrescribedText:*TheStudents' Companion*byWilfredD. Best, HarperCollins Publishers, 2010

1. Antonyms: pages128 to 130

Testing: Attemptall 6 Antonyms 3 marks

2. Synonyms: pages132 to 134

Testing: Attemptall 6 Synonyms 3 marks

INTERNAL ASSESSMENT

30 Marks

Internal Assessment will be given on the basis of attendance, MSTs and over-all performance in the class. There will also be an internal viva based on the following topics of practical relevance. The teachers should focus on enhancing the skills of the students in writing, speaking and reading. One period per week will be allotted for covering these topics:-

- 1 Résumé Writing
- 2 Dialogue delivery on a given situation
3. Facing an interview
4. Reading newspaper

Note: A Scrap Book to be made by the student on the given topics.

Suggested Readings

-) The Written Word by Vandana R. Singh, Oxford University Press, 2006
-) Essential English Grammar by Raymond Murphy, Cambridge University Press (2nd ed.), 2009
-) Advanced Grammar in Use by Martin Hewings. Cambridge University Press (2nd ed.), 2008
-) English Vocabulary in Use by Michael MacCarthy and Felicity O'Dell. Cambridge University Press, 2008

BCSM 109: PUNJABI COMPULSORY

ਕ੍ਰੈਡਿਟ: 4(3+1)

ਕੁੱਲ ਅੰਕ: 100 ਅੰਕ

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ: 70 ਅੰਕ

ਨੋਟ: ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿੱਚੋਂ ਅਲੱਗ-ਅਲੱਗ 35% ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ: 05

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ: 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ: 30 ਅੰਕ

Course Outcome

1. ਵਿਦਿਆਰਥੀ ਇਸ ਰਾਹੀਂ ਜੀਵਨ- ਜਾਚ, ਨੈਤਿਕ ਕਦਰਾਂ ਕੀਮਤਾਂ, ਆਧੁਨਿਕ ਯੁੱਗ ਵਿਚ ਬਜ਼ੁਰਗਾਂ ਦਾ ਸਤਿਕਾਰ ਅਤੇ ਰਿਸ਼ਤਿਆਂ ਦੀ ਟੁੱਟ-ਭੱਜ ਨੂੰ ਸਮਝਣ ਅਤੇ ਹਾਂ ਪੱਖੀ ਰਵੱਈਏ ਨੂੰ ਅਪਨਾਉਣ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦਾ ਹੈ।
2. ਵਿਦਿਆਰਥੀ ਆਧੁਨਿਕ ਕਥਾ ਕਹਾਣੀਆਂ ਰਾਹੀਂ ਸਮਕਾਲੀ, ਸਮਾਜਿਕ, ਆਰਥਿਕ, ਰਾਜਨੀਤਿਕ, ਧਾਰਮਿਕ ਪ੍ਰਸਥਿਤੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦਾ ਹੈ।
3. ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਸੰਸਾਰ ਦੀਆਂ ਹੋਰ ਭਾਸ਼ਾਵਾਂ ਨੂੰ ਸ਼ੁੱਧ ਰੂਪ ਵਿਚ ਬੋਲਣ, ਸਿੱਖਣ ਅਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੋ ਜਾਂਦਾ ਹੈ।
4. ਵਿਦਿਆਰਥੀ ਵੱਖੋ-ਵੱਖਰੇ ਖਿੱਤੇ ਵਿੱਚ ਬੋਲੀਆਂ ਜਾਣ ਵਾਲੀਆਂ ਪੰਜਾਬੀ ਦੀਆਂ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਰਾਹੀਂ ਵੱਖੋ-ਵੱਖਰੇ ਕਿੱਤਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਸ਼ਬਦਾਵਲੀ ਨੂੰ ਜਾਣਨ ਅਤੇ ਸਮਝਣ ਦੇ ਕਾਬਲ ਹੋ ਜਾਂਦੇ ਹਨ।

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਭਾਗ-ਉਕਥਾ-ਵਾਰਤਾ (ਕਹਾਣੀ ਸੰਗ੍ਰਹਿ) ਮੁੱਖ ਸੰਪਾਦਕ - ਡਾ. ਲਖਵੀਰ ਸਿੰਘ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ।

ਭਾਗ ਅ-1 ਵਿਆਕਰਨ

I ਪੰਜਾਬੀ ਧੁਨੀਆਂ: ਖੰਡੀ ਧੁਨੀਆਂ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਸਵਰਾਂ ਅਤੇ ਵਿਅੰਜਨਾਂ ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਉਚਾਰਨ ਅੰਗਾਂ, ਉਚਾਰਨ ਸਥਾਨ ਅਤੇ ਉਚਾਰਨ ਵਿਧੀ ਅਨੁਸਾਰ ਵਰਗੀਕਰਣ। ਅਖੰਡੀ ਧੁਨੀਆਂ (ਬਲ, ਸੁਰ ਤੇ ਵਾਕ-ਸੁਰ, ਨਾਸਿਕਤਾ) ।

II ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ: ਪਰਿਭਾਸ਼ਾ, ਮੁੱਢਲੇ ਸੰਕਲਪ, ਮੂਲ ਰੂਪ, ਅਗੇਤਰ, ਪਛੇਤਰ, ਵਿਉਂਤਪਤ ਰੂਪ ਅਤੇ ਰੂਪਾਂਤਰੀ ਰੂਪ ।

ਅ-2 ਪੈਰਾ ਰਚਨਾ (ਸਮਾਜਿਕ, ਧਾਰਮਿਕ, ਸੱਭਿਆਚਾਰਕ, ਵਾਤਾਵਰਣ)

ਭਾਗ- ਏਸਥਾਨਕ ਕਾਲਜ ਦੇ ਪੰਜਾਬੀ ਵਿਭਾਗ ਵੱਲੋਂ ਤਿਆਰ ਕੀਤੀ ਗਈ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦੇ ਆਪਣੀ ਆਪਣੀ ਫੈਕਲਟੀ ਨਾਲ ਸੰਬੰਧਤ ਭਾਗ ਦੇ ਪਹਿਲੇ 100 ਸ਼ਬਦਾਂ ਦਾ ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ।

ਭਾਗ-ਸ ਭਾਗ ਓ ਤੇ ਵਿਆਕਰਨ ਦੇ ਅ-1 ਵਾਲੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ਓ ਵਿੱਚੋਂ ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ ਸਾਰ/ਕਹਾਣੀ ਕਲਾ ਅਤੇ ਪੰਜਾਬੀ ਸਾਹਿਤ ਵਿੱਚ ਲੇਖਕ ਦਾ ਸਥਾਨ ਸਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
2. ਕਹਾਣੀਆਂ ਵਿਚਲੇ ਪਾਤਰਾਂ ਦਾ ਪਾਤਰ- ਚਿਤਰਨ (ਚਾਰ ਵਿੱਚੋਂ ਕੋਈ ਦੋ) 4+4=8 ਅੰਕ
3. ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਅ-1 ਨਾਲ ਸੰਬੰਧਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ । (ਦੋ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
4. ਭਾਗ ਅ-2 ਵਿਚਲੇ ਵਿਸ਼ਿਆਂ 'ਤੇ ਪੈਰਾ ਰਚਨਾ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 08 ਅੰਕ
5. ਵੱਖਰੀ-ਵੱਖਰੀ ਫੈਕਲਟੀ ਨਾਲ ਸੰਬੰਧਤ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦੇ ਪਹਿਲੇ ਭਾਗ ਦੇ 100 ਤਕਨੀਕੀ ਸ਼ਬਦਾਂ ਦਾ ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ। (ਪੱਚੀ ਵਿੱਚੋਂ ਕੋਈ ਵੀਹ) 10 ਅੰਕ
6. ਭਾਗ ਸ ਵਿਚ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 10 ਪ੍ਰਸ਼ਨ, ਭਾਗ ਓ ਅਤੇ ਅ-1 ਦੀਆਂ ਪੁਸਤਕਾਂ ਵਿਚੋਂ ਬਰਾਬਰ ਪੁੱਛੇ ਜਾਣਗੇ। ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਵਿਚ ਉੱਤਰ ਦੇਣੇ ਹੋਣਗੇ ਅਤੇ ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਦੋ ਅੰਕ ਹੋਣਗੇ।

10x2=20 ਅੰਕ

(ਨੋਟ: ਪੇਪਰ ਵਿਚ ਭਾਗ ਅ ਦੇ ਅ.2 ਅਤੇ ਏ ਵਿਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ ਨਹੀਂ ਪੁੱਛੇ ਜਾਣਗੇ)।

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

30 ਅੰਕ

ਨੋਟ: ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ ਲਈ ਅਧਿਆਪਕ ਵੱਲੋਂ ਕਰਵਾਏ ਗਏ ਕਾਰਜਾਂ ਤੇ ਆਧਾਰਿਤ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਇੱਕ ਫਾਇਲ ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ ਜਿਸ ਦੇ ਅੰਕ ਨਿਸ਼ਚਿਤ ਹੋਣਗੇ ਅਤੇ ਇਹ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦਾ ਹਿੱਸਾ ਹੋਵੇਗੀ। ਇਸ ਲਈ ਦੋ ਪੀਰਿਅਡ ਪ੍ਰਤਿ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਹੇਠ ਲਿਖੇ ਕਾਰਜ ਕਰਨਗੇ।

- ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਉਚਾਰਣ/ਲਿਖਣ ਦਾ ਅਭਿਆਸ
- ਅਖ਼ਬਾਰਾਂ ਤੇ ਰਸਾਲਿਆਂ ਵਿਚ ਛਪੇ ਸਾਹਿਤ ਸਬੰਧੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ
- ਪਾਠਕ੍ਰਮ ਨਾਲ ਸਬੰਧਿਤ ਅਸਾਈਮੈਂਟ ਤਿਆਰ ਕਰਨਾ
- ਕਾਲਜ ਦੇ ਕਿਸੇ ਸਮਾਗਮ/ਵਿਦਿਅਕ ਟੂਰ ਦੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ

ਸਹਾਇਕ ਪਾਠ- ਸਮੱਗਰੀ

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5. ਪ੍ਰੋਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ, **ਸਿਧਾਂਤਕ ਭਾਸ਼ਾ ਵਿਗਿਆਨ**, ਮਦਾਨ ਪਬਲਿਸਰਜ਼, ਪਟਿਆਲਾ,2002.
6. ਹਰਕੀਰਤ ਸਿੰਘ, **ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ**, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ, 1986.

Note:- Those students who have not studied Punjabi up to matriculation can opt for Punjabi Compulsory (Elementary Punjabi/Mudla Gyan). Other students will study compulsory Punjabi.

BCSM 109-A:PUNJABI COMPULSORY (ELEMENTARY PUNJABI/MUDLA GYAN)

ਕ੍ਰੈਡਿਟ :4(3+1)

ਕੁੱਲ ਅੰਕ : 100

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆਦਾ ਸਮਾਂ : 3 ਘੰਟੇ

ਨੋਟ: ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿਚੋਂ ਅਲੱਗ ਅਲੱਗ 35%ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

Course Outcome

1. ਵਿਦਿਆਰਥੀ ਇਸ ਰਾਹੀਂ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਵਰਤਣ ਵਾਲੀ ਲਿਪੀ (ਵਰਣਨਮਾਲਾ) ਤੋਂ ਜਾਣੂ ਹੋਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
2. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਬੋਲਣ, ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
3. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਰੋਜ਼ਾਨਾ ਪੰਜਾਬੀ ਜੀਵਨ ਵਿੱਚ ਵਰਤੀ ਜਾਣ ਵਾਲੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਪਾਠ ਪੁਸਤਕ: ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (ਭਾਗ ਪਹਿਲਾ), ਡਾ. ਪੁਸ਼ਪਿੰਦਰ ਕੌਰ, ਖ਼ਾਲਸਾ ਕਾਲਜ, ਪਟਿਆਲਾ, 2018.

ਭਾਗ -ੳ

ੳ.1 ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ:

- (1) ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ ਅਤੇ ਲਿਖਣ ਦੇ ਨਿਯਮ
- (2) ਅੱਖਰ ਸਿੱਖਿਆ: ਤਰਤੀਬਵਾਰ ਤੇ ਭੁਲਾਵੇਂ ਅੱਖਰ

ੳ.2 ਮਾਤਰਾ ਰਹਿਤ ਸ਼ਬਦ ਜੋੜ:

- (1) ਦੋ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਜੋੜ
- (2) ਤਿੰਨ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਜੋੜ
- (3) ਬਹੁ- ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਜੋੜ

10+10=20 ਅੰਕ

ਭਾਗ -ਅ

ਅ.1 ਪੰਜਾਬੀ ਧੁਨੀ ਪ੍ਰਬੰਧ:

- (1) ਸਵਰ: ਪਰਿਭਾਸ਼ਾ, ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ
- (2) ਵਿਅੰਜਨਾਂ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ

ਅ.1 ਲਗਾਖਰ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ:

- (4) ਲਗਾਖਰਾਂ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ
- (5) ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣਾਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ

10+10=20 ਅੰਕ

ਭਾਗ -ੲ

ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਜਾਣ ਪਛਾਣ:

- (1) ਗਿਣਤੀ (1 ਤੋਂ 50 ਤੱਕ) ਸ਼ਬਦਾਂ ਵਿਚ
- (2) ਹਫ਼ਤੇ ਦੇ ਦਿਨਾਂ ਦੇ ਨਾਂ
- (3) ਅੰਗਰੇਜ਼ੀ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ
- (4) ਦੇਸੀ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ
- (5) ਰੰਗਾਂ ਦੇ ਨਾਂ
- (6) ਫ਼ਲਾਂ-ਸਬਜ਼ੀਆਂ ਦੇ ਨਾਂ

5+5=10 ਅੰਕ

ਭਾਗ-ਸ

ਸਾਰੇ ਸਿਲੇਬਸ 'ਤੇ ਅਧਾਰਿਤ 10 ਅਬਜੈਕਟਿਵ ਟਾਈਪ ਪ੍ਰਸ਼ਨ।

10×2= 20 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਵਿਦਿਆਰਥੀ ਪਹਿਲੀ ਵਾਰ ਗੁਰਮੁਖੀ ਸਿਖ ਰਹੇ ਹਨ। ਹੋ ਸਕਦਾ ਹੈ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੋਂ ਅਣਜਾਣ ਹੋਣ। ਸੋ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਪੱਧਰ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੀ ਸੀਮਾ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰੱਖ ਕੇ ਨਿਸ਼ਚਿਤ ਕੀਤਾ ਜਾਵੇ।
2. ਸਰਲ ਅਤੇ ਸਪੱਸ਼ਟ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ।
3. ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ ਨਾ ਪੁੱਛੇ ਜਾਣ।
4. ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਲਿਪੀ ਦਾ ਬੋਧ ਕਰਵਾਉਣ ਲਈ ਧੁਨੀਆਂ, ਲਿਪੀ ਚਿੰਨ੍ਹਾਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਸਬੰਧੀ ਸੰਖੇਪ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ।
5. ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟ ਜਾਂ ਚੋਣ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ।

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ

30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ: ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ ਲਈ ਅਧਿਆਪਕ ਵੱਲੋਂ ਕਰਵਾਏ ਗਏ ਕਾਰਜਾਂ ਤੇ ਆਧਾਰਿਤ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਇੱਕ ਫਾਇਲ ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ ਜਿਸ ਦੇ ਅੰਕ ਨਿਸ਼ਚਿਤ ਹੋਣਗੇ ਅਤੇ ਇਹ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦਾ ਹਿੱਸਾ ਹੋਵੇਗਾ। ਇਸ ਲਈ ਦੋ ਪੀਰਿਅਡ ਪ੍ਰਤੀਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਹੇਠ ਲਿਖੇ ਕਾਰਜ ਕਰਨਗੇ।

- ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਉਚਾਰਣ/ਲਿਖਣ ਦਾ ਅਭਿਆਸ
- ਅਖ਼ਬਾਰਾਂ ਤੇ ਰਸਾਲਿਆਂ ਵਿਚ ਛਪੇ ਸਾਹਿਤ ਸਬੰਧੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ
- ਪਾਠਕ੍ਰਮ ਨਾਲ ਸਬੰਧਿਤ ਅਸਾਈਮੈਂਟ ਤਿਆਰ ਕਰਨਾ
- ਕਾਲਜ ਦੇ ਕਿਸੇ ਸਮਾਗਮ/ਵਿਦਿਅਕ ਟੂਰ ਦੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ

ਨੋਟ: ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਵਿਭਾਗ ਵੱਲੋਂ ਪ੍ਰਕਾਸ਼ਿਤ ਕੀਤੀ ਗਈ ਪਾਠ ਪੁਸਤਕ ਉੱਤੇ ਹੀ ਆਧਾਰਿਤ ਹੋਵੇ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਲਈ ਪੁਸਤਕ ਦੇ ਪਿੱਛੇ ਦਿੱਤੇ ਗਏ ਨਮੂਨਾ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਸਟਾਇਲ ਨੂੰ ਆਧਾਰ ਬਣਾਇਆ ਜਾਵੇ।

ਸਹਾਇਕ ਪੁਸਤਕ ਸੂਚੀ

1. ਸਤਿਨਾਮ ਸਿੰਘ ਸੰਧੂ, **ਆਓ ਪੰਜਾਬੀ ਸਿਖੀਏ**, (ਹਿੰਦੀ ਤੋਂ ਪੰਜਾਬੀ ਸਿੱਖਣ ਲਈ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2009.
2. ਸਤਿਨਾਮ ਸਿੰਘ ਸੰਧੂ, **ਗੁਰਮੁਖੀ ਸਿੱਖੋ**, (ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਸਿੱਖਣ ਲਈ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2011.
3. ਸੀਤਾ ਰਾਮ ਬਾਹਰੀ, **ਪੰਜਾਬੀ ਸਿਖੀਏ**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2002. (ਹਿੰਦੀ)।
4. ਰਾਜਿੰਦਰ ਸਿੰਘ, **ਪੰਜਾਬੀ ਗਿਆਨ ਸੀ.ਡੀ.** (ਕੰਪਿਊਟਰ ਐਪਲੀਕੇਸ਼ਨ ਟੂ-ਲਰਨ ਐਂਡ ਟੀਚ ਪੰਜਾਬੀ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2011.
5. Hardev Bahri, **Teach Yourself Punjabi**, Punjabi University, Patiala, 2011.
6. Henry A. Gleason and Harjeet Singh Gill, **A Start in Punjabi**, Punjabi University, Patiala, 1997.
7. Ujjal Singh Bahri and Paramjit Singh Wallia, **Introductory Punjabi**, Punjabi University, Patiala, 2011.

ਨੋਟ: Only those students who have not studied Punjabi up to matriculation can opt for Punjabi Compulsory (Elementary Punjabi/Mudla Gyan). Other students will study Compulsory Punjabi.

SEMESTER II
BCSM 201: SEQUENCE AND SERIES
Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75
Internal Assessment: 23
External Examination: 52

Course Objectives: The Primary objective of this course is

-) To assimilate the notions of limit of a sequence and convergence of a sequence of real numbers.
-) To recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
-) To test convergence and divergence of infinite series of real numbers.
-) To give knowledge of different kinds of convergence criterion for series
-) To give knowledge of different kinds of tests for convergence/ divergence.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Sequences, Bounded and unbounded sequences, Convergence and divergence of sequence, Limit of a sequence, Algebra of convergent sequences, Monotone Sequences, Monotone Convergence Theorem, Cauchy's first and second theorem on limits, Cauchy Stolze's Theorem, Cesaro's Theorem.

Subsequences, peak point of sequence, Divergence Criteria, Monotone Subsequence Theorem, Bolzano Weierstrass Theorem for Sequences, Sub - sequential limits of a sequence, Cauchy sequence, Cauchy's Convergence Criterion.

Section B

Infinite series, convergence and divergence of infinite series, Alternating series, Leibnitz test, Absolute and Conditional convergence, Cauchy's Criterion, Series with positive terms Standard tests of convergence(without proof): Comparison test, Root Test and Ratio Test, Cauchy's Condensation test, Kummer's Test, Raabe's Test, Logarithmic Test, Gauss Test and Integral test, Abel's and Driehlet's Test. Re-arrangement of absolutely convergent series, Reimann's re-arrangement theorem.

Books Recommended

1. R.G. Bartle and D. R. Sherbert, *Introduction to Real Analysis*, 3rd Edition, John Wiley (Asia) Pvt. Ltd., Singapore, 2002.
2. G. Bilodeau, P. Thie, G. E. Keough, *An Introduction to Analysis*, 2nd Edition, Jones & Bartlett, 2010.
3. B. S. Thomson, J. B. Bruckner and A. M. Bruckner, *Elementary Real Analysis*, 2nd Edition, Prentice Hall, 2001.
4. S. K. Berberian, *A First Course in Real Analysis*, Springer Verlag, New York, 1994.
5. S.C. Malik and S. Arora, *Mathematical Analysis*, New Academic Science Publisher, 2017

BCSM 202- PLANE AND SOLID GEOMETRY

Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75

Internal Assessment: 23

External Examination: 52

Course Objectives: The Primary objective of this course is

-) To understand the properties of ellipse, parabola and hyperbola.
-) To be well-versed with sphere, cone and cylinder
-) To enable the students to aware the applications of plane and solid geometry.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Transformation of axes, shifting of origin, rotation of axes, reduction of the second degree equation into standard forms by transformation of co-ordinates. The invariants t , Δ and θ . Identification of curves represented by second degree equation.

Parabola, Ellipse, Hyperbola: Pole and polar, pair of tangents from a point, chord of contact, equation of the chord in terms of midpoint and diameter of conic.

Conjugate diameters, Conjugate hyperbola, Asymptotes of a hyperbola, rectangular hyperbola.

Section B

Sphere: General equation of a sphere, Plane section of a sphere, Intersection of two spheres, Sphere through a given circle, Intersection of a straight line and a sphere, Equation of a tangent plane to sphere, Condition of tangency, Plane of contact, Orthogonal Spheres, Angle of intersection of two spheres, Length of tangent, radical plane, coaxial system of spheres.

Cone: Equation of a cone whose vertex is at origin, Equation of a cone with a given vertex and a given conic as base, Condition that general equation of second degree represent a cone, Equation of a tangent plane, Condition of tangency of a plane and a cone, Reciprocal cone, Right circular cone.

Cylinder: Tangent plane, Enveloping cylinder, Cylinder as Limiting form of cone.

Books Recommended

1. S. L. Loney, *The Elements of Coordinate Geometry*, Macmillan and Company, London, 1895.
2. G. Prasad and H.C. Gupta, *Text Book on Coordinate Geometry*, Pothishala Pvt. Ltd., Allahabad, 2000.
3. P. K. Jain and Khalil Ahmad, *A Text Book of Analytical Geometry of two Dimensions*, Wiley Eastern Ltd., 1994.
4. N. Saran and R. S. Gupta, *Analytical Geometry of Three Dimensions*, Pothishala Pvt. Ltd., Allahabad, 2017.
5. R. J. T. Bell, *Elementary Treatise on Coordinate Geometry of Three Dimensions*, Macmillan India Ltd., 1994.

BCSM 203: PROBABILITY THEORY

Credit: 5:5H (L)

Duration: 3 Hrs.

Max. Marks: 100

Internal Assessment: 30

External Examination: 70

Course Objectives: The Primary objective of this course is

-) To understand the concept of random variables, probability mass function, probability density function.
-) To study various discrete and continuous distribution.
-) To study the applications of CLT.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 10 marks each and section C will consist of 1 compulsory question of short-answer type having 10 parts of 3 marks each covering the entire syllabus uniformly. Scientific non-programmable calculator is allowed. Table for area under normal probability curve is required.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Random variables: Discrete and continuous random variables, probability mass function, probability density function and cumulative distribution function, illustrations of random variables and its properties, expectation of random variable and its properties, Moments and cumulants, moment generating function, cumulants generating function and characteristic function, Transformation in univariate and bivariate distributions.

Section B

Bivariate probability distributions; marginal and conditional distributions; independence of variates (only general idea to be given). Binomial, Poisson, negative binomial and Normal distribution and their properties. Statement and application of Chebychev's inequality, Weak law of large numbers and Strong law of large numbers, De-Moivre's Laplace Theorem, Central limit theorem and its applications.

Books Recommended

1. A.M. Goon, M.K. Gupta and B. Dasgupta, *An outline of Statistical Theory (Vol. I)*, 4th Edition, World Press, Kolkata, 2003.
2. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 11th Edition, Sultan Chand and Sons, 2007.
3. R.V. Hogg, A. T. Craig and J.W. Mckean, *Introduction to Mathematical Statistics*, 6th Edition Pearson Education, 2005.
4. A. M. Mood, F. A. Graybill and D.C. Boes, *Introduction to the Theory of Statistics*, 3rd Edition, Tata McGraw Hill Publication, 2007.
5. V. K. Rohtagi and A. K. Md. E. Saleh, *An Introduction to Probability and Statistics*, 2nd Edition, John Wiley and Sons, 2009.
6. S.A. Ross, *Introduction to Probability Models*, 9th Edition, Academic Press, 2007
7. P.L.Meyer, *Introductory Probability and Statistical Applications*, 2nd Edition, Oxford and IBH Publishing, 2017

BCSM 204: STATISTICS LAB-II

Credit: 1:2H (P)

Duration: 3 hrs

Max Marks: 50

Instructions for Paper Setter and Candidates

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the examination will be as under:

Lab. Record: 10

Viva-voce: 10

Exercises: 30

Lab Course:

The exercises will be based on the syllabus of the paper BCSM 203: Probability theory

BCSM 205: DATA STRUCTURES

Credit: 3:3H (L)

Duration: 3 Hrs.

Max.Marks:50

Course Objective

Internal Assessment: 15

External Examination: 35

The objective of the course is to understand the basics of Data Structures and to make students capable enough to write algorithms using different Data Structures.

Course Learning Outcomes:

After completion of this course students will able to:

CO1: To access how the choices of data structure & algorithm methods impact the performance of program.

CO2: To solve problems based on different data structure & also write programs. And know about the basic concepts of Array and Linked-list.

CO3: Understand how several fundamental algorithms work particularly those concerned with Stack, Queues, Trees and Graphs.

CO4: Learn various searching and Sorting algorithms.

Instructions for PaperSetter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short- answer type having 5 questions of 1 mark each and 5 questions of 2 mark each covering the entire syllabus uniformly.

Instructions forCandidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory questions of sectionC.

SECTION-A

Introduction: Definition, Basic terminology, types of data structure, operations on data structures, Basic Mathematical concepts and notations, algorithm complexity, Big- O notation, time-spacetradeoff.

Arrays: Definition, one dimensional and two-dimensional array, memory representation, Row major and Column major order, address calculation, various operations on linear arrays (Insertion, Deletion and Traversal), sparse matrices and its representation.

Linked Lists: Definition, Representation of linked lists in memory, types of linked lists (Header, doubly, circular), various operations on singly linkedlists.

Stacks: Definition, Representation of stack in memory using arrays and linked list, Basic stack operations (PUSH and POP), Applications of stacks-converting arithmetic expression from infix notation to postfix, parenthesis matching.

SECTION-B

Queues: Definition, Representation of queue in memory using arrays and linked list, Basic queue operations (Insertion, Deletion), Types of Queue (Circular, Priority, Deque).

Trees: Definition, Binary Tree, Properties, Representation of binary tree in memory using array and linked lists, Binary search tree, BST operations (Traversal, Insertion, Deletion, Searching), Threaded Binary Tree.

Graphs: Definition, Basic terminology, Representation of graph in memory using array and Linked Lists, Breadth First Search, Depth First Search.

Searching and Sorting: Linear Search, Binary search, Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort, Radix Sort.

Suggested Readings:

1. *Seymour Lipschutz, Theory and Problems of Data Structures, Schaum Outline Series, McGraw-Hill Book Company.*
2. *Jeffery Esakov, Data Structures- An Advanced Approach Using C, Tom Weiss, Prentice-Hall International, Inc.*
3. *Trembley and Sorenson: An Introduction to Data Structures with Application, Tata Mc-Graw Hill Company, Delhi.*
4. *Aaron M. Tanenbaum: Data Structures and C, PHI Publications.*

BCSM 206: DATABASE MANAGEMENT SYSTEM

Credit: 3:3H (L)

Duration: 3 Hrs.

Max.Marks:50

Internal Assessment: 15

External Examination: 35

Course Objective

The objective of the course is to understand the basics of Database Management System and to make students capable of creating database and working with it.

Course Learning Outcomes: After completion of this course students will able to:

CO1: Gain a good understanding of the architecture and functioning of database management systems, Principles of data modeling and normalization techniques.

CO2: Explore the components of relational database management system.

CO3: Understand the use of structured query language and its syntax, transactions, database recovery and techniques for query optimization.

CO4: Acquire the practical knowledge of MySQL

Instructions for PaperSetter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short- answer type having 5 questions of 1 mark each and 5 questions of 2 mark each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory questions of section C.

SECTION-A

Database Management Systems: Introduction, Definition, Characteristics, Classification of DBMS, Database Approaches and its characteristics. Database Administrators, Database Designers, End Users, Application Developers, Advantages of DBMS, Codd Rules.

Architecture: Data Models, Categories of Data Models- Conceptual Data Models, Physical data Models, Representational Data Models: Object Based Models, Record Based Models, Database Schema and Instance, Three Schema Architecture, Data Independence – Physical and Logical data Independence.

Database Conceptual Modelling by E-R model: Concepts, Entities and Entity Sets, Attributes, Mapping Constraints, E-R Diagram, Weak Entity Sets, Strong Entity Sets. Enhanced E-R Modelling: Aggregation, Generalization, Converting ER Diagrams to Tables.

Relational Data Model: Concepts and Terminology, Characteristics of Relations. Constraints: Integrity Constraints- Entity and Referential Integrity constraints, Keys- Super Keys, Candidate Keys, Primary Keys, Secondary Keys and Foreign Keys.

SECTION-B

Relational Algebra: Basic Set Operations: Union, Intersection, Cartesian Product, Division. Additional Operations: Selection, Projection and Join, Examples and Queries.

Normalization: Definition, Need of Normalization, Properties, Functional Dependency, Full Functional Dependency, Transitive Dependency, Normal Forms – 1NF, 2NF, 3NF, Boyce-Codd NF.

Database Design: Guidelines for Designing the Relation Schemas, Problems of Bad DatabaseDesign.

MySQL: Getting started with MySQL, MySQL data types, managing MySQL databases and tables, filtering data, joining tables, grouping data, sub queries, set operators, modifying data in MySQL.

Suggested Readings:

1. Elmisry Navathe, "Introduction to Database Systems", Pearson EducationIndia.
2. Henry F. Korth, Abraham, "Database System Concepts", Tata McGrawHill.

3. *Naveen Prakash, Introduction to Database Management”, TataMcGrawHill.*
4. *Parteek Bhatia and G. Singh, Simplified Approach to DBMS, KalyaniPublications.*

BCSM 207: SOFTWARE LAB-II (BASED ON BCSM 205 & BCSM 206)

Credit: 2:4H (P)

MaximumMarks:50

Maximum Time:3hours

Internal Assessment:15Marks

Pass Marks:35%

This laboratory course will comprise as exercises to supplement what is learnt under paper **BCSM 205 & BCSM 206**. Students are required to develop the programs with internal documentation. The breakup of external 35 marks for the final practical will be asunder:-

-) Viva Voce (External Evaluation) 15Marks.
-) Lab Record, Program Development and Execution (External Evaluation) 20 Marks.

List of Activities (Based on BCSM 205)

1. To insert an element into anarray.
2. To delete an element from anarray.
3. To store an array using sparserepresentation.
4. To apply various operations onstack.
5. To insert and delete element in aqueue.
6. To insert and delete and search a node in a linked list.
7. To insert or delete node in a binarytree.
8. To traverse binarytree.
9. To implement linearsearch.
10. To implement binarysearch.
11. To implement Bubblesort.
12. To implement Selectionsort.
13. To implement Insertionsort.
14. To implement Mergesort.
15. To implement Quicksort.

List of Activities (Based on BCSM 206)

1. Create and drop database.
2. Create and drop tables in MySQL
3. Creating queries in MySQL for selection, insertion, update, and deletion of data in tables.
4. Creating query to clone tables, temporary tables and altering tables.
5. Creating queries to handle duplicates in MySQL.
6. Importing and exporting data from MySQL.
7. Creating queries in MySQL for different types of joins.

BCSM 208: ENGLISH COMMUNICATION SKILLS

Credit: 4: 4H (L)

Time: 3 hours

Maximum Marks: 100

Periods per week: 5

Theory: 70 marks

Pass Marks: 35%

Internal Assessment: 30marks

Course Objectives: After the successful completion of this course, the students will be able to:

- Get acquainted with the rhythm, metrics and other musical aspects of poetry
- Read and discuss selected poems by different poets
- Understand and appreciate poetry as a literary art form
- Enhance their vocabulary
- Recognize and incorporate proper grammar and mechanics including parts of speech, verb tense, subject-verb agreement, word choice, spelling, commas, and other punctuation

Section - A

Text Prescribed: *Flames of Inspiration*, edited by Department of English, Khalsa College, Patiala, 2017

Testing:

Q1. (a) One essay-type question with an internal alternative on summary, central idea and theme in about 250 words. 12 marks

(b) Five short answer questions to be attempted out of the given eight from the prescribed text in about 30-40 words each. 5 X 3=15 marks

Section-B

Q.2. Writing Skills:

a. Letter Writing: Formal and Informal letters

Testing: One letter to be attempted out of the given two 10 marks

b. Banner Writing on the given topic (Social, Political, Economic and Religious) 7 marks

Q.3. Grammar and Vocabulary:

(a) Grammar

Prescribed Text: Oxford Practice Grammar by John Eastwood, Oxford University Press, 2006

1. Ex. 40-59 10 marks

Testing: Attempt any 10 sentences out of the given 12

2. Ex.60 to 75 10 marks

Testing: Attempt any 10 sentences out of the given 12 (b) Vocabulary

Prescribed Text: The Students' Companion by Wilfred D. Best, Harper Collins Publishers, 2010

1. Antonyms: pages 131 & 132 3 marks

Testing: Attempt all 6 Antonyms

2. Synonyms: pages 135 & 136 3 marks

Testing: Attempt all 6 Synonyms

INTERNAL ASSESSMENT

30 Marks

Internal Assessment will be given on the basis of attendance, MSTs and over-all performance in the class. There will also be an internal viva based on the following topics of practical relevance. The teacher should focus on enhancing the skills of the students in writing, speaking and reading. One period per week will be allotted for covering these topics:-

1. Describing the Recipe of your favourite dish (step-wise description of the dish is required)

2. Giving directions to someone who wants to reach a particular destination

3. Writing a Banner

4. Extempore- speaking impromptu on the given topics

Note: A Scrap Book to be made by the student on the given topics.

Books Recommended for Grammar and Composition:

) The Written Word by Vandana R. Singh, Oxford University Press, 2006.

) Essential English Grammar by Raymond Murphy, Cambridge University Press (2nd ed.), 2009

) Advanced Grammar in Use by Martin Hewings, Cambridge University Press (2nd ed.), 2008

) English Vocabulary in Use by Michael MacCarthy and Felicity O'Dell, Cambridge University Press, 2008

BCSM 209:PUNJABI COMPULSORY

ਕ੍ਰੈਡਿਟ: 4(3+1)

ਕੁੱਲ ਅੰਕ : 100 ਅੰਕ

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਨੋਟ: ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿੱਚੋਂ ਅਲੱਗ-ਅਲੱਗ 35%ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

Course Outcome

1. ਵਿਦਿਆਰਥੀ ਇਸ ਰਾਹੀਂ ਜੀਵਨ- ਜਾਚ, ਨੈਤਿਕਕਦਰਾਂਕੀਮਤਾਂ, ਆਧੁਨਿਕਯੁੱਗ ਵਿਚ ਬਜ਼ੁਰਗਾਂ ਦਾ ਸਤਿਕਾਰ ਅਤੇ ਰਿਸ਼ਤਿਆਂ ਦੀ ਟੁੱਟ-ਭੱਜਨੂੰ ਸਮਝਣ ਅਤੇ ਹਾਂਪੱਖੀਰਵੱਈਏਨੂੰ ਅਪਨਾਉਣ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦਾ ਹੈ।
2. ਵਿਦਿਆਰਥੀ ਆਧੁਨਿਕਕਥਾਕਹਾਣੀਆਂ ਰਾਹੀਂ ਸਮਕਾਲੀ, ਸਮਾਜਿਕ, ਆਰਥਿਕ, ਰਾਜਨੀਤਿਕ, ਧਾਰਮਿਕ ਪ੍ਰਸਥਿਤੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦਾ ਹੈ।
3. ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਸੰਸਾਰਦੀਆਂ ਹੋਰ ਭਾਸ਼ਾਵਾਂ ਨੂੰ ਸੁੱਧਰੂਪ ਵਿਚ ਬੋਲਣ, ਸਿੱਖਣ ਅਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੋ ਜਾਂਦਾ ਹੈ।
4. ਵਿਦਿਆਰਥੀ ਵੱਖ-ਵੱਖ ਰੇਖਿੱਤੇ ਵਿਚ ਬੋਲੀਆਂ ਜਾਣ ਵਾਲੀਆਂ ਪੰਜਾਬੀ ਦੀਆਂ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਰਾਹੀਂ ਵੱਖ-ਵੱਖ ਰੇਕਿੱਤਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਸ਼ਬਦਾਵਲੀ ਨੂੰ ਜਾਣਨ ਅਤੇ ਸਮਝਣ ਦੇ ਕਾਬਿਲ ਹੋ ਜਾਂਦੇ ਹਨ।

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਭਾਗ ਓ ਜੀਵਨ ਜੁਗਤ- ਸੰਪਾ. ਡਾ. ਧਰਮਿੰਦਰ ਸਿੰਘ ਉੱਭਾ, ਡਾ. ਗੁਰਦੀਸ਼ ਕੌਰ ਬਾਜਵਾ ਖ਼ਾਲਸਾ ਕਾਲਜ, ਪਟਿਆਲਾ।

ਭਾਗ ਅ-1 ਵਿਆਕਰਨ

I ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ, ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ ਅਤੇ ਅੰਤਰ ਸਬੰਧ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ ਚਿੰਨ੍ਹ।

II ਸ਼ਬਦ ਸ਼ਰੇਣੀਆਂ: ਪ੍ਰੀਭਾਸ਼ਾ, ਕਾਰਜ ਅਤੇ ਬਣਤਰ ਦੇ ਆਧਾਰ 'ਤੇ।

ਅ-2 ਚਿੱਠੀ ਪੱਤਰ(ਸਮਾਜਿਕ ਸਰੋਕਾਰ, ਨਿੱਜੀ ਅਤੇ ਦਫ਼ਤਰੀ ਚਿੱਠੀ-ਪੱਤਰ)

ਭਾਗ-ੲਸਥਾਨਕ ਕਾਲਜ ਦੇ ਪੰਜਾਬੀ ਵਿਭਾਗ ਵੱਲੋਂ ਪ੍ਰਕਾਸ਼ਿਤ ਕੀਤੇ ਗਏ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਕੋਸ਼ ਵਿੱਚੋਂ ਸਬੰਧਤ ਫੈਕਲਟੀ ਵਾਲੇ ਭਾਗ ਦੇ 101 ਤੋਂ 200 ਤੱਕ ਸ਼ਬਦਾਂ ਦਾ ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ।

ਭਾਗ-ਸਭਾਗ ਓ ਤੇ ਵਿਆਕਰਨ ਦੇ ਅ-1 ਵਾਲੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ਓ ਵਿੱਚੋਂ ਕਿਸੇ ਇਕ ਨਿਬੰਧਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ ਨਿਬੰਧ ਕਲਾ ਜਾਂ ਲੇਖਕ ਦਾ ਯੋਗਦਾਨ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
2. ਭਾਗ ਓ ਵਿੱਚੋਂ ਨਿਬੰਧਾਂ ਵਿਚਲੇ ਵਿਚਾਰਾਂ ਸਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਚਾਰ ਵਿੱਚੋਂ ਦੋ) 4+4=08 ਅੰਕ
3. ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਅ-1 ਨਾਲ ਸਬੰਧਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
4. ਭਾਗ ਅ-2 ਵਿਚਲੇ ਵਿਸ਼ਿਆਂ 'ਤੇ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਸਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇਕ) 08 ਅੰਕ
5. ਵੱਖਰੀ-ਵੱਖਰੀ ਫੈਕਲਟੀ ਨਾਲ ਸਬੰਧਤ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦੇ 101 ਤੋਂ 200 ਤੱਕ ਤਕਨੀਕੀ ਸ਼ਬਦਾਂ ਦਾ ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ। (ਪੱਚੀ ਵਿੱਚੋਂ ਕੋਈ ਵੀਹ) 10 ਅੰਕ
6. ਭਾਗ ਸ ਵਿਚ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 10 ਪ੍ਰਸ਼ਨ, ਭਾਗ ਓ ਅਤੇ ਅ-1 ਦੀਆਂ ਪੁਸਤਕਾਂ ਵਿਚੋਂ ਬਰਾਬਰ ਪੁੱਛੇ ਜਾਣਗੇ। ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਵਿਚ ਉੱਤਰ ਦੇਣੇ ਹੋਣਗੇ ਅਤੇ ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਦੋ ਅੰਕ ਹੋਣਗੇ 10x2= 20ਅੰਕ

(ਨੋਟ: ਪੇਪਰ ਵਿਚ ਭਾਗ ਅ ਦੇ ਅ.2 ਅਤੇ ੲ ਵਿਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ ਨਹੀਂ ਪੁੱਛੇ ਜਾਣਗੇ।)

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ

30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ: ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ ਲਈ ਅਧਿਆਪਕ ਵੱਲੋਂ ਕਰਵਾਏ ਗਏ ਕਾਰਜਾਂ ਤੇ ਆਧਾਰਿਤ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਇੱਕ ਫਾਇਲ ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ ਜਿਸ ਦੇ ਅੰਕ ਨਿਸ਼ਚਿਤ ਹੋਣਗੇ ਅਤੇ ਇਹ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦਾ ਹਿੱਸਾ ਹੋਵੇਗੀ। ਇਸ ਲਈ ਦੋ ਪੀਰੀਅਡ ਪ੍ਰਤਿ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਹੇਠ ਲਿਖੇ ਕਾਰਜ ਕਰਨਗੇ।

- ਸੁੱਧ ਪੰਜਾਬੀ ਉਚਾਰਣ/ਲਿਖਣ ਦਾ ਅਭਿਆਸ
- ਅਖ਼ਬਾਰਾਂ ਤੇ ਰਸਾਲਿਆਂ ਵਿਚ ਛਪੇ ਸਾਹਿਤ ਸਬੰਧੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ
- ਪਾਠਕ੍ਰਮ ਨਾਲ ਸਬੰਧਿਤ ਅਸਾਈਮੈਂਟ ਤਿਆਰ ਕਰਨਾ
- ਕਾਲਜ ਦੇ ਕਿਸੇ ਸਮਾਗਮ/ਵਿਦਿਅਕ ਟੂਰ ਦੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ

ਸਹਾਇਕ ਪਾਠ- ਸਮੱਗਰੀ

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Note:-Those students who have not studied Punjabi up to matriculation can opt for Punjabi Compulsory (Elementary Punjabi/Mudla Gyan).Other students will study compulsory Punjabi.

BCSM 209A: PUNJABI COMPULSORY (ELEMENTARY PUNJABI/MUDLA GYAN)

ਕ੍ਰੈਡਿਟ :4(3+1)

ਕੁੱਲ ਅੰਕ : 100

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਦਾ ਸਮਾਂ : 3 ਘੰਟੇ

ਨੋਟ : ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿੱਚੋਂ ਅਲੱਗ-ਅਲੱਗ 35% ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

Course Outcome

1. ਵਿਦਿਆਰਥੀ ਇਸ ਰਾਹੀਂ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਵਰਤਣ ਵਾਲੀ ਲਿਪੀ (ਵਰਣਨਮਾਲਾ) ਤੋਂ ਜਾਣੂ ਹੋਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
2. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਬੋਲਣ, ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
3. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਰੋਜ਼ਾਨਾ ਪੰਜਾਬੀ ਜੀਵਨ ਵਿੱਚ ਵਰਤੀ ਜਾਣ ਵਾਲੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਪਾਠ ਪੁਸਤਕ: **ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ** (ਭਾਗਦੂਜਾ), ਡਾ. ਪੁਸ਼ਪਿੰਦਰ ਕੌਰ, ਖ਼ਾਲਸਾ ਕਾਲਜ, ਪਟਿਆਲਾ, 2018.

ਭਾਗ-ੳ

ਸ਼ਬਦ ਜੋੜ : (ਮਾਤਰਾ ਸਹਿਤ)

(1) ਦੋ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਜੋੜ

(2) ਤਿੰਨ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਜੋੜ

(3) ਬਹੁ- ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਜੋੜ

10 ਅੰਕ

ਭਾਗ-ਅ

ਅ.1 ਸ਼ਬਦ ਸ਼ਰੇਣੀਆਂ: ਪਛਾਣ ਤੇ ਵਰਤੋਂ:

ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ ਅਤੇ ਯੋਜਕ ਵਿਆਕਰਨਕ ਵਰਗ: ਲਿੰਗ, ਵਚਨ, ਪੁਰਖ, ਕਾਲ

ਅ.2 ਸ਼ਬਦ ਸ਼ਰੇਣੀਆਂ ਦੀ ਵਾਕਾਂ ਵਿਚ ਵਰਤੋਂ:

ਸ਼ਬਦ ਸ਼ਰੇਣੀਆਂ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤਣਾ ਸਿਖਾਉਣਾ
ਖ਼ਾਲੀ ਸਥਾਨ ਭਰ ਕੇ ਵਾਕ ਪੂਰੇ ਕਰਨਾ ਸਿਖਾਉਣਾ

10+10=20 ਅੰਕ

ਭਾਗ-ੲ

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰਾਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋਂ:

ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਸਮਾਸ, ਦੁਹਰੁਕਤੀ

10 ਅੰਕ

ਭਾਗ-ਸ

ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਜਾਣ-ਪਛਾਣ :

1. ਗਿਣਤੀ (51-100)

2. ਪਸ਼ੂ-ਪੰਛੀਆਂ ਦੇ ਨਾਂ

3. ਨਾਨਕੇ ਅਤੇ ਦਾਦਕੇ ਘਰ ਦੇ ਰਿਸ਼ਤਿਆਂ ਦੇ ਨਾਂ

4. ਆਵਾਜਾਈ ਦੇ ਸਾਧਨਾਂ ਦੇ ਨਾਂ

5. ਘਰੇਲੂ ਵਸਤਾਂ ਦੀ ਸ਼ਬਦਾਵਲੀ

10 ਅੰਕ

ਭਾਗ-ਹ

ਸਾਰੇ ਸਿਲੇਬਸ 'ਤੇ ਅਧਾਰਿਤ ਦਸ ਅਬਜੈਕਟਿਵ ਟਾਈਪ ਪ੍ਰਸ਼ਨ।

10×2= 20 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਵਿਦਿਆਰਥੀ ਪਹਿਲੀ ਵਾਰ ਗੁਰਮੁਖੀ ਸਿੱਖ ਰਹੇ ਹਨ। ਹੋ ਸਕਦਾ ਹੈ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੋਂ ਅਣਜਾਣ ਹੋਣ। ਸੋ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਪੱਧਰ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੀਮਾ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰੱਖ ਕੇ ਨਿਸ਼ਚਿਤ ਕੀਤਾ ਜਾਵੇ।
2. ਸਾਰੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ।
3. ਸਰਲ ਅਤੇ ਸਪੱਸ਼ਟ ਸ਼ਬਦ ਪੁੱਛੇ ਜਾਣ।

4. ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ ਨਾ ਪੁੱਛੇ ਜਾਣ।
 5. ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਸਬੰਧੀ ਸੰਖੇਪ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟੇ ਜਾਂ ਚੋਣ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ।
 6. ਵਿਦਿਆਰਥੀ ਨੂੰ ਵਿਆਕਰਨ ਵਿਚ ਸਵਾਲ ਵਾਕਾਂ ਵਿਚ ਵਰਤੋਂ ਦੇ ਪੱਧਰ ਤੇ ਵੀ ਪੁੱਛੇ ਲਏ ਜਾਣ।
- ਨੋਟ: ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਵਿਭਾਗ ਵੱਲੋਂ ਪ੍ਰਕਾਸ਼ਿਤ ਕੀਤੀ ਗਈ ਪਾਠ ਪੁਸਤਕ ਉੱਤੇ ਹੀ ਆਧਾਰਿਤ ਹੋਵੇ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਲਈ ਪੁਸਤਕ ਦੇ ਪਿੱਛੇ ਦਿੱਤੇ ਗਏ ਨਮੂਨਾ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਸਟਾਇਲ ਨੂੰ ਆਧਾਰ ਬਣਾਇਆ ਜਾਵੇ।**

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ

30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ: ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ ਲਈ ਅਧਿਆਪਕ ਵੱਲੋਂ ਕਰਵਾਏ ਗਏ ਕਾਰਜਾਂ ਤੇ ਆਧਾਰਿਤ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਇੱਕ ਫਾਇਲ ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ ਜਿਸ ਦੇ ਅੰਕ ਨਿਸ਼ਚਿਤ ਹੋਣਗੇ ਅਤੇ ਇਹ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦਾ ਹਿੱਸਾ ਹੋਵੇਗਾ। ਇਸ ਲਈ ਦੋ ਪੀਰਿਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਹੇਠ ਲਿਖੇ ਕਾਰਜ ਕਰਨਗੇ।

- ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਉਚਾਰਣ/ਲਿਖਣ ਦਾ ਅਭਿਆਸ
- ਅਖ਼ਬਾਰਾਂ ਤੇ ਰਸਾਲਿਆਂ ਵਿਚ ਛਪੇ ਸਾਹਿਤ ਸਬੰਧੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ
- ਪਾਠਕ੍ਰਮ ਨਾਲ ਸਬੰਧਿਤ ਅਸਾਈਮੈਂਟ ਤਿਆਰ ਕਰਨਾ
- ਕਾਲਜ ਦੇ ਕਿਸੇ ਸਮਾਗਮ/ਵਿਦਿਅਕ ਟੂਰ ਦੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ
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ਸਹਾਇਕ ਪੁਸਤਕ-ਸੂਚੀ

1. ਸਤਿਨਾਮ ਸਿੰਘ ਸੰਧੂ, **ਆਓ ਪੰਜਾਬੀ ਸਿਖੀਏ**, (ਹਿੰਦੀ ਤੋਂ ਪੰਜਾਬੀ ਸਿੱਖਣ ਲਈ) ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2009.
2. ਸਤਿਨਾਮ ਸਿੰਘ ਸੰਧੂ, **ਗੁਰਮੁਖੀ ਸਿੱਖੋ**, (ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਸਿੱਖਣ ਲਈ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2011.
3. ਸੀਤਾ ਰਾਮ ਬਾਹਰੀ, **ਪੰਜਾਬੀ ਸਿਖੀਏ**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2002, (ਹਿੰਦੀ)।
4. ਰਾਜਿੰਦਰ ਸਿੰਘ, **ਪੰਜਾਬੀ ਗਿਆਨ ਸੀ.ਡੀ.** (ਕੰਪਿਊਟਰ ਐਪਲੀਕੇਸ਼ਨ ਟੂ-ਲਰਨ ਐਂਡ ਟੀਚ ਪੰਜਾਬੀ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2011.
5. Hardev Bahri, **Teach Yourself Punjabi**, Punjabi University, Patiala, 2011.
6. Ujjal Singh Bahri and Paramjit Singh Wallia, **Introductory Punjabi**, Punjabi University, Patiala, 2011.

ਨੋਟ: Only those students who have not studied Punjabi up to matriculation can opt for Punjabi Compulsory (Elementary Punjabi/Mudla Gyan). Other students will study Compulsory Punjabi.

GN-201: DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Note: This is a compulsory qualifying paper, which the students have to study and qualify during three years of their degree course.

Time: 3 hours

Pass Marks: 35%

Lectures per week: 4

Max Marks: 100

Theory: 70

Internal Assessment: 30

Course Objective: After the successful completion of this course, students will be able to:

-) Gain knowledge regarding the menace of drug addiction, its problems, and the ways to prevent it

INSTRUCTIONS FOR THE PAPER SETTERS

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus. Each question shall carry 7 marks. Section C will consist of 14 short answer type of 2 marks each.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt any three questions from section A and any three questions from section B. Section C is compulsory.

UNIT I

) **Problem of Drug Abuse: Concept and Overview; Types of Drug Often Abused**

a) **Concept and Overview:** What are drugs and what constitutes Drug Abuse? ; Prevalence of menace of Drug Abuse; Difference between drug abuse Drug Dependence and Drug Addiction? ; Physical and psychological dependence- concepts of drug tolerance.

b) **Introduction to drugs of abuse: Stimulants, Depressants, Narcotics, Hallucinogens and Steroids.**

) **Nature of the Problem**

Vulnerable Age Groups; Signs and symptoms of Drug Abuse: (a) Physical indicators, (b)- Academic indicators,(c)- Behavioral and Psychological indicators.

UNIT II

) **Causes and Consequences of Drug Abuse**

a) **Causes:** Physiological, Psychological, Sociological

b) **Consequences of Drug Abuse:** For individuals, for families, For society & Nation.

) **Management & Prevention of Drug Abuse**

Management of Drug Abuse

Prevention of Drug Abuse

Role of Family, School, Media, Legislation & De-addiction Centers

Suggested readings

1. Ahuja, Ram,(2003),Social Problems in India, Rawat Publications: Jaipur
2. 2003 National Household Survey of Alcohol and Drug Abuse. New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
3. World Drug Report 2011, United Nations Office of Drug and Crime.
4. World Drug Report 2010, United nations Office of Drug and Crime.
5. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
6. The Narcotic Drugs and Psychotropic Substances Act, 1985, (New Delhi: Universal, 2012)
7. Sharma & Bansal (2017),Drug Abuse: Problem, Management & Prevention. R.D. Publication, Jalandhar.
8. Verma Meenakshi,(2017), Drug Abuse: Problem, Management & Prevention. A.P. Publishers, Jalandhar.

Pedagogy of the Course Work:

The pedagogy of the course work will consist of the following:

40% lectures.

30% Tutorials(Including Extension lectures and Interactions with Experts dealing with Drug Abuses).

30% assignments, discussion and seminars and class tests.

Note: A visit to drug de-addiction centre could also be undertaken.

APPROVED
Jasleen Kaur
Member Secretary
Academic Council

APPROVED
Shiv
Principal
General Shivdev Singh Diwan Gurbachan Singh
Khalsa College Patiala

**B.SC. (CSM)-II
(SEMESTER- III & IV)
(SESSION 2021-22)**

Course No.	Course Title	Credit Hours
Semester-III		
BCSM 301	Integral Calculus	4:4H(L)
BCSM 302	Differential Equations-I	4:4H(L)
BCSM 303	Statistical Inference- I	3:3H(L)
BCSM 304	Applied Statistics	2: 2H(L)
BCSM 305	Statistics Lab-III	2:4H(P)
BCSM 306	Web Technologies	3:3H(L)
BCSM 307	Computer Networks and Data Communication	3:3H(L)
BCSM 308	Software Lab	2:4H(P)
BCSM 309	Environmental and Road Safety Awareness	4:4H(L)
Semester -IV		
BCSM 401	Real Analysis	4:4H(L)
BCSM 402	Differential Equations-II	4:4H(L)
BCSM 403	Statistical Inference- II	3:3HL)
BCSM 404	Industrial Statistics	2: 2H(L)
BCSM 405	Statistics Lab-IV	2:4H(P)
BCSM 406	Python Programming	3:3H(L)
BCSM 407	Operating System	3:3H(L)
BCSM 408	Software Lab	2:4H(P)

APPROVED
Jasleen Kaur
Member Secretary
Academic Council

APPROVED
Shikha
Principal
General Shivdev Singh Diwan Gurbachan Singh
Khalsa College Patiala

B.SC (CSM) PART-II (SEMESTER III)
Paper: BCSM-301: Integral Calculus
Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75
Internal Assessment: 23
External Examination: 52

Course Objectives:

-) To analyze and find integral of hyperbolic function, rational function, trigonometric function and logarithmic function.
-) To understand the concept of Improper Integral and multiple integral.
-) To understand the concept of partition and fundamental concept of Riemann Integrability.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have four questions from the respective sections of the syllabus of 8 marks each and section C will consist of one compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Integration of hyperbolic and inverse hyperbolic functions, Reduction formulae for integrals of rational, trigonometric, exponential and logarithmic functions and of their combinations, Applications of definite integral to find quadrature, length of an arc.

Improper integrals and their convergence, Comparison tests, Absolute and conditional convergence, Abel's and Dirichlet's tests (without proofs)

Section B

Double and Triple integrals, Change of order of integration in double integrals, Change of variables, Applications to evaluation of areas and Volume, Beta – Gamma Functions and their properties, duplication formula, convergence of Beta and gamma functions.

Books Recommended

1. G.B. Thomas and R.L. Finney, *Calculus*, 9th Ed., Pearson Education, Delhi, 2005.
2. H. Anton, I. Bivens and S. Davis, *Calculus*, John Wiley and Sons (Asia) P. Ltd. 2002

BCSM-302: Differential Equations-I
Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75

Internal Assessment: 23

External Examination: 52

Course Objectives: The Primary objective of this course is

-) To know about solutions of first and higher order differential equations.
-) To exhibit the techniques for obtaining solutions to ordinary differential equations.
-) To investigate the qualitative and quantitative behavior of solutions of system of differential equations.
-) To develop interests in solving a number of problems related to model natural phenomena, engineering systems and many other situations.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Exact differential equations: $M + N = 0$, Integrating Factor

Equations of first order and higher degree: Solvable for x, y, p . Clairaut's equations, equations reducible to Clairaut's equation, equation not containing x , equations not containing y .

Equations of the form $\frac{d^n y}{dx^n} = f(x)$

Linear Independence and Wronskian, Differential operator with basic laws, Linear differential equations with constant and variable coefficients.

Section B

Methods of variation of parameters: Method of variation of parameters for solving

$\frac{dy}{dx} + P = Q$, where P and Q are functions of x or constants,

Method of variation of parameters for solving

$\frac{d^2 y}{dx^2} + P\left(\frac{dy}{dx}\right) + Q = R$, where P, Q and R are functions of x or constants

Series solution of differential equation: radius and interval of convergence, Ordinary and Singular points, Solutions of Differential equation in series with Power Series Method and Frobenius method.

Picard's Iterative Method: Picard's method of successive approximation (or Picard's iteration method), Picard's method of solving simultaneous differential equation with initial conditions.

Books Recommended

1. M.D. Raisinghania, *Ordinary and Partial Differential Equations*, 19th Edition, S. Chand and Company Limited, 2016.
2. W.E. Boyce, P.C. DiPrima and D.B. Meade, *Elementary Differential Equations and Boundary value problems*, 11th Edition, John Wiley, 2017.
3. E.A. Coddington, *An Introduction to Ordinary Differential Equations*, Dover Publications, 2012. (Chapters I-V).
4. E.L. Ince, *Theory of Ordinary Differential Equations*, Dover Publications, 2005.

5. E.D. Rainville, P.E. Bedient and R.E. Bedient , *Elementary Differential Equations*, Publisher Prentice Hall, 1997.
6. Frank Ayres, *Theory & Problems of Differential Equations*, Macgraw- Hill Book Co., 2010.
7. Zafar Ahsan, *Differential Equations and their applications*, 2nd Edition, PHI Learning Pvt. Ltd., 2009.
8. Richard Bronson, *Theory & Problems of Differential Equations*, Macgraw- Hill Book Company, 2009.
9. S.L. Ross, *Differential Equations*, 3rd Edition, John Wiley, 2007.

BCSM-303: Statistical Inference- I

Credit: 3:3H (L)

Duration: 3 Hrs.

Max. Marks:50

Internal Assessment:15

External Examination: 35

Course Objectives: Course Objective for the Statistical Inference is

1. The aim is to teach students to formulate the null and alternative hypothesis regarding a population.
2. To make the students capable of performing tests of hypothesis as well as to calculate confidence interval for population parameter.
3. To understand the concept of p-value.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 mark each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section-A

Introduction: Concept of Parameter & statistic and its sampling distribution. Sufficiency, Factorization Theorem (statement only), Illustrations and its application, Concept of Minimal Sufficiency.

Point Estimation: Properties of estimators: Unbiasedness and Minimum Variance Unbiased Estimator (MVUE), Consistency of estimators and sufficient conditions for consistency, Relative efficiency of an estimator.

Interval Estimation: Concepts of Confidence Interval and Confidence Coefficient, Confidence Intervals for the Parameters of univariate normal & two independent normal populations.

Section-B

Sampling distributions: Chi-square, t and F tests.

Testing of Hypotheses: Statistical Hypotheses- Simple and Composite. Statistical tests, Critical region, Type I and Type II errors, Size and Power of a test. Test about the mean and variance of a univariate normal distribution, comparison of two univariate normal distributions through their means and variances, t-test and paired t-test.

Books Recommended

1. A. M. Gun, M.K. Gupta and B. Dasgupta, *Fundamentals of Statistics*, Vol.1, 8th Ed., World Press Publishers Private Limited, Kolkata, 2008
2. G.K. Bhattacharya and R.A. Johnson, *Statistical Concepts and Methods*, John Wiley and Sons, 1977.
3. E.J. Dudewicz and S.N. Mishra, *Modern Mathematical Statistics*, 1st Ed., John Wiley and Sons, 1988.
4. J.E. Freund, *Mathematical Statistics*, Prentice - Hall of India, 2000.
5. R.V. Hogg, J. McKean and A.T. Craig, *Introduction to Mathematical Statistics*, 7th Ed., Collier Macmillan Publisher, 2012.
6. A.M. Mood, F.A. Graybill and D.C. Boes, *Introduction to the Theory of Statistics*, Third Edition, McGraw Hill, 2001.
7. B.K. Kale, *Parametric Inference: An Introduction*, Narosa Publishing House, 2016.

BCM-304: Applied Statistics

Credit: 2:2H (L)

Duration: 3 Hrs.

Max. Marks: 50

Internal Assessments: 15

External Examination: 35

Course Objective: Course Objective for the applied statistics is:

1. The objective is to equip the students with various forecasting techniques and knowledge on modern statistical methods to analyze the time series data.
2. To make students identifying the components of a time series and be able to isolate them.
3. Fitting different time series and demand Analysis models.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Time Series: Definition of time series, components of a time series, measurement of secular trend by method of moving average, and fitting of linear and Non-linear trend, measurement of seasonal fluctuations by ratio-to-moving average, ratio to trend and link relative methods, measurement of cyclical fluctuations. (Excluding periodogram analysis)

Section B

Index numbers: Definitions, interpretation and applications of index numbers. Problems involved in the construction of index numbers, Laspeyre's, Paasche's, Marshal-Edgeworth formulae for index numbers. Criterion of good index number. Fisher's ideal index number, chain base index number, uses of index numbers. Cost of living index numbers and its uses. Errors in index numbers.

Demand Analysis: Theory and analysis of consumer's demand: Law of demand, Price Elasticity of demand, Estimation of demand curves; Forms of demand functions, Engel's curves, Income elasticity of demand.

Books Recommended

1. A. M. Gun, M.K. Gupta and B. Dasgupta, *Fundamentals of Statistics*, Vol.1, 8th Ed., World Press Publishers Private Limited, Kolkata, 2008
2. S.C. Gupta and V.K. Kapoor, *Fundamentals of Applied Statistics*, 4th Edition, Sultan Chand & Sons, 2014.
3. F.E. Croxton and D.J. Cowden, *Applied General Statistics*, 17th Edition, Prentice Hall of India, 1949.
4. P. Mukhopadhyay, *Applied Statistics*, 2nd Edition, Books and Allied Pvt. Ltd., 2011.
5. D.N. Elhance. *Fundamentals of Statistics*, 1972.

BCSM-305: Statistics Lab-III
Credit: 2:4H (P)

Duration: 3 Hrs.

Max. Marks: 50

Instructions for Paper Setter and Candidates

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the examination will be as under:

Lab. Record: 10

Viva-voce: 10

Exercises: 30

Lab Course:

The exercises will be based on the syllabus of the paper BCSM 303: Statistical Inference-I and paper BCSM 304: Applied Statistics

BCSM-306: Web Technologies

Credit: 3: 3H (L)

Duration: 3 Hrs

Max Marks: 50

Course Objective

The objective of the course is to understand the basics of Web Technologies and to make students capable of designing websites.

Course Learning Outcomes:

After completion of this course students will be able to:

CO1: Understand basics of internet technologies and HTML.

CO2: Design a media-rich dynamic websites using text, fonts, colors, images, tables, hyperlinks and client side scripting.

CO3: Explore the different platforms and hypertext languages.

CO3: Learn to connect websites with databases and basic operations.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section-A

Basic Concepts: Domain, URL, Web Browser, Web Server, Internet and WWW, Overview of Web browser/ web Servers.

HTML: Basics of HTML, Formatting and Fonts, Hyperlink (Internal and External), tables, Lists, Images, forms, frame set.

Style sheets: Introduction to CSS, Need for CSS, Syntax and structure, types of CSS, Background images, Colors and Properties, Manipulating texts, Using fonts, Borders and boxes, Margins, Padding lists, Positioning using CSS.

JavaScript: Client side scripting with JavaScript, Variables, Functions, Conditions, Loops and Repetition, Pop up boxes, Forms and Validations.

Section-B

WAMP Server: Introduction, Components of WAMP Server: Apache, PHP And MySQL.

PHP: Introduction, requirements, PHP syntax, data type, variables, strings, operators, control structures, array, function, form, session/state management, error and exception.

MySQL: Introduction to RDBMS, Connection of PHP with MySQL Database.

Performing basic database operations: (DML) (Insert, Delete, Update, Select).

Books Recommended

1. Ullman, "PHP for the Web: Visual Quick Start Guide", Pearson Education.
2. Ramesh Bangia, "Internet and Web Design", New Age International.
3. Xavier, C, "Web Technology and Design", New Age International.
4. Jeffrey C Jackson, "Web Technology – A computer Science perspective", Pearson Education.
5. Chris Bates, "Web Programming – Building Internet Applications, "Wiley India,.
6. Nixon, R. Learning PHP, MySQL, JavaScript, and CSS: A step-by-step guide to creating dynamic websites. "O'Reilly Media, Inc."

BCSM-307: Computer Networks and Data Communication

Credit: 3:3H (L)

Duration: 3 Hrs

Max Marks: 50

Internal Assessment: 15

External Examination: 35

Course Objective

The objective of the course is to understand the basics of Computer Networking and to make students aware of the network management and how networking actually takes place.

Course Learning Outcomes:

After completion of this course students will be able to:

CO1: Describe how communication works in computer networks and to understand the basic terminology of computer networks.

CO2: Figure out the Reference Models in Networking and communication media.

CO3: Analyse the role of switching and different protocols in networking.

CO4: Learn about the networking devices and remote file access.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section-A

Computer Networks: Uses of Computer Network, Network Hardware, Network Software, Goals and Applications of Computer networks.

Structure of Computer Network: Point-to-point structure, Broadcasting structure, Types of Networks, Topologies.

Reference Models: Layering Approach, OSI Reference Model, TCP/IP reference Model, Comparison of OSI and TCP Reference Model.

Data Communication: Transmission media, Wireless communication, and the Telephone system, Introduction to cellular radio and communication satellite, Data Rate of Channel, Electromagnetic spectrum.

Section-A

Switching: Concepts, Circuit Switching, Packet Switching and Message Switching, Comparison.

Internet Protocol and Applications: IP protocol, IP Addresses, Subnets, Internet Control Protocol, Introduction to interior and exterior gateway routing protocol, internet multicasting and mobile IP, Domain Name System, Electronic mail, World Wide Web.

Networking Devices: Modem, Hub, Switch, Bridge, Repeater, Router, Gateway and Firewalls.

Remote Login: File Transfer and Remote File Access, client-server architecture.

Books Recommended

1. Behrouz A. Forouzan, Data Communications and Networking, Tata McGraw Hill Publications.
2. William Stallings, "Data & Computer Communication", PHI Publications.
3. Andrew S. Tanenbaum, "Computer Networks", PHI Publications.
4. D.E. Corner, "Computer Networks and Internets", Addison-Wesley Publications.

BCSM- 308: Software Lab (Based On BCSM-306)
Credit: 2: 4H (P)

Maximum Marks: 50
Internal Assessment: 15 Marks

Maximum Time: 3 hours
Pass Marks: 35%

This laboratory course will comprise as exercises to supplement what is learnt under paper
CSM 306 Web Technologies.

A **Minor Project** should be submitted by the student, which will be evaluated by the External Examiner.

BCSM- 309: Environmental and Road Safety Awareness
4:4H(L)

Time Allowed: 3 hours
Total lectures: 50

Total: 100 marks
Pass marks: 35 %
Theory Paper: 70 marks
Internal Assessment: 30 marks

INSTRUCTIONS FOR PAPER SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. Section C will consist of 15 short-answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR CANDIDATES

Candidates are required to attempt two questions from each section A and B and the entire section C.

Section – A

Unit 1: Introduction to Environmental Studies (2 Lectures)

-) Multidisciplinary nature of environmental studies.
-) Scope and importance; Concept of sustainability and sustainable development.

Unit 2: Eco System (6 Lectures)

-) What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 3: Natural Resources: Renewable and Non Renewable Resources (8 Lectures)

-) Land resource and land use change; Land degradation, soil erosion and desertification.
-) Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
-) Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state).
-) Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit 4: Biodiversity and Conservation (8 Lectures)

-) Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots.
-) India as mega-biodiversity nation; Endangered and endemic species of India.
-) Threats of biodiversity: Habitat Loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
-) Ecosystem and biodiversity services, Ecological, Economic, social ethical, aesthetic and Informational value.

Section B

Unit 5: Environmental Pollution (8 Lectures)

-) Environmental Pollution: types, causes, effects and controls; Air, water, soil and noise pollution.
-) Nuclear hazards and human health risks.
-) Solid waste management: Control measures of urban and industrial waste.
-) Pollution case studies.

Unit 6: Environmental Policies and Practices (7 Lectures)

-) Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.

-) Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; water (Prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act, International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD)
-) Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian Context.

Unit 7: Human Communities and the Environment (6 Lectures)

-) Human population growth: Impacts on environment, human health and welfare.
-) Resettlement and rehabilitation of project affected persons; case studies.
-) Disaster management: floods, earthquake, cyclones and landslides.
-) Environmental movements: Chipko, silent valley, Bishnois of Rajasthan.
-) Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
-) Environmental communication and public awareness, case studies (eg. CNG vehicles in Delhi).

Unit 8: Road safety Awareness (6 Lectures)

-) Concept and significance of Road safety.
-) Traffic signs.
-) Traffic rules.
-) Traffic Offences and penalties.
-) How to obtain license.
-) Role of first aid in Road Safety.

Field work (Internal Assessment based on Project file in lieu of assignments) (Equal to 5 lectures)

-) Visit to an area to document environmental assets: river/forest/flora/fauna, etc.
-) Visit to local polluted site-urban/Rural/Industrial/Agricultural.
-) Study of common plants, insects, birds and basic principles of identification.
-) Study of simple ecosystems-pond, river, Delhi Ridge etc.

Suggested Readings:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. Kumar, N. 2015. Environmental and Road Safety Awareness. R.D. Publications, Jalandhar.
8. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29---64). Zed Books.
9. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
10. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
11. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
12. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
13. Raven, P.H., Hassenzahl, D.M. & Berg, L. R. 2012. Environment. 8th edition. John Wiley & Sons.
14. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
15. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. Oxford University Press.
16. Sharma, P.D. 2007. Ecology and Environment. Rastogi Publication.

17. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
18. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
19. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
20. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
21. Wilson, E. O. 2006. The Creation: An appeal to save life on earth. New York: Norton.
22. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Press.

(SEMESTER IV)
BCSM-401: Real Analysis
Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75

Internal Assessment: 23

External Examination: 52

Course Objectives:

-) This course is designed to provide knowledge about Riemann integrals and convergence. Their applications are also included to clear the topic to students.
-) The aim of this course is to make the students familiar with the use of vectors and vector calculus so that they may employ the same in an effective manner to various applications in science subjects and to exhibit the techniques of solving ordinary and partial differential equations.
-) To understand the concept of sequence and series of functions.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have four questions from the respective sections of the syllabus of 8 marks each and section C will consist of one compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Riemann integral: Lower and Upper Riemann Sums, NASC condition of Integrability, Integrability of continuous and monotonic functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus.

Vector Calculus: Product of Two Vectors, Scalar & Vector Product of Three Vectors, Limit and Continuity of Vector Valued Functions, Vector Differentiation, Gradient, Divergence and Curl, Vector integration, Applications of Gauss, Green and Stokes Theorem (without proof of theorems)

Section B

Sequences and series of functions, pointwise and uniform convergence, Cauchy's criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence (without proofs) uniform convergence and continuity, uniform convergence and Riemann integration, uniform convergence and differentiation, Weierstrass approximation theorem.

Books Recommended

1. T.M. Apostol, *Mathematical Analysis*, Narosa Publishing House, New Delhi, 1985.
2. D. Somasundaram and B. Choudhary, *A First Course in Mathematical Analysis*, Narosa Publishing House, New Delhi, 1997.
3. P.K. Jain and S.K. Kaushik, *An Introduction to Real Analysis*, S. Chand & Co., New Delhi, 2000.
4. S.C. Malik, *Mathematical Analysis*, New Age Science, 2009.
5. Shanti Narayan, *A Course of Mathematical Analysis*, 9th Edition, S. Chand & Co., New Delhi, 1968.
6. Murray R. Spiegel, *Vector Analysis*, Schaum publishing Company, New York.

BCSM-402: Differential Equations-II**Credit: 4:4H (L)****Duration: 3 Hrs.****Max. Marks: 75****Internal Assessment: 23****External Examination: 52****Course Objectives:** The Primary objective of this course is

-) To know about solutions of first and higher order partial differential equations.
-) To exhibit the techniques for obtaining solutions to ordinary differential equations.
-) To investigate the qualitative and quantitative behavior of solutions of system of differential equations.
-) To develop interests in solving a number of problems related to model natural phenomena, engineering systems and many other situations.
-) To understand how to extract information from partial derivative models in order to interpret reality.
-) To identify real phenomena as models of partial derivative equations.
-) To apply the concepts of the course in real life problems.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Bessel, Legendre and hyper geometric equations: Bessel, Legendre and Hypergeometric functions and their properties, Convergence, recurrence relations and generating functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.

Section B

Partial Differential Equations: Order and degree of partial differential equations, Concept of linear and non-linear partial differential equations, Formation of first order partial differential equations, Lagrange's method, Some special types of equations which can be solved easily by methods other than the general method, Charpit's method.

Partial Differential equations of second and higher order: Classification of linear partial differential equations of second order, Homogenous and Non homogenous partial differential equation with constant and variable coefficients, Monge's method.

Books Recommended

1. M.D. Raisinghania, *Ordinary and Partial Differential Equations*, 19th Edition, S. Chand and Company Limited, 2016.
2. S.L. Ross, *Differential Equations*, 3rd Edition, John Wiley, 2007.

3. W.E. Boyce, P.C. Dippima and D.B. Meade, *Elementary Differential Equations and Boundary value problems*, 11th Edition, John Wiley, 2017.
4. I.N. Sneddon, *Elements of Partial Differential Equations*, Dover Publications, 2013.
5. E.A. Coddington, *An Introduction to Ordinary Differential Equations*, Dover Publications, 2012. (Chapters I-V).
6. E.L. Ince, *Theory of Ordinary Differential Equations*, Dover Publications, 2005.
7. E.D. Rainville, P.E. Bedient and R.E. Bedient , *Elementary Differential Equations*, Publisher Prentice Hall, 1997.
8. Frank Ayres, *Theory & Problems of Differential Equations*, Macgraw- Hill Book Co., 2010.
9. Zafar Ahsan, *Differential Equations and their applications*, 2nd Edition, PHI Learning Pvt. Ltd., 2009.
10. Richard Bronson, *Theory & Problems of Differential Equations*, Macgraw- Hill Book Company, 2009.

BCSM-403: Statistical Inference- II
Credit: 3: 3H (L)

Duration: 3 hrs.

Max Marks: 50
Internal Assessment: 15
External Examination: 35

Course Objective: Course Objective for the statistical inference-II is:

1. To make students be able to estimate unknown parameters of a population.
2. To make students be able to obtain inferences about a population when sample size is large.
3. To check the significance of a null hypothesis against an alternative hypothesis.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Methods of Estimation: Method of moments, Method of maximum likelihood. Statement of properties of MLE.

Testing Hypothesis: Concept of CR, Tests of hypothesis, level of significance. MP and UMP tests in a class of size α tests, Neyman- Pearson Lemma, MP test for simple null against simple alternative hypothesis, UMP tests for simple null hypothesis against one-sided alternatives and for one sided null against one-sided alternatives in one parameter exponential family.

Section B

Large sample tests: Use of Central limit theorem (CLT) for deriving large sample tests for binomial proportion, difference of two binomial proportions, tests related to binomial and Poisson distribution, Related confidence intervals, Chi-square tests for independence of attributes, homogeneity of populations and goodness of fit.

Fisher's Z-transformation of the sample correlation, test regarding the population correlation coefficient, Testing the significance of regression coefficients in case of simple regression based on Z-transformation and confidence limits for the coefficient based on it.

Books Recommended

1. G.K. Bhattacharyya and R.A. Johnson, *Statistical Concepts and Methods*, John Wiley and Sons, 1977.
2. V.K. Rohatgi, and A.K. Md. E. Saleh, *An Introduction to Probability and Statistics*, 3rd Edition, John Wiley, 2015.
3. A.M. Goon, M.K. Gupta and B. Dasgupta, *Fundamentals and Statistics*, Vol. 1, 8th Edition, World Press Pvt. Ltd., 2008
4. A.M. Goon A.M. and M.K. Gupta M.K., *An outline of Statistical Theory*, Vol. 2, The World Press Publishers Private Limited, Calcutta, 2010.
5. B.K. Kale, *Parametric Inference: An Introduction*, Narosa Publishing House, 2016.
6. E. J. Dudewicz and S.N. Mishra, *Modern Mathematical Statistics*, 1st Edition, John Wiley and sons, 1988.

BCSM-404: Industrial Statistics**Credit: 2:2H (L)****Duration: 3 hrs.****Max. Marks: 50****Internal Assessment: 15****External Examination: 35****Course Objective:** The course Objective for the subject is

To form good statistics practitioner in the belief that the application of Statistics in Industrial setting requires a practical more than a theoretical approach.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Statistical quality control, chance and assignable causes, process and product control, the technique of control charts for process control, three sigma and specification limits. Schewhart control charts for mean, S.D. and range, control charts for number defectives and fraction defective, control chart for number of defects. Advantages of process control, sampling inspection by attribute, the concept of producer's and consumer's risks, AOQ, AOQL, ASN and OC functions and curves, single and double sampling plans.

Section B

Inventory problem, introduction, definition, inventory costs, inventory variables. Classification of inventory problems, concept of Economic Ordering Quantity (EOQ), EOQ problems without/with shortages, Uniform/Constant demand, finite/infinite replenishment of inventory. EOQ problems with price breaks.

Books Recommended

1. A.M. Goon, M.K. Gupta and B. Dasgupta, *Fundamentals of Statistics*, Vol. II, World Press, 9th Ed., 2008.
2. Kanti Swarup, P.K. Gupta and Manmohan, *Operations Research*, Sultan Chand and Sons, New Delhi, 15th Ed.
3. S.C. Gupta and V.K. Kapoor *Fundamentals of Applied Statistics*, 4th Edition, Sultan Chand & Sons, 2010.

BCSM-405: Statistics Lab-IV**Credit: 2:4H (P)****Duration: 3 hrs.****Max. Marks: 50****Instructions for Paper Setter and Candidates**

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the examination will be as under:

Lab. Record: 10

Viva-voce: 10

Exercises: 30

Lab Course:

The exercises will be based on the syllabus of the paper BCSM 403: Statistical Inference- II,
BCSM 404: Industrial Statistics

BCSM-406: Python Programming**Credit: 3:3H (L)****Duration: 3 Hrs****Max Marks: 50****Internal Assessment: 15****External Examination: 35****Course Objective**

The objective of the course is to understand the basics of Python Programming and to make students capable enough to do programming with Python.

Course Learning Outcomes:

After completion of this course students will able to:

CO1: Describe Object oriented programming concepts in Python.

CO2: Explain various Data types, Control Structures, Functions, Modules and Sequence in Python.

CO3: Understand and summarize the different File handling operations.

CO4: Interpret the concept of Exception Handling in Python

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Introduction to Python: History of Python, Strength and Weakness, Different Versions, Installing Python, Setting up in local environment, IDLE, Executing from file, command line from interactive mode, Python Identifiers and reserved key words.

Basic Python: Variables and Variables type, Data types, Data Types Conversion, Operators (Arithmetic, Comparison, Assignment, Bitwise, Logical, Membership, Identity), Operators Precedence,

Control Structures: Python Decision making: (if, el if, else, nested if), Python loops (while, for, nested loops), Break and continue statements.

Python Collections or Sequence: Sequence introduction, Number operations, String Operations, List, Tuple, Dictionary, Set.

Section B

Python Functions: Function introduction, User defined functions, Functions with parameters, Keywords and optional parameters, Scope of variables (Global and Local), Anonymous function –Lambda, In-built function, List comprehension.

Python Modules: Modules, Standard Modules (Sys, Math, Time), Import Statement, from statement, Dir() functions.

Python File handling: Sending Output to STDOUT Using the print() Method, Reading Input with the input() Method, Creating File Objects with the open() Method, Controlling File Access Modes, Working with File Object Attributes, Closing File Objects with the close() Method, Reading and Writing to File Objects with read() and write(), Using File Processing Functions from the OS Module.

Exceptions handling: Exceptions handling: Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Raise, Writing Your Own Exception Classes.

Books Recommended

1. Yashwant Kanetkar, Adiyta Kanetkar, “Let Us Python”, BPB Publication.
2. John V Guttag, “Introduction to Computation and Programming Using Python”, MIT Press.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python:An Inter-disciplinary Approach”, Pearson Education India.
4. Timothy A. Budd, “Exploring Python”, Tata Mc-Graw Hill.
5. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3”, Pragmatic Programmers, LLC.
6. Rossum, “Introduction To Python”, Shroff Publications and Distributors.

BCSM-407: Operating System
Credit: 3: 3H (L)

Duration: 3 Hrs
Max Marks: 50

Internal Assessment: 15
External Examination: 35

Course Objective

The objective of the course is to understand the basics of Operating System and to make students aware of the CPU scheduling.

Course Learning Outcomes:

After completion of this course students will be able to:

CO1: Describe different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system.

CO2: Develop deadlock handling algorithms and learn Memory management.

CO3: Implement various algorithms required for management, scheduling, allocation and communication used in operating system.

CO4: Describe and analyze the memory management, storage management and its policies

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Introduction: Definition, Functions of OS, OS as Resource Manager, Operating system Structure - Operating system services, System calls, Types of system calls. Mobile Operating Systems – Symbian, iOS, RIM, Windows, Linux, Palm, Android.

Process Management: process definition, process state, process scheduling, operations on processes, Basic concepts of thread, Difference between process and thread.

CPU Scheduling: Basic concepts, scheduling criteria, scheduling algorithms and evaluations– FCFS, SJF, LJF, LRTF, SRTF, Round Robin and Multi-level queue scheduling, Multi-level feedback queue scheduling.

Deadlocks: Characteristics of deadlocks, methods for handling deadlocks, deadlock prevention, Resource allocation graph, Safe and unsafe state, deadlock avoidance- Banker's Algorithm.

Section B

Memory Management: Logical versus Physical address space, swapping, contiguous allocation, Paging, Concept of Virtual memory, Implementation by Demand Paging, Page replacement algorithms – FIFO, Optimal, LRU, concept of thrashing.

File Management: file concept, access methods, directory structure, Allocation methods: contiguous allocation, linked allocation and indexed allocation.

Device Management: Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK.

LINUX: Installation, Structure of Linux, General Purpose Commands, Process Management Commands, File Oriented Commands, Directory Oriented Commands, vi editor.

Books Recommended

1. Abraham Silberschatz, Peter B. Galvin, "Operating Sytem Concepts", Wiley Publishing.
2. N. Haberman, "Introduction to Operating System Design", Galgotia Publication.
3. Brinch Hansen, "Operating System Principles", Prentice-Hall.
4. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Pvt. Ltd.

BCSM-408: Software Lab (Based On BCSM- 406)
Credit: 2:4H (P)

Maximum Marks: 50
Internal Assessment: 15 Marks

Maximum Time: 3 hours
Pass Marks: 35%

This laboratory course will comprise of exercises to supplement what is learnt under paper **CSM 406**. Students are required to develop the programs with internal documentation. The breakup of external 35 marks for the final practical will be as under:

-) Viva Voce (External Evaluation) 15 Marks.
-) Lab Record, Program Development and Execution (External Evaluation) 20 Marks.

List of Programs

1. Python Program to Check Whether a Number is Positive or Negative
2. Python Program to Reverse a Given Number
3. Python Program to Check if a Number is a Palindrome
4. Python Program to Print an Inverted Star Pattern
5. Python Program to Concatenate Two Dictionaries into One
6. Python Program to Count the Number of Vowels Present in a String using Sets
7. Python Program to swap two numbers using functions.
8. Python Program to Find the Factorial of a Number Using Recursion
9. Python Program to Calculate the Length of a String without Using a Library Function
10. Python Program to Find the Largest Number in a List
11. Python Program to Interchange the first and last element in a List
12. Python Program to Read the Contents of a File
13. Python Program to Copy the Contents of One File into Another
14. Python Program to Append the Contents of One File to another File
15. Python Program to Read a File and Capitalize the First Letter of Every Word in the File.
16. Python Program to Read the Contents of a File in Reverse Order.

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B.Sc. (CSM)-III SEMESTER-V, VI		
Course No.	Course Title	Credit Hours
Semester V		
BCSM 501	Abstract Algebra	4:4H(L)
BCSM 502	Discrete Mathematics	4:4H(L)
BCSM 503	Computer Oriented Numerical Methods	3:3H(L)
BCSM 504	Sample Surveys	2:2H(L)
BCSM 505	Statistics lab-V	2:4H(P)
BCSM 506	Java Programming	3:3H(L)
BCSM 507	Computer Networks and Data Communication	4:4H(L)
BCSM 508	Software lab-V (Based on BCSM 506)	1:2H(P)
Semester VI		
BCSM 601	Linear Algebra	4:4H(L)
BCSM 602	Mechanics	4:4H(L)
BCSM 603	Linear Programming	3:3H(L)
BCSM 604	Analysis of Variance and Design of Experiments	2:2H(L)
BCSM 605	Statistics lab-VI	2:4H(P)
BCSM 606	Advanced Database Management System	3:3H(L)
BCSM 607	Software Engineering	4:4H(L)
BCSM 608	Software Lab-VI(Based on BCSM 606)	1: 2H(P)

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BCSM 501: ABSTRACT ALGEBRA**Credit: 4:4H (L)****Duration: 3 Hrs.****Max. Marks: 75****Internal Assessment: 23****External Examination: 52****Course Objectives: The Primary objective of this course is**

-) To recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups etc.
-) To explain the significance of cosets, normal subgroups, and quotient groups.
-) To understand the fundamental concepts of rings, fields and integral domains.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Group Theory: Definition and Examples, Properties of groups, subgroups, cosets, counting principle, Lagrange's theorem, Order of an element, Cyclic groups, Normal subgroups and Quotient groups.

Permutation groups, Homomorphism, Cayley's theorem, Fundamental theorems of homomorphism and isomorphism, Automorphisms.

Section B

Ring theory: Definition and examples, Elementary properties of rings, Integral domains, division rings and fields, Subring and characteristic of ring, Ideals, Maximal and Prime Ideals, the Quotient ring, Homomorphism, the fundamental theorem and the correspondence theorem, Field of Quotients of Integral domain.

Books Recommended

1. P. B. Bhattacharya, S. K. Jain and S. R. Nagpaul, *Basic Abstract Algebra*, 2nd Edition, Cambridge University Press, 1995.
2. I. N. Herstein, *Topics in Algebra*, 2nd Edition, Vikas Publishing House, 1976.
3. Surjeet Singh and Qazi Zameeruddin, *Modern Algebra*, 7th Edition, Vikas Publishing House, New Delhi, 2006.
4. V. K. Khanna, S. K. Bhambri, *A Course in Abstract Algebra*, 5th Edition, Vikas Publishing House, 2016.

BCSM 502: DISCRETE MATHEMATICS

Credit: 4:4H (L)

Duration: 3 Hrs.

Max. Marks: 75

Internal Assessment: 23

External Examination: 52

Course Objectives: The Primary objective of this course is

-) To learn about partially ordered sets, lattices and their types.
-) To understand Boolean algebra and Boolean functions, logic gates, switching circuits and their applications.
-) To enable students to solve real-life problems using finite-state and Turing machines.
-) To assimilate various graph theoretic concepts and familiarize with their applications.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Relations – Definitions, Equivalence relations and Partitions, Partial order relations and Lattices, Chains, Hasse Diagram, Product of lattices and Pigeon Hole Principle.

Graphs – Basic Terminology, Simple and Multigraphs, Weighted Graphs, Paths and Circuits, Shortest path problem, Dijkstra's Algorithm, Euler and Hamiltonian paths and circuits, Planar Graphs, Euler's Formula, Coloring, chromatic number

Trees – Definition, binary tree, properties, spanning trees, Kruskal's algorithm, Prim's Algorithm, binary search trees, pre-fix and post-fix expressions

Section B

Discrete numeric functions and Generating functions

Recurrence Relations and Recursive Algorithms – Linear Recurrence Relations with Constant Coefficients, Homogeneous Solutions, Particular Solution, Solution by the Methods of Generating Functions.

Boolean Algebras – Lattices and Algebraic Structures, Duality, Distributive and Complemented Lattices, Boolean Lattices and Boolean Algebras, Boolean Functions and Expressions, Propositional Calculus, Design and Implementation of Digital Networks, Switching Circuits.

Books Recommended

1. C.L. Liu, *Elements of Discrete mathematics*, 4th Edition, Tata McGraw Hill Education Pvt. Ltd, International, 2012.
2. S. Lipschutz and M. Lipson, *Discrete Mathematics*, 3rd Edition, Schaum's Outlines, McGraw Hill, 2007.
3. K. H. Rosen, *Discrete Mathematics and its Applications*, 7th Edition, McGraw Hill, 2011.

BCSM 503: COMPUTER ORIENTED NUMERICAL METHODS

Credit: 3:3H (L)

Duration: 3 Hrs.

Max. Marks: 50

Internal Assessment: 15

External Examination: 35

Course Objectives: The Primary objective of this course is

-) To obtain numerical solutions of algebraic and transcendental equations.
-) To find numerical solutions of system of linear equations .
-) To solve initial and boundary value problems in differential equations using various numerical methods.
-) To apply various numerical methods in real life problems.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly. Scientific non-programmable calculator is allowed.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Floating point representation of numbers, Arithmetic operations with normalised floating point numbers and its consequences, Errors in numbers, Binary representation of numbers, Solution of Transcendental and polynomial equations: Bi-section method, Regula-falsi method, Newton-Raphson method, Secant method.

Section B

Solution to simultaneous linear and algebraic equations: Gauss elimination method, pivoting, ill-conditioned equations, Gauss-Seidal iterative method.

Finite difference and Interpolation: Difference operators, Divided differences, (Definition and properties), relations among operators, Newton-Gregory formulae for forward and backward interpolation, Newton's interpolation formula for divided differences, Lagrange's interpolation formula, truncation error in various interpolation formulae.

Books Recommended

1. E. Bala Gurusamy, *Computer Oriented Statistical and Numerical Methods*, Macmillan Publishers India Limited, 2000.
2. H. C. Saxena, *Finite Differences and Numerical Analysis*, S. Chand and Sons, Delhi, 2010.
3. B. S. Grewal, *Numerical Methods in Engineering and Science*, Khanna Publishers, 2013.
4. S. S. Sastry, *Introductory Methods of Numerical Analysis*, PHI Ltd, 2012.

BCSM 504: SAMPLE SURVEYS

Credit: 2:2H (L)

Duration: 3 Hrs.

Max. Marks: 50

Internal Assessments: 15

External Examination: 35

Course Objectives: The Primary objective of this course is

-) After completion of this course, students are able to differentiate between complete census and sample.
-) To make them aware about various errors in a survey and able to perform statistical analysis of a real sample surveys.
-) To understand the concept of Simple random sampling, Stratified sampling, Ratio and Regression method of sampling.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly. Scientific non-programmable calculator is allowed.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Concepts of population and sample, need for sampling, census and sample surveys, basic concepts in sampling, Sampling and Non-Sampling Errors, Probabilistic and Non-Probabilistic Sampling, Simple random sampling (with and without replacement) : estimation of population mean, population variance and population proportion, Variance of estimators of population mean, population proportion and their estimators.

Section B

Stratified random sampling: proportional, Neyman and optimum allocations, estimate of population mean, variance of the estimate and estimate of its variance.

Ratio and Regression methods of estimation under simple random sampling , large sample expressions of their variances, comparison with mean per unit estimate.

Books Recommended

1. D. Singh and F.S. Chaudhary, *Theory and Analysis of Sample Surveys Design*, 2nd ed., New Age International Private Limited, 2020.
2. W. G. Cochran, *Sampling Techniques*, Wiley East.

BCSM 505: STATISTICS LAB-V
Credit: 2:4H (P)

Duration: 3 Hrs.

Max. Marks: 50

Course Objectives: The Primary objective of this course is

-) To draw a random sample using various techniques.
-) To understand SRS with and without replacement .
-) To see the efficiency of Simple random sampling, Stratified sampling ,Ratio and Regression estimation.
-) To learn about the applications of various numerical methods using ‘C’ language.

Instructions for Paper Setter and Candidates

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the examination will be as under:

Lab. Record: 10

Viva-voce: 10

Exercises: 30

Lab Course:

The exercises will be based on the syllabus of the paper BCSM 503: Computer Oriented Numerical Methods and paper BCSM 504: Sample Surveys

BCSM 601: LINEAR ALGEBRA**Credit: 4:4H (L)****Duration: 3 hrs.****Max. Marks: 75****Internal Assessment: 23****External Examination: 52****Course Objectives: The Primary objective of this course is**

-) To recognize the algebraic structure vector spaces, subspaces and quotient spaces.
-) To understand the fundamental concepts of Linear Transformation
-) To enable the identification of square matrix as operator.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Vector spaces, Examples, Linear Dependence, Linear Combinations, Basis and Dimension, Subspaces, Dimension of a subspace, Existence and Extension theorem, Quotient spaces, Direct Sum of vector spaces, Dimension of a direct sum, Dual of a vector space.

Section B

Linear transformation, Algebra of linear transformations, Matrices as linear mappings, Kernel and image, Sylvester's law of Nullity, Singular and non-singular linear mappings, Isomorphism, Composition of linear mappings, Square matrices as linear operators, matrix representation of a linear operator, Change of basis, characteristic and minimal polynomial for linear operators, eigen values and eigen vectors, Cayley Hamilton Theorem.

Books Recommended

1. C. Prasad, *Text book on Algebra and Theory of equations*, Pothishala Pvt. Ltd, 2017.
2. I. N. Herstein, *Topics in Algebra*, 2nd Edition, Vikas Publishing House, 1976.
3. S. Lipschutz and M. Lipson, *Schaum's Outline of Linear algebra*, 4th Edition, McGraw Hill Education, 2009.
4. S.R.K.Iyenger ,R.K Jain, ,*Engineering Mathematics*, Narosa Publishing House.,2007

BCSM 602: MECHANICS**Credit: 4:4H (L)****Duration: 3 hrs.****Max. Marks: 75****Internal Assessment: 23****External Examination: 52****Course Objectives: The Primary objective of this course is**

-) To learn about friction, centre of gravity, work and potential energy in statics.
-) To know about various topics in dynamics such as simple harmonic motion, simple pendulum and projectile motion.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each and section C will consist of 1 compulsory question having 10 parts of short-answer type of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Statics: Basic notation, system of two forces, parallelogram law of forces, resultant of two collinear forces, resolution of forces, Lami's theorem, μ theorem, moment of a force, couple, theorem on moments of a couple, Varignon's theorem, generalized theorem of moments.

Equilibrium of two concurrent forces, equilibrium condition for any number of coplanar concurrent forces, Equilibrium conditions for coplanar non-concurrent forces.

Section B

Dynamics: Motion of a particle with constant acceleration, acceleration of falling bodies, motion under gravity, motion of a body projected vertically upward, motion of a two particles connected by a string, motion along a smooth inclined plane, constrained motion along a smooth inclined plane.

Variable acceleration: Simple harmonic motion, elastic string. Work, Power, conservative fields and potential energy, work done against gravity, potential energy of a gravitational field.

Books Recommended

1. S.L. Loney, *The elements of statics and dynamics*, New Age International Private Ltd. 2016.
2. J. L. Synge and B. A. Griffith, *Principles of mechanics*, 3rd Edition, McGraw Hill Exclusive (CBS) 2017.

BCSM 603: LINEAR PROGRAMMING

Credit: 3: 3H (L)

Duration: 3 hrs.

Max. Marks: 50

Internal Assessment: 15

External Examination: 35

Course Objectives: The Primary objective of this course is

-) To analyze and solve linear programming models in real life situations.
-) To provide graphical solutions to linear programming problems in two variables
-) To understand the primal dual relation.
-) To learn the applications of Transportation, Assignment and game problems

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Linear programming problems (LPPs): Mathematical formulation of LPP, Graphical solution, optimality and unboundedness, certain definitions and concepts of convex sets, Simplex method, Introduction to artificial variables, Big-M method and Two phase simplex method.

Duality in linear programming: Concept, Mathematical formulation, fundamental properties of duality (without proof), duality and simplex method and dual simplex method.

Section B

Transportation problem: Introduction and its mathematical formulation, North west-corner method, Least cost method and Vogel approximation method for determination of starting basic solution, Optimal solution for solving transportation problem using MODI method, unbalanced problems, problem of degeneracy.

Assignment Problem: Introduction and its mathematical formulation, Hungarian method for solving balanced and unbalanced assignment problems.

Game Theory: Definition and Characteristics of Games, Two Person Zero Sum Games, Maximin–Minimax Principle, Games without saddle point, Mixed Strategies, Graphical Method, Concept of dominance.

Books Recommended

1. Kanti Swarup, P.K. Gupta and Manmohan, *Operations Research*, Sultan Chand and Sons, New Delhi, 14th Edition, 2017.
2. D.S. Hira and P.K. Gupta, *Operations Research*, S. Chand Publisher, 2014.
3. H.A.Taha, *Operations Research An Introduction*, 10th Edition, Prentice –Hall India, 2017

BCSM 604: ANALYSIS OF VARIANCE AND DESIGN OF EXPERIMENTS**Credit: 2:2H (L)****Duration: 3 hrs.****Max. Marks: 50****Internal Assessment: 15****External Examination: 35****Course Objectives: The Primary objective of this course is**

-) To understand the concept of one way and two way ANOVA.
-) To understand the fundamental concepts of design of experiments.
-) To give introduction to planning valid and economical experiments within given resources.
-) To understand the completely randomized design, Randomized block design, Latin square design.
-) To learn about the applications of various factorial design.

Instructions for Paper Setter/Examiner

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 5 marks each and section C will consist of 1 compulsory question of short-answer type having 5 parts of 1 mark each and 5 parts of 2 marks each covering the entire syllabus uniformly. Scientific non-programmable calculator is allowed. Table for ANOVA is required.

Instructions for Candidates

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C.

Section A

Linear models, the fixed effect models, the distribution of minimum error sum of squares, and the conditional error sum of squares, tests of general linear-hypotheses.

Analysis of one way classified data under the fixed effects model, Analysis of the two way classified data with one observation per cell and multiple but equal observations in cells under the fixed effect model,

Section B

Terminology in experimental designs, basic principles of design-randomization, replication and local control. Completely randomized design, randomized block design and Latin square design and their advantages and disadvantages

Concept of factorial experiments, the concept of main effects and interactions in 2^2 and 2^3 factorial experiments and the sum of squares due to them, Yate's method of computing the sum of squares due to the main effects and interactions in 2^2 and 2^3 factorial designs.

Books Recommended

1. A.M. Goon, M.K. Gupta and B. Dasgupta, *Fundamentals of Statistics*, Vol. II, World Press, 6th ed. (revised and enlarged), 2016.
2. S.C. Gupta and V.K. Kapoor, *Fundamentals of Applied Statistics*, Sultan Chand and Sons, 2014.
3. D.C Montgomery, *Design and Analysis of Experiments*, Wiley Eastern Limited, 2004.
4. M.N. Dass & N.C. Giri, *Design and Analysis of Experiments*, Wiley Eastern Limited, 1979.
5. B.L. Bowerman and R.T. O'Connell, *Linear Statistical Models*, PWS-KENT publishing company, 2nd edition, 1990.

BCSM 605: STATISTICS LAB-VI

Credit: 2:4H (P)

Duration: 3 hrs.

Max. Marks: 50

Course Objectives: The Primary objective of this course is to understand the concepts based on

-) Analysis of variance: One way classification, two way classification with m observations per cell.
-) Design: CRD, RBD, LSD
-) 2^2 and 2^3 factorial experiments
-) Solution of L.P.P using graphical and Simplex techniques and Dual problems.
-) Solution of Transportation problems, Assignment problems and Game theory problems.

Instructions for Paper Setter and Candidates

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the examination will be as under:

Lab. Record: 10

Viva-voce: 10

Exercises: 30

Lab Course:

The exercises will be based on the syllabus of the paper BCSM 603: Linear Programming and paper BCSM 604: Design and Analysis of Experiments.

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