

**ORDINANCES
AND
OUTLINES OF TESTS,
SYLLABI AND COURSES OF READING
FOR
B.Sc. (NON-MEDICAL)
FOR
2021-22**

COURSE CODE: BSNM



**GENERAL SHIVDEV SINGH DIWAN GURBACHAN SINGH
KHALSA COLLEGE PATIALA**

An Autonomous College
NAAC Accredited 'A' Grade
College with Potential for Excellence Status by UGC,
Star College Status-DBT

E-mail: Khalsacollegepatiala@gmail.com

Website: www.khalsacollegepatiala.org

APPROVED

**Member Secretary
Academic Council**

APPROVED

Principal
General Shivdev Singh Diwan Gurbachan Singh
Khalsa College Patiala

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.

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 BACHELOR OF SCIENCE B.Sc. (NON-MEDICAL)

UNDER CREDIT BASED SEMESTER SYSTEM

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.(Non-Medical) is an integrated course comprising three parts spread over three years. Each part will consist of two semesters. The course of study of B.Sc. (Non-Medical) 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. (Non-Medical) Part-I shall be open to a student who produces the following certificates to the Principal of the college.

(i) If he/she has passed +2 examination (Non-medical, without reappear) of Punjab School Education Board, or any other examination recognised as equivalent thereto.

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. (Non-Medical) Part-I Course.

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

(iii) Having good character.

(iv) A student can opt for Elementary Punjabi 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 Defence 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 in 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.

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. (Non-Medical) First semester. If candidate does not clear

the lower examination within in stipulated period the higher result of the candidate will stand automatically cancelled.

4. Semester examinations 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. **SUBJECT COMBINATIONS IN B.Sc. COURSE**

- 5.1 Subject to the restrictions contained in the Ordinances, a candidate for B.Sc. (Non-Medical) +3 Scheme shall be required to take up the following subjects For B.Sc. (Non-Medical) Part-I, II and III:

(i) **For B.Sc. (Non-Medical) Part-I**

Punjabi, English, Drug Abuse: Problems, Management and Prevention with three elective Science subjects.

(ii) **For B.Sc. (Non-Medical) Part-II**

Punjabi, Environmental and Road Safety Awareness with three elective Science subjects.

(ii) **For B.Sc. (Non-Medical) Part-III**

Punjabi with three Elective Science Subjects.

5.2 **Three Elective Science subjects for B.Sc. Non-Medical**

1. Physics
2. Chemistry/ Computer Application
3. Mathematics

6. **EXAMINATION RULES:**

- 6.1 Paper Setting/Evaluation will be done by an External Examiner or as decided by the Examination Cell.
- 6.2 Viva-voce / practical examination shall be conducted by a committee consisting of the following:
- (i) One external examiner
 - (ii) One internal examiner
- 6.3 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.

- 6.4 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.
- 6.5 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.

6.6 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.

6.7 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.

6.8 The Principal can provide Golden Chance (with special chance fee) to students who have been unable to clear their exams even after two attempts.

6.9 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.

6.10 Grading System:

The grades and their description, along with equivalent numerical grade points are listed in the Grading Assignment Table below:

Grade Assignment Table

Percentage 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. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.
- b. 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.

6.11 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):

- a. 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.

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

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.

- b. 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.

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

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

- c. 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			

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

Illustration for CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit : 20 SGPA : 6.9	Credit : 22 SGPA : 7.8	Credit : 25 SGPA : 5.6	Credit : 26 SGPA : 6.0
Semester 5	Semester 6		
Credit : 26 SGPA : 6.3	Credit : 25 SGPA : 8.0		

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.

6.12 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
CGPA 6.0 or more but less than 7.5	1st	Division
CGPA 5.0 or more but less than 6.0	2nd	Division
CGPA 3.5 or more but less than 5.0	3rd	Division
Otherwise	Fail	

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

- 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.

6.13 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.

6.14 Equivalence:

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

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

6.15 MALPRACTICES/UNFAIR MEANS

6.15.1 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.

6.15.2 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.
- 6.15.3 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.

7. Attendance Regulations & Condonation:

- 7.1 A student shall be eligible to appear for end semester examinations, if he/she acquires a minimum of 75% of attendance in each subject.
- 7.2 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 Non-Medical grounds in each semester.
- 7.3 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.
- 7.4 A Student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester as applicable.
- 7.5 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.
8. 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.
9. Applications for admission to the examination shall be made on the prescribed form attested by the competent authority as per the college rules.
10. Amount of examination fee to be paid by a candidate for each semester shall be as fixed by the College from time to time.
11. 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	With late fee of	With late fee of	With late Fee of
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.**

12. 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.
 13. All the question papers except Punjabi Language Paper will be set in English only and candidates can answer the questions in English only.
 14. A candidate is required to secure atleast 35% marks both in external examination (Theory and Practical/Project work) and in internal assessment separately in each subject in order to qualify in an examination. Two theory papers of Mathematics and Chemistry in each semester will be conducted and candidates are required to obtain 35% marks in aggregate in both the papers of each subject in each semester.
 15. **Assessment:**
 - 15.1 B.Sc. (Non-Medical) Course will be run on Choice Based Credit System (CBCS) as described in the Introduction.
 - 15.2 The Assessment in each semester of B.Sc. (Non-Medical) 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.
 - 15.3 There shall be Two Mid Semester tests in each Semester.
 - 15.4 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/Internal Practical 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
- 15.5 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.

16. 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.

17. Degree Requirement:

17.1 An undergraduate degree with Accounting and Finance 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.

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

17.3 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.

17.4 The College may from time to time revise, amend and change the regulations or the curriculum, if found necessary.

17.5 The students will be given the facilities of transfer of Credits earned in different recognized/approved Institutions of Higher Education in India and Abroad.

17.6 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.

18. 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.

19. 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.

APPROVED
Jasleen Kaur
Member Secretary
Academic Council

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

B. SC. (NON-MEDICAL) PART I (SEMESTER I & II)

(SEMESTER-I)								
Paper Code	Subject	Credits			Marks			Total Marks
		Theory	Practical	Total	External Theory	Internal assessment	Practical	
BSNM-101	Punjabi Compulsory	4	0	4	70	30	0	100
BSNM-101 A	Punjabi Compulsory (Mudla Gyam/Elementary Punjabi)							
BSNM-102	English Communication Skills	4	0	4	70	30	0	100
BSNM-103	Physics	4	2	6	70	30	50	150
BSNM-104	Mathematics:							
	Paper-I ALGEBRA & TRIGONOMETRY	4	0	8	52	23	0	150
	Paper-II DIFFERENTIAL CALCULUS	4			52	23		
BSNM-105	Chemistry:							
	Inorganic chemistry-I	2	2	6	35	15	50	150
	Organic Chemistry-I	2			35	15		
BSNM-105 A	Computer Science	4	2	6	70	30	50	150
TOTAL		24	04	28	384	166	100	650
(SEMESTER-II)								
Paper Code	Subject	Credits			Marks			Total Marks
		Theory	Practical	Total	External Theory	Internal assessment	Practical	
BSNM-201	Punjabi Compulsory	4	0	4	70	30	0	100
BSNM-201 A	Punjabi Compulsory (Mudla Gyam/Elementary Punjabi)							
BSNM-202	English Communication Skills	4	0	4	70	30	0	100
BSNM-203	Physics	4	2	6	70	30	50	150
BSNM-204	Mathematics:							
	Paper-III: Sequence and Series	4	0	8	52	23	0	150
	Paper-IV: Plane and Solid Geometry	4			52	23		
BSNM-205	Chemistry:							
	Physical chemistry-I	2	2	6	35	15	50	150
	Organic Chemistry-II	2			35	15		
BSNM-201 A	Computer Science	4	2	6	70	30	50	150
GN-201	Drug Abuse: Problem, Management and Prevention (Qualifying Paper)	-	-	-	70	30	-	100
TOTAL		24	04	28	384	166	100	650

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SEMESTER-I

BSNM 101: ਪੇਪਰ - ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (Punjabi Compulsory)

ਕ੍ਰੈਡਿਟ: 4(3+1)

ਕੁੱਲ ਅੰਕ : 100 ਅੰਕ

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

Course Outcome

- 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।
- ਵਿਦਿਆਰਥੀ ਆਧੁਨਿਕਕਥਾਕਹਾਣੀਆਂਰਾਹੀਂਸਮਕਾਲੀ, ਸਮਾਜਿਕ, ਆਰਥਿਕ, ਰਾਜਨੀਤਿਕ, ਧਾਰਮਿਕਪ੍ਰਸਥਿਤੀਆਂਨੂੰਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਸੰਸਾਰ ਦੀਆਂ ਹੋਰ ਭਾਸ਼ਾਵਾਂ ਨੂੰ ਸ਼ੁੱਧ ਰੂਪ ਵਿਚ ਬੋਲਣ, ਸਿੱਖਣ ਅਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨਪ੍ਰਾਪਤ ਹੋ ਜਾਂਦਾ ਹੈ।
- 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।

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

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਭਾਗ-ੳ ਕਥਾ-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- ੲ ਸਥਾਨਕ 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 ੳ ਤੇ ਵਿਆਕਰਨ ਦੇ ਅ-1 ਵਾਲੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ੳ ਵਿੱਚੋਂ ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ ਸਾਰ/ਕਹਾਣੀ ਕਲਾ ਅਤੇ ਪੰਜਾਬੀ ਸਾਹਿਤ ਵਿੱਚ ਲੇਖਕ ਦਾ ਸਥਾਨ ਸਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
- ਕਹਾਣੀਆਂ ਵਿਚਲੇ ਪਾਤਰਾਂ ਦਾ ਪਾਤਰ- ਚਿਤਰਨ (ਚਾਰ ਵਿੱਚੋਂ ਕੋਈ ਦੋ) 4+4=8 ਅੰਕ
- ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਅ-1 ਨਾਲ ਸੰਬੰਧਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
- ਭਾਗ ਅ-2 ਵਿਚਲੇ ਵਿਸ਼ਿਆਂ 'ਤੇ ਪੈਰਾ ਰਚਨਾ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 08 ਅੰਕ
- ਵੱਖਰੀ-ਵੱਖਰੀ ਫੈਕਲਟੀ ਨਾਲ ਸੰਬੰਧਤ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦੇ ਪਹਿਲੇ ਭਾਗ ਦੇ 100 ਤਕਨੀਕੀ ਸ਼ਬਦਾਂ ਦਾ ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ। (ਪੰਚੀ ਵਿੱਚੋਂ ਕੋਈ ਵੀਹ) 10 ਅੰਕ
- ਭਾਗ ਸ ਵਿਚ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 10 ਪ੍ਰਸ਼ਨ, ਭਾਗ ੳ ਅਤੇ ਅ-1 ਦੀਆਂ ਪੁਸਤਕਾਂ ਵਿੱਚੋਂ 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 ੲ ਵਿੱਚੋਂ 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 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 ਸੰਬੰਧਿਤ ਅਸਾਈਮੈਂਟ ਤਿਆਰ ਕਰਨਾ
- ਕਾਲਜ ਦੇ ਕਿਸੇ ਸਮਾਗਮ/ਵਿਦਿਅਕ ਟੂਰ ਦੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ

ਸਹਾਇਕ ਪਾਠ- ਸਮੱਗਰੀ

1. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨ, ਭਾਗ ਪਹਿਲਾ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ, 2009.
2. ਹਰਕੀਰਤ ਸਿੰਘ, ਭਾਸ਼ਾ ਵਿਗਿਆਨ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ, ਬਾਹਰੀ ਪਬਲੀਕੇਸ਼ਨ, ਦਿੱਲੀ, 1971.
3. ਸਵਿੰਦਰ ਸਿੰਘ ਉੱਪਲ, ਪੰਜਾਬੀ ਕਹਾਣੀਕਾਰ, ਨੈਸ਼ਨਲ ਬੁੱਕ ਸ਼ਾਪ, ਦਿੱਲੀ, 1954.
4. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ: ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ, 2008.
5. ਪ੍ਰੇਮ 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 Elementary Punjabi (Mudla Gyan). Other students will study compulsory Punjabi.

ਕੁੱਲ ਅੰਕ: 100

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ: 70 ਅੰਕ

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਦਾ ਸਮਾਂ: 3 ਘੰਟੇ

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 (ਵਰਣਮਾਲਾ) 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।

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

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਪਾਠ ਪੁਸਤਕ: ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (ਭਾਗ ਪਹਿਲਾ, ਸਮੈਸਟਰ 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) ਫਲਾਂ-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 Elementary Punjabi (Mudla Gyan). Other students will study Compulsory BSNM-105: CHEMISTRY

BSNM 102: ENGLISH COMMUNICATIONS SKILL

Credit: 4:4H (L)

Time: 3 hour

Maximum Marks: 100

Theory: 70 marks

Periods per week: 5

Pass Marks: 35%

Internal Assessment: 30 marks

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

- Learn the historical and cultural contexts, developing a critical understanding of how speeches can both uphold and resist existing structures of power
 - Understand the factors that influence use of grammar and vocabulary in speech and writing
 - Recognize and incorporate proper grammar and mechanics including parts of speech, verb tense, subject-verb agreement, word choice, spelling, commas, and other punctuation
- Enhance their reading and writing skills

Section-A

Prescribed Text: *Diverse Voices*, Department of English, Khalsa College Patiala, 2017

The speeches of the following speakers are to be studied:

1. Helen Adams Keller
2. Jawaharlal Nehru
3. Subhas Chandra Bose
4. Nelson Mandela
5. Martin Luther King Jr.
6. A.P.J Abdul Kalam
7. Dalai Lama
8. Ratan Tata
9. Steve Jobs
10. Aisha Chaudhary

Testing:

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

(b) Five short answer type questions to be attempted out of the given eight from the prescribed text in about 30-40 words each. 5X3= 15 marks

Section- B

Q.2. Writing Skills:

(a) Report Writing: Analytical and Action Report

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

(b) Developing a story from the given hints. 7 marks

Q.3. Grammar and Vocabulary

(a) Grammar

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

1. Ex. 1-20 10 marks

Testing: Attempt any 10 sentences out of the given 12

2. Ex.21-39 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 128 to 130

Testing: Attempt all 6 Antonyms 3 marks

2. Synonyms: pages 132 to 134

Testing: Attempt all 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 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 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

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

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

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

4. English Vocabulary in Use by Michael MacCarthy and Felicity O'Dell. Cambridge University press, 2008

**BSMN 103: PHYSICS
MECHANICS**

**Maximum Marks: External 70
Internal: 30
Total: 100**

**Time Allowed: 3 Hours
Total Teaching hours: 60
Pass Marks: 35%**

On successful completion of the course students would have

CO1: familiarize with types of co-ordinate systems and their applications.

CO2: learned the basics of the central forces, Kepler's laws and rotational dynamics.

CO3: grasped the knowledge of the fundamentals of different types of frames of references and transformation laws. (Both Galilean and Lorentz).

CO4: learned fundamental ideas of special theory of relativity such as length contraction and time dilation and mass –energy invariance.

CO5: acquire the knowledge of simple harmonic motion (SHM), can deeply understand the undamped, damped and forced harmonic oscillations.

Out of 100 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 30 marks, and the final examination at the end of the semester carries 70 marks.

INSTRUCTION FOR THE PAPER SETTER

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

INSTRUCTION FOR THE CANDIDATES

The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 10 marks and section C carries 30 marks. Use of scientific calculators is allowed

Section A

Cartesian and spherical polar co-ordinates system area, volume, displacement, velocity, and acceleration in this system. Solid angle. Various forces in Nature (brief introduction), Centre of mass, Equivalent one body problem, Central forces, Equation of motion under central force, Equation of orbit in inverse square, Force field and turning points, Kepler's laws and their derivations.

Rigid body motion: Rotational motion, principal moments and axes. Euler's equations, Galilean transformation and Invariance, Non-Inertial frames, concept of stationary universal frame of reference and ether.

Frames of reference, Postulates of special theory of relativity, and Michelson Morley Experiment, Lorentz transformations, Length, Time, Velocities, Relativistic Doppler effect. Variation of mass with velocity, mass-energy equivalence, Relativistic momentum and energy, their transformation, concepts of Minkowski space, four vector formulation

Section B

Oscillations: Simple harmonic motion, energy of a SHO. Compound pendulum, Electrical oscillations. Transverse vibrations of a mass on a string, composition of two perpendicular SHM of same period and of period ratio 1: 2, Decay of free vibrations due to damping. Differential equation of motion, types of damping. Determination of damping co-efficient-logarithmic decrement, relaxation time and Q-Factor.

Differential equation for forced mechanical and electrical oscillators. Transient and steady

state oscillation. Displacement and velocity variation with driving force frequency, Power supplied to an oscillator, Q value of a forced oscillator and band width.

Reference Books:

1. University Physics. F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986. Addison-Wesley
2. Mechanics Berkeley Physics, v.1: Charles Kittel, et. al. 2007, Tata McGraw-Hill. Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley
3. Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole

BSMN 103: PHYSICS LAB MECHANICS

Course Objectives: Students will have

CO1: A working knowledge of fundamental Physics and basic mechanics principles.

CO2: The ability to identify, formulates, and solve physics problems.

CO3: The ability to conduct, analyse and interpret experiments in physics.

CO4: The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation.

CO5: A hands on experience on pendulums, sextant, vernier calipers, screw gauge, traveling microscope, Maxwell needle and flywheel.

Maximum Marks: 50

60 Lectures

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To determine the Height of a Building using a Sextant.
3. To determine the Moment of Inertia of a Flywheel.
4. To determine the Young's Modulus of a Wire by Optical Lever Method.
5. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
6. To determine the Elastic Constants of a Wire by Searle's method.
7. To determine g by Bar Pendulum.
8. To determine g by Kater's Pendulum.
9. To determine g and velocity for a freely falling body using Digital Timing Technique
10. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of g

Reference Books:

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
3. Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
4. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

BSNM-104 (Paper I): 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 learn various methods of obtaining roots.
-) To understand the application of De Moivre'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, Descartes's rule of signs, Solution of cubic equations (Cardon's method) and Biquadratic equations (Descartes'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.

BSNM-104 (Paper II): 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

-) To understand the concept of functions of one and two variables.
-) To understand the concept of the n th 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, n th 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, Maclaurin 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.

BSNM 105: INORGANIC CHEMISTRY –I: ATOMIC STRUCTURE & CHEMICAL BONDING

(Credits: Theory-02)

Max Marks: 50

Semester Paper: 35

Internal Assessment: 15

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

Course Objectives: Objectives of this course are to make the student understand at theoretical level about the:

O1. Structure of chemical compounds, their mechanism, thermodynamics and kinetic studies.

O2. High level mathematics as a tool to understand the atomic and molecular structure, their properties as well as chemical reactivity.

O3. Different types of bonds, nature of bonds and effect of electro-negativity in bonding

O4. Shapes of molecules, their bond angles, bond length and bond strength based on VSEPR theory.

O5. Relative polarity of two or more polar bonds.

Course Outcomes: At the end of this course, the students will be able to:

CO1. Understand the formation of chemical compounds by learning the concept of electrostatic attraction and repulsions between the ions, molecules and atoms.

CO2. Appreciate how chemical substances can be described in terms of structure and bond type.

CO3. Understand the concept of electro-negativity and its variation over periodic table to rationalize the nature of bonding in substances.

CO4. Understand the common themes running through ionic, covalent and metallic descriptions of chemical bonding.

CO5. Gain knowledge about the electronic

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all by selecting two questions each from sections A & B and Section C (9th question) is compulsory.

Section A

(15 hrs)

Atomic Structure: Dual behaviour of matter and radiation, de Broglie's relation, Heisenberg Uncertainty principle. Hydrogen atom spectra. Need of a new approach to Atomic structure.

Quantum mechanics: Introduction, Time independent Schrodinger equation and meaning of various terms in it. Significance of ψ and ψ^2 , Schrödinger equation for hydrogen atom. Radial and angular parts of the hydrogenic wavefunctions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation). Radial and angular nodes and their significance. Radial distribution functions and the concept of the most probable distance with special reference to 1s and 2s atomic orbitals. Significance of quantum numbers, orbital angular momentum and quantum numbers m_l and m_s . Shapes of s, p and d atomic orbitals, nodal planes. Discovery of spin, spin quantum number (s) and magnetic spin quantum number (m_s). Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Pauli's exclusion principle, Hund's rule, Aufbau principle and limitation. Stability of half-filled and completely filled orbitals,

concept of exchange energy. Relative energies of atomic orbitals, Anomalous electronic configurations.

Section B

Chemical Bonding and Molecular Structure

(15 Hrs)

Ionic Bonding: General characteristics of ionic bonding. Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.

Covalent bonding: Hybridization and its different types, VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements (BeF_2 , BF_3 , H_2O , NH_3 , PCl_5 , SF_6 , IF_7 , SnCl_2 , XeF_2 , CO_3^{2-} , NO_3^- , SO_4^{2-} , ClO_4^-).

Concept of resonance and resonating structures in various inorganic and organic compounds.

MO Approach: Linear combinations of atomic orbitals, combination of 2s and 2p atomic orbitals, conditions for the combination of atomic orbitals, energy level diagram for molecular orbitals, electronic configuration and molecular behavior, bonding in homonuclear diatomic molecules, molecular orbital energy level diagrams for heteronuclear diatomic molecules. Comparison of VB and MO theory.

Reference Books:

1. Lee, J.D. Concise Inorganic Chemistry ELBS, 1991.
2. Cotton, F.A., Wilkinson, G. & Gaus, P.L. Basic Inorganic Chemistry, 3rd ed., Wiley.
3. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
4. Huheey, J.E., Keiter, E.A., Keiter, R.L. & Medhi, O.K. Inorganic Chemistry: Principles of Structure and Reactivity, Pearson Education India, 2006.

BSNM-105: ORGANIC CHEMISTRY-I: GENERAL ORGANIC CHEMISTRY & ALIPHATIC HYDROCARBONS (Credits: Theory-02)

Max Marks: 50

Semester Paper: 35

Internal Assessment: 15

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

Objectives: The students will be able to:

O1. Recognize many functional groups and their reactivity.

O2. Describe the bonding models and appreciate how this impact on the properties of a simple molecule.

O3. Draw logical and detailed mechanisms for various fundamental reactions of alkanes, cyclo-alkanes, alkenes, dienes and arenes.

O4. Classify molecules as chiral or achiral, identify the relationships between pairs of molecules as enantiomers, diastereomers or equivalent and identify when a solution is racemic versus optically active.

Outcomes: At the end of this course, the students will be able to:

CO1. Classify the organic molecules by their functional groups and identify fundamental properties associated with these functional groups.

CO2. Predict and explain patterns in stability, shape, hybridization, reactivity and product formation when resonance or conjugation applies to a reactant, intermediate or final product.

CO3. To predict products including their stereochemistry in the reactions of alkanes, alkenes, dienes and arenes.

CO4. Learn the IUPAC names of alkanes, alkenes and aromatics including cyclic molecules.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all by selecting two questions each from sections A & B and Section C (9th question) is compulsory.

Section A

(15hrs)

Fundamentals of Organic Chemistry

Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis.

Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals, carbene and nitrene (structure, stability, preparation and reactions).

Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values. Aromaticity: Benzenoids and Hückel's rule.

Stereochemistry

Conformations with respect to ethane, butane and cyclohexane. Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations. Concept of chirality (upto two carbon atoms). Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds). Threo and erythro; D and L; cis - trans nomenclature; CIP Rules: R / S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for upto two C=C systems).

Section B

(15 Hrs)

Aliphatic Hydrocarbons

Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.

Alkanes: (Upto 5 Carbons). Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties and Mechanism of free radical halogenation of alkanes:

orientation, reactivity and selectivity.

Cyclo alkanes: Cycloalkanes--nomenclature, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strain less rings. The case of cyclopropane ring: banana bonds

Alkenes: (Upto 5 Carbons) Preparation: Elimination reactions: Dehydration of alkenes and dehydrohalogenation of alkyl halides (Saytzeff's rule); cis alkenes (Partial catalytic hydrogenation) and trans alkenes (Birch reduction). Reactions: cis-addition (alk. KMnO_4) and trans-addition (bromine), Addition of HX (Markownikoff's and anti-Markownikoff's addition), Hydration, Ozonolysis, oxymercuration-demercuration, Hydroboration-oxidation.

Dienes: Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions-I,2 and 1,4 additions, Diels-Alder reaction

Alkynes: (Upto 5 Carbons) Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions hydroboration-oxidation. metal-ammonia reductions, oxidation and polymerization.

Reference Books:

1. Graham Solomon, T.W., Fryhle, C.B. & Snyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
2. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
3. Sykes, P. A Guidebook to Mechanism in Organic Chemistry, Orient Longman, New Delhi (1988).
4. Eliel, E.L. Stereochemistry of Carbon Compounds, Tata McGraw Hill education, 2000.
5. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
6. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010.
7. Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.

BSNM-105: CHEMISTRY-I PRACTICAL

(Credit – 02)

Max Marks: 50

Semester paper: 50

Pass Marks: 35%

60 hours

Time allowed - 3 hrs

Section A: Inorganic Chemistry - Volumetric Analysis

1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.
2. Estimation of oxalic acid by titrating it with KMnO_4 .
3. Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4 .
4. Estimation of Fe (II) ions by titrating it with $\text{K}_2\text{Cr}_2\text{O}_7$ using internal indicator.
5. Estimation of Cu (II) ions iodometrically using $\text{Na}_2\text{S}_2\text{O}_3$.

Section B: Organic Chemistry

1. Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements)
2. Separation of mixtures by Chromatography: Measure the R_f value in each case (combination of two compounds to be given)
Identify and separate the components of a given mixture of two dyes (red and blue ink, flurescent and methylene blue) by paper chromatography

Reference Books:

1. Svehla, G. Vogel's Qualitative Inorganic Analysis, Pearson Education, 2012.
2. Mendham, J. Vogel's Quantitative Chemical Analysis, Pearson, 2009.
3. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G.,
4. Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996.
5. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry Orient-Longman, 1960.

INSTRUCTIONS FOR EXAMINERS AND CANDIDATES

The practical examination will be held in single session (morning/evening). Candidates are required to perform practicals from volumetric Analysis and TLC. Distribution of marks will be as under (Books may be consulted):

- | | |
|---------------------------------|---|
| (1) Volumetry analysis | = 15 marks (Initial write up 5 marks
(Volumetry; equation:1, Indicator:1, end point:1 and general calculations:2)
Performance and results: 10 marks (initial burette reading: 1, final reading:1, end point:1
calculations and result:7) |
| (2) TLC | = 10 marks (Performance and result) |
| (3) Detection of extra elements | = 10 marks (Performance and result) |
| (4) Viva-Voce | = 10 marks |
| (5) Note Books | = 5 marks |
| Total | = 50 marks |

BSMN 105-A: FUNDAMENTALS OF INFORMATION TECHNOLOGY

6 CREDITS: 4H (L) + 4H (P)

Time: 3 hours

Pass Marks: 35%

Total Teaching Hours: 45-50

External Marks: 70

Internal Assessment: 30marks

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.

INSTRUCTION FOR THE PAPER SETTER

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

INSTRUCTION FOR THE CANDIDATES

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

UNIT-I

Computer Fundamentals: 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/output Devices: Keyboard & Mouse, Trackball, Joystick, Scanner (OCR, OMR, MICR) Displays- CRT, LCD, LED, Plotter, Printer-Impact & Non- Impact Printers, Speakers

Memories: Types, Units of Memory, Primary Storage-RAM, ROM, Cache, Virtual Memory. Secondary Storage –Drives – CD, DVD(R/W), Hard Disk, Pen Drive.

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

UNIT-II

Windows: Introduction and features of Windows, Installing Windows, 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 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, 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, Worksheets and Workbooks, Entering Information into MS Excel, formatting a Worksheet, Adding Elements to a Workbook, Charts, Formulas and Calculations, Statistical functions and financial functions.

Suggested Readings:

1. *P.K. Sinha and P. Sinha, "Foundations of Computing", BPB.*
2. *A. Goel, "Computer Fundamentals", Pearson Education.*
3. *V. Rajaraman, Computer fundamentals, PHI.*
4. *Ed Bott and Woody Leonhard, Special Edition Using Microsoft Office 2007.*

BSNM 105-A: SOFTWARE LAB-I
(BASED ON FUNDAMENTALS OF INFORMATION AND TECHNOLOGY)

Maximum Marks: 50	Minimum Pass Marks: 35%
Internal Assessment: 15	Maximum Time: 3 Hours

The breakup of marks for the practical will be as under:-

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

Students are required to develop the following activities I

MS-Word

Activity 1:

- i. Create, open, save and close a document.
- ii. Typing, copying, moving and deleting data in word document.
- iii. Perform Save and Save as, Cut and Copy, Paste and Paste Special.

Activity 2:

Formatting of data in word Document:-

- i. Text formatting (font size, font style, font color, subscript, superscript, upper/lower case etc.)
- ii. Text Alignment and character spacing.
- iii. Indention and line spacing.
- iv. Border and shading.
- v. Bullets and Numbering

Activity 3:

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

Activity 4:

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

Activity 5:

- i. Arranging, splitting windows in MS-word?
- ii. Perform Mail-merge in MS-word.
- iii. Create and run Macros in MS-Word.
- iv. Set the print properties of a word document.

II. PowerPoint

Activity 1:

- i. Create, open, save and close a Presentation.
- ii. Typing, copying, moving and deleting data in presentation.
- iii. 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 character spacing.
3. Indention and line spacing.
4. Border and shading.
5. Bullets and Numbering

Activity 3:

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

Activity 4:

- i. Adding Animation and Transition Effects in Slides, Understanding Slide Show
- ii. Presentation Views, Understanding Formatting commands in PowerPoint

Activity 5:

- i. Create and run Macros in PowerPoint.
- ii. Arranging, splitting windows in MS-PowerPoint.

III. MS-Excel**Activity 1**

- i. Create, open, save and close work book.
- ii. Create a new worksheet, renaming and moving sheet.
- iii. Entering, copying, moving and deleting data in cells and worksheets.
- iv. Insert and delete cells, columns and rows in MS-Excel.

Activity 2:

Formatting of data in cells:-

- i. Text formatting (font size, font style, font color, Cell border etc.)
- ii. Text Alignment.
- iii. Text Orientation, Text Direction, Text Control.

Activity 3:

- i. Find and replace data in a sheet.
- ii. Perform data sorting and data filtering in MS-Excel.
- iii. Protect your Worksheet and Workbook?
- iv. Enter and perform some basic formulas in ms-excel.

Activity 4:

- i. Perform some basic Functions in MS-Excel.
- ii. Create a chart in MS-Excel.
- iii. Create different types of Charts in excel.
- iv. Set a size, margin, orientation of page in Ms-Excel.
- v. The print properties of a worksheet in MS-Excel.

Activity 5:

- i. Hide and unhide row and column in MS-Excel.
- ii. Set column width and row height in MS-Excel.
- iii. Adding text Box, header/footers, pictures and special symbols in your worksheet.
- iv. Arranging, splitting and hiding windows in MS-Excel. And also freezing panes
- v. Create and run Macros in MS-Excel.

SEMESTER-II

BSNM 201: ਪੇਪਰ - ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (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 Outcomes

- ਵਿਦਿਆਰਥੀ ਸਮਕਾਲੀ ਲੇਖਕਾਂ ਦੁਆਰਾ ਸਮਾਜਿਕ, ਆਰਥਿਕ, ਰਾਜਨੀਤਿਕ, ਧਾਰਮਿਕ ਪ੍ਰਸਥਿਤੀਆਂ ਨੂੰ ਸਮਝਦਾ ਹੋਇਆ ਉਹਨਾਂ ਨੂੰ ਉਹ ਨਾਟਕੀ ਅਤੇ ਕਾਵਿਕ ਅੰਦਾਜ਼ ਵਿੱਚ ਪੇਸ਼ ਕਰਨ ਦੇ ਯੋਗ ਬਣ ਜਾਂਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਇਸ ਰਾਹੀਂ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਲਿਖਤ ਦੇ ਹੋਂਦ ਵਿੱਚ ਆਉਣ ਦੇ ਪੜਾਵਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਦਾ ਹੈ ਖਾਸ ਕਰਕੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਲਿਪੀ ਗੁਰਮੁਖੀ ਬਾਰੇ।
- ਇਸ ਵਿਸ਼ੇ ਦੇ ਮਾਧਿਅਮ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੇ ਮੁੱਢਲੇ ਪ੍ਰਬੰਧ ਨੂੰ ਸਮਝਕੇ ਕਿਸੇ ਦੂਜੀ ਭਾਸ਼ਾ ਦੇ ਪ੍ਰਬੰਧ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਬਣਦਾ ਹੈ।

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਭਾਗ ਓ ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਨਿਬੰਧ – ਸੰਪਾ. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ, ਪਰਮਜੀਤ ਸਿੰਘ ਸਿੱਧੂ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, 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-੮ ਸਥਾਨਕ 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-ਸ ਭਾਗ ਓ ਤੇ ਵਿਆਕਰਨ ਦੇ ਅ-1 ਵਾਲੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ਓ ਵਿੱਚੋਂ ਕਿਸੇ ਇਕ ਨਿਬੰਧ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ ਨਿਬੰਧ ਕਲਾ ਜਾਂ ਲੇਖਕ ਦਾ ਯੋਗਦਾਨ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
 - ਭਾਗ ਓ ਵਿੱਚੋਂ ਨਿਬੰਧਾਂ ਵਿਚਲੇ ਵਿਚਾਰਾਂ ਸਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਚਾਰ ਵਿੱਚੋਂ ਦੋ) 4+4=08 ਅੰਕ
 - ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਅ-1 ਨਾਲ ਸਬੰਧਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
 - ਭਾਗ ਅ-2 ਵਿਚਲੇ ਵਿਸ਼ਿਆਂ 'ਤੇ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਸਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇਕ) 08 ਅੰਕ
 - 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
 - ਭਾਗ ਸ ਵਿਚ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 10 ਪ੍ਰਸ਼ਨ, ਭਾਗ ਓ ਅਤੇ ਅ-1 ਦੀਆਂ ਪੁਸਤਕਾਂ ਵਿੱਚੋਂ ਬਰਾਬਰ ਪੁੱਛੇ ਜਾਣਗੇ। 10x2= 20 ਅੰਕ
- ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਵਿਚ ਉੱਤਰ ਦੇਣੇ ਹੋਣਗੇ ਅਤੇ ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਦੋ ਅੰਕ ਹੋਣਗੇ।

(ਨੋਟ: ਪੇਪਰ ਵਿਚ ਭਾਗ ਅ ਦੇ ਅ.2 ਅਤੇ ੮ ਵਿੱਚੋਂ 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।

- 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

- ਹਰਕੀਰਤ ਸਿੰਘ, ਭਾਸ਼ਾ ਵਿਗਿਆਨ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ, ਬਾਹਰੀ ਪਬਲੀਕੇਸ਼ਨ, ਦਿੱਲੀ, 1971.
- ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ ਅਤੇ ਵਿਆਕਰਨ (ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਵਿਸ਼ਾ ਕੋਸ਼), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2000.
- ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ: ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ, 2008.
- ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ, ਸਿਧਾਂਤਕ ਭਾਸ਼ਾ ਵਿਗਿਆਨ, ਮਦਾਨ ਪਬਲਿਸਰਜ਼, ਪਟਿਆਲਾ, 2002.

5. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਸ਼੍ਰੋਤ ਤੇ ਬਣਤਰ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 1996.

6. ਖੋਜ ਪੜ੍ਹਕਾ (ਨਿਬੰਧ ਅੰਕ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ.

7. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨ, ਭਾਗ ਪਹਿਲਾ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ, 2009.

8. ਸੁਖਵਿੰਦਰ ਸਿੰਘ ਸੰਘਾ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ, 1999.

9. 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 Elementary Punjabi (Mudla Gyan). Other students will study compulsory Punjabi.

ਕ੍ਰੈਡਿਟ :4 (3+1)

ਕੁੱਲ ਅੰਕ : 100

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਦਾ ਸਮਾਂ : 3 ਘੰਟੇ

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

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

Course Outcome

1. ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖੋ- ਵੱਖਰੀਆਂਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂਹੁੰਦੇਹੋਏ ਪੰਜਾਬੀ ਸਾਹਿਤ ਨੂੰਸਮਝਣ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦੇਹਨ।
2. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਦੂਜੀਭਾਸ਼ਾ ਦੀ ਸ਼ਬਦਬਣਤਰਨੂੰਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇਹਨ।
3. ਇਸ ਰਾਹੀਂਬਾਹਰਲੇਰਾਜਾਂ ਦੇ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਿੱਚਮੁਹਾਰਤਹਾਸਿਲ ਕਰਕੇ ਕਿਸੇਵੀਸਰਕਾਰੀਜਾਂਪ੍ਰਾਈਵੇਟਅਦਾਰੇਵਿੱਚਸੰਚਾਰਕਰਨ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇਹਨ ।

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਪਾਠ ਪੁਸਤਕ: ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (ਭਾਗ ਪਹਿਲਾ, ਸਮੈਸਟਰ ਦੂਜਾ), 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 ਅਧਾਰਿਤ ਹੋਵੇ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਲਈ ਪੁਸਤਕ ਦੇ ਪਿੱਛੇ ਦਿੱਤੇ ਗਏ ਨਮੂਨਾ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਸਟਾਇਲ ਨੂੰ ਅਧਾਰ 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
-

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 Elementary Punjabi. Other students will study Compulsory Punjabi.

BSNM 202: ENGLISH COMMUNICATION SKILLS

Credit: 4: 4H (L)

Time: 3 hours

Maximum Marks: 100

Pass Marks: 35%

Theory: 70 marks

Periods per week: 5

Internal Assessment: 30 marks

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

- Acquaint with the rhythm, metrics and other musical aspects of poetry
- Understand, discuss and critically analyze selected poems by different poets
- Understand and appreciate poetry as a literary art form
- Enhance their vocabulary

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

BSMN 203: PHYSICS
ELECTRICITY AND MAGNETISM

Maximum Marks: External 70

Internal: 30

Total: 100

Time Allowed: 3 Hours

Total Teaching hours: 60

Pass Marks: 35%

On successful completion of the course students would have:

CO1: Gain knowledge on the vector analysis.

CO2: Understand the concept of electrostatics and its applications on conductors and dielectrics.

CO3: Understand the concept of magnetism and magnetic materials such as paramagnetic, diamagnetic and ferromagnetic substances.

CO4: Gain knowledge on electromagnetic induction and its applications.

CO5: Acquire the knowledge of electromagnetic waves and Maxwell's equations.

Out of 100 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 30 marks, and the final examination at the end of the semester carries 70 marks.

INSTRUCTION FOR THE PAPER SETTER

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

INSTRUCTION FOR THE CANDIDATES

The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 10 marks and section C carries 30 marks. Use of scientific calculators is allowed

Section - A

Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarization, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

Section - B

Magnetism:

Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law. Introduction of dia-, para-and ferromagnetic materials. Magnetic properties of materials: Magnetic intensity, magnetic induction. Behaviour of various substances in magnetic field. Permeability and susceptibilities and their inter-relationship. Orbital motion of electrons and diamagnetism. Electron spin and Paramagnetism. Definition of M and H and their relation to free and bound currents. Ferromagnetism. Domain theory of Ferromagnetism. Hysteresis Loss. Magnetization curve Ferrites.

Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field.

Maxwell's equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.

Reference Books:

1. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education
2. Electricity & Magnetism, J.H. Fewkes & J.Yarwood. Vol. I, 1991, Oxford Univ. Press
3. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
5. D.J.Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.

BSMN 203: PHYSICS LAB
ELECTRICITY AND MAGNETISM (PRACTICAL)

After successful completion of the course, the student is expected to have:

CO1: A working knowledge of electrical circuits and variation of magnetic field.

CO2: The ability to identify, formulates, and solve problems related to electricity and magnetism.

CO3: The ability to conduct, analyse and interpret experiments in this discipline.

CO4: The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation.

CO5: A hands on experience on ballistic galvanometer, RC, LCR circuits, Carey Foster's Bridge, and use of multimeter.

Maximum Marks: 50

60 Lectures

1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.
2. Ballistic Galvanometer:
 - (i) Measurement of charge and current sensitivity
 - (ii) Measurement of CDR
 - (iii) Determine a high resistance by Leakage Method
 - (iv) To determine Self Inductance of a Coil by Rayleigh's Method.
3. To compare capacitances using De'Sauty's bridge.
4. Measurement of field strength B and its variation in a Solenoid (Determine dB/dx).
5. To study the Characteristics of a Series RC Circuit.
6. To study the series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
7. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor
8. To determine a Low Resistance by Carey Foster's Bridge.
9. To verify the Thevenin and Norton theorem
10. To verify the Superposition, and Maximum Power Transfer Theorem.

Reference Books

1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
4. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

BSNM-204 (PAPER III): 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 the convergence and divergence of an 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

BSNM-204 (Paper IV): 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 mid point 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.

BSNM-205: PHYSICAL CHEMISTRY- I: THERMODYNAMICS & EQUILIBRIA
(Credits:Theory-02)

Max Marks: 50

Semester Paper: 35

Internal Assessment: 15

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

Objectives: The students will be able to:

O1. State the various laws of thermodynamics and define heat, work, thermal efficiency and different between various forms of energy.

O2. Describe the energy exchange processes in terms of various forms of energy, heat and work.

O3. Describe a system at chemical equilibrium and position of equilibrium.

O4. Describe the difference between completion for irreversible and reversible chemical reactions.

Outcomes: at the end of this course, the students will be able to:

CO1. Describe why concentration of reactants and products donot changes at equilibrium stage.

CO2. Describe the set of conditions where a chemical reaction can reasonably be treated as an irreversible and reversible reaction.

CO3. Deal with thermal equilibrium using Zeroth law of thermodynamics.

CO4. Predict the feasibility of a reaction on the basis of concept of entropy and Gibbs free energy.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all by selecting two questions each from sections A & B and Section C (9th question) is compulsory.

Section A

(15 Hrs)

Thermodynamics- I

Definition of thermodynamics terms: system, surroundings. Types of systems, intensive and extensive properties. State and path functions and their differentials, Thermodynamic processes, Concept of heat and work, elementary idea of thermochemistry.

First Law of Thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law. Joule Thomson coefficient and inversion temperature, Calculation of w , q , dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Variation of enthalpy of a reaction with temperature – Kirchhoff's equation.

Second law of thermodynamics: need for the law, different statements of the law, Carnot cycle and its efficiency, Carnot theorem.

Concept of entropy as a state function, entropy as a function of V & T , entropy as a function of P & T , entropy change in physical change, Clausius inequality, entropy as a criterion of spontaneity and equilibrium. Entropy change in ideal gases mixing of gases.

Section B

(15 Hrs)

Thermodynamics-II

Third law of thermodynamics, Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities. A & G as criteria for

thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T .

Chemical and ionic equilibrium:

Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. Le Chatelier's principle. Relationships between K_p , K_c and K_x for reactions involving ideal gases. Reaction isotherm and Van't Hoff equation and Clausius-Clapeyron equation

Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect. Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.

Reference Books:

1. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
2. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
3. Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage 4. Learning India Pvt. Ltd., New Delhi (2009).
4. Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998).
5. Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.:New York (1985).

BSNM-205:ORGANIC CHEMISTRY-II: FUNCTIONAL ORGANIC CHEMISTRY
(Credits: Theory-02)

Max Marks : 50

Semester Paper: 35

Internal Assessment: 15

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

Objectives: the students will be able to:

O1. Predict the products of the reactions of carbonyl compound with Grignard reagent, hydride ion donor and phosphonium ylides etc.

O2. Write the mechanism and products for nucleophilic addition, elimination reactions of carbonyl compounds.

O3. Classify the alcohols, phenols, ether, aldehydes and ketones and also name them according to IUPAC and common nomenclature.

O4. Understand the types of reactions like SN^1 & SN^2 with energy profile diagrams.

Outcomes: At the end of this course, the students will be able to:

CO1. Identify the difference between various organic compounds on the basis of functional groups attached and their respective properties.

CO2. Acquire the knowledge of various industrial chemical reactions.

CO3. Draw structures of various organic compounds on the basis of hybridization and MOT.

CO4. Gain knowledge about the standard conditions for occurrence of organic reactions.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all by selecting two questions each from sections A & B and Section C (9th question) is compulsory.

Section A

(15 Hrs)

Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.

Aromatic hydrocarbons

Structure of benzene Stability and carbon-carbon bond lengths of benzene, resonance structure, MO picture

Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid.

Reactions: (Case benzene): Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation) (upto 4 carbons on benzene). Side chain oxidation of alkyl benzenes (upto 4 carbons on benzene).

Alkyl and Aryl Halides

Alkyl Halides (Upto 5 Carbons) Types of Nucleophilic Substitution (SN_1 , SN_2) reactions. SN_2 and SN_1 reactions with energy profile diagrams

Preparation: from alkenes and alcohols.

Reactions: hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation. Williamson's ether synthesis: Elimination vs substitution.

Aryl Halides Preparation: (Chloro, bromo and iodo-benzene case): from phenol, Sandmeyer & Gattermann reactions.

Reactions (Chlorobenzene): Aromatic nucleophilic substitution (replacement by –OH group) and effect of nitro substituent. Benzyne Mechanism: KNH_2/NH_3 (or $\text{NaNH}_2/\text{NH}_3$).

Reactivity and Relative strength of C-Halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.

Section B

(15 Hrs)

Alcohols, Phenols and Ethers

Classification and nomenclature.

Monohydric Alcohols-nomenclature, methods of formation by reduction of aldehydes, ketone, carboxylic acids and esters. Hydrogen bonding, Acidic nature, Reactions of alcohols.

Dihydric alcohols-nomenclature, methods of formation, chemical reactions of vicinal glycols-nomenclature, methods of formation chemical reaction of vicinal glycols, oxidative cleavage with $[\text{Pb}(\text{OAc})_4]$ and HIO_4 and Pinacol-Pinacolone rearrangement.

Trihydric alcohol-nomenclature, methods of formation and chemical reactions of glycerol.

Phenols.

Nomenclature, structure and bonding. Preparation of Phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols-electrophilic aromatic substitution, acylation and carboxylation Mechanisms of Fries rearrangement. Gatterman synthesis, Hauben. Hostch reaction. Lederer-Mianasse reaction and Reimer-Tiemann reaction.

Ethers

Nomenclature of ethers and methods of their formation, physical properties, Chemical reactions-cleavage and autooxidation, Ziesel' s Method.

Aldehydes and Ketones

Nomenclature and structure of the carbonyl group, Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3- dithianes, synthesis of ketones from nitrites and from carboxylic acids. Physical properties and Mechanism of nucleophilic addition to carbonyl group with particular emphasis of Benzoin, Aldol, Perkin and Knoevenagel condensations, Condensation with ammonia and its derivatives, Wittig reaction, and Mannich reaction.

Use of acetals as protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV (Meerwein Ponderoff Vorley) reaction, Clemmensen, Wolff-Kishner, LiAlH_4 and NaBH_4 reductions. Halogenation of enolizable ketones.

An Introduction to α, β unsaturated aldehydes and ketones, Michael addition.

Reference Books:

1. Graham Solomon, T.W., Fryhle, C.B. & Snyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
2. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
3. Sykes, P. A Guidebook to Mechanism in Organic Chemistry, Orient Longman, New Delhi (1988).
4. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010.
6. Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.

BSNM-205: CHEMISTRY –II PRACTICAL
(Credit -02)

Max Marks: 50
Semester paper: 50

60 hours

Time allowed - 3

hrs

Pass Marks: 35%

Section A: Physical Chemistry

Thermochemistry

1. Determination of heat capacity of calorimeter for different volumes.
 2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
 3. Determination of enthalpy of ionization of acetic acid.
 4. Determination of integral enthalpy of solution of salts (KNO₃, NH₄Cl).
 5. Determination of enthalpy of hydration of copper sulphate.
 6. Study of the solubility of benzoic acid in water and determination of enthalpy. Ionic equilibria
- pH measurements
- a) Measurement of pH of different solutions like aerated drinks, fruit juices, shampoos and soaps
 - b) (use dilute solutions of soaps and shampoos to prevent damage to the glass electrode) using pH-meter.
- b) Preparation of buffer solutions:
- (i) Sodium acetate-acetic acid
 - (ii) Ammonium chloride-ammonium hydroxide
- Measurement of the pH of buffer solutions and comparison of the values with the theoretical values.

Section B: Organic Chemistry

1. Purification of organic compounds by crystallization (from water and alcohol).
 2. Criteria of Purity: Determination of melting and boiling points.
 3. Preparations: Mechanism of various reactions involved to be discussed. Recrystallisation, determination of melting point and calculation of quantitative yields to be done.
- (a) Benzoylation of amines/phenols
- (b) Oxime and 2,4-dinitrophenylhydrazone of aldehyde/ketone

Reference Books

1. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G.,
2. Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996.
3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry Orient-Longman, 1960.
4. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry,
5. R. Chand & Co.: New Delhi (2011).

INSTRUCTIONS FOR EXAMINERS AND CANDIDATES

The practical examination will be held in single session (morning/evening). Candidates are required to perform

practicals from volumetric Analysis and TLC. Distribution of marks will be as under (Books may be consulted):

- (1) Organic Chemistry Experiment

(a) Preparation = 10 marks (Preparation:5, recrystallisation: 3, Determination of melting point: (2)

(b) Purification and determination of melting point (5)

Physical Chemistry Experiment=20 marks (initial Write up 7 marks

(Theory/principle: 2, Procedure: 2, General Calculations: 3)

Performance and result: 13 marks (Full credit up to 10% error)}

(3) Viva-Voce = 10 marks

(4) Note Books = 5 marks

Total = 50 marks

BSMN 205-A: DATABASE MANAGEMENT SYSTEM

6 CREDITS: 4H(L) + 4H(P)

Time: 3 hours

External Marks: 70

Pass Marks: 35% marks

Internal Assessment: 30

Total Teaching Hours: 45-50

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 THE PAPER SETTER

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

INSTRUCTIONS FOR THE CANDIDATES

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

UNIT - I

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.

UNIT - II

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 Database Design.

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 Education India.
2. Henry F. Korth, Abraham, *"Database System Concepts"*, Tata McGraw Hill.
3. Naveen Prakash, *"Introduction to Database Management"*, TMH.
4. C.J. Date, *"An Introduction to Data Base Systems"*, Pearson Education India.

BSMN 205-A: SOFTWARE LAB -II
(BASED ON DATABASE MANAGEMENT SYSTEM)

Maximum Marks: 50

Internal Assessment: 15

Maximum Time: 3 hours

Minimum Pass Marks: 35%

The breakup of marks for the practical will be as under:-

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

Students are required to practices following:

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.

N-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: 3hours

Pass Marks 35%

Lectures per week: 4

Max Marks: 100

Theory: 70

Internal Assessment: 30

Course Objectives: 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. (NON-MEDICAL)
PART-II (SEMESTER-III & IV)
2021-22

SEMESTER III								
Paper Code	Subject	Credits			Marks			Total Marks
		Theory	Practical	Total	External Theory	Internal Assessment	Practical	
BSNM 301	Punjabi Compulsory	4	0	4	70	30	-	100
BSNM 301 A	Punjabi Compulsory (Mudla Gyan/Elementary Punjabi)							
BSNM 302	Physics:- Thermal Physics and Statistical Mechanics	4	2	6	70	30	50	150
BSNM 303	Mathematics:-							
	Paper V: Integral Calculus	4	0	8	52	23	0	150
	Paper VI: Differential Equations - I	4			52	23		
BSNM 304	Chemistry:-							
	(i): Physical Chemistry-II: Solutions, Phase Equilibrium and Electrochemistry	2	2	6	35	15	50	150
	(ii): Organic Chemistry-III: Carboxylic Acids and Amines	2			35	15		
BSNM 304-A	Computer Science: Programming Using ‘C’	4	2	6	70	30	50	150
BSNM 305	Environmental and Road Safety Awareness	4	0	4	70	30	-	100
TOTAL		24	04	28	384	166	100	650
SEMESTER IV								
Paper Code	Subject	Credits			Marks			Total Marks
		Theory	Practical	Total	External Theory	Internal assessment	Practical	
BSNM 401	Punjabi Compulsory	4	0	4	70	30	-	100
BSNM 401 A	Punjabi Compulsory (Mudla Gyan/Elementary Punjabi)							
BSNM 402	Physics: Waves and Optics	4	2	6	70	30	50	150
BSNM 403	Mathematics:-							
	Paper VII: Real Analysis	4	0	8	52	23	0	150
	Paper VIII: Differential Equations-II	4			52	23		
BSNM 404	Chemistry:-							
	(i): Inorganic Chemistry II: Transition Metal Coordination Chemistry	2	2	6	35	15	50	150
	(ii): Physical Chemistry-III: States of Matter & Chemical	2			35	15		

	Kinetics							
BSNM 404-A	Computer Science: Data Structures	4	2	6	70	30	50	150
TOTAL		20	04	24	314	136	100	550

APPROVED

Member Secretary
Academic Council

APPROVED

Principal
General Shivdev Singh Diwan Gurbachan Singh
Khalsa College Patiala

(SEMESTER III)

BSNM 301: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਕ੍ਰੈਡਿਟ: 04

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਕੁੱਲ ਅੰਕ : 100 ਅੰਕ

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

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

Course Objectives

1. ਵਿਦਿਆਰਥੀ ਸਮਕਾਲੀਲੇਖਕਾਂਦੁਆਰਾਸਮਾਜਿਕ, ਆਰਥਿਕ, ਰਾਜਨੀਤਿਕ, ਧਾਰਮਿਕਪ੍ਰਸਥਿਤੀਆਂਨੂੰਸਮਝਦਾਹੋਇਆਉਹਨਾਂਨੂੰ ਉਹ ਨਾਟਕੀ ਅਤੇ ਕਾਵਿਕਅੰਦਾਜ਼ਵਿੱਚਪੇਸ਼ਕਰਨ ਦੇ ਯੋਗ ਬਣ ਜਾਂਦਾ ਹੈ।
2. ਵਿਦਿਆਰਥੀ ਇਸ ਰਾਹੀਂ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਲਿਖਤ ਦੇ ਹੋਂਦਵਿੱਚਆਉਣ ਦੇ ਪੜਾਵਾਂਬਾਰੇਜਾਣਕਾਰੀਹਾਸਿਲਕਰਦਾ ਹੈ ਖਾਸ ਕਰਕੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਲਿਪੀਗੁਰਮੁਖੀਬਾਰੇ।
ਇਸ ਵਿਸ਼ੇ ਦੇ ਮਾਧਿਅਮਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੇ ਮੁੱਢਲੇਪ੍ਰਬੰਧਨੂੰਸਮਝਕੇਕਿਸੇਦੂਜੀਭਾਸ਼ਾ ਦੇ ਪ੍ਰਬੰਧਨੂੰਸਮਝਣ ਦੇ ਸਮਰੱਥ ਬਣਦਾ ਹੈ।

ਪਾਠਕਮ ਅਤੇ ਪਸ਼ਨ -ਪੱਤਰ ਦੀ ਰੂਪ- ਰੇਖਾ

ਭਾਗ-ੳ

ਸਮਕਾਲੀ ਪੰਜਾਬੀ ਨਾਟਕ (1960 ਤੋਂ ਪਿੱਛੋਂ ਦੇ ਇਕਾਗੀਆਂ ਦਾ ਸੰਗ੍ਰਹਿ): ਸੰਪਾ. ਡਾ.ਮਨਜੀਤਪਾਲ ਕੌਰ ਅਤੇ ਡਾ. ਜਸਵਿੰਦਰ ਸਿੰਘ ਸੈਣੀ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ,ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ।

ਭਾਗ-ਅ

ਅ-1: ਲੇਖ ਰਚਨਾ (ਚਲੰਤ ਮਸਲਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ)

ਅ-2: ਵਿਆਕਰਣ

(i)ਮੂਲ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦੀ ਪਛਾਣ ਅਤੇ ਸਥਾਪਤੀ

(ii) ਵਾਕ ਬਣਤਰ ਅਤੇ ਵਾਕ ਰਚਨਾ

(iii) ਉਪਵਾਕ ਬਣਤਰ : ਪਛਾਣ ਤੇ ਕਾਰਜ

ਭਾਗ-ੲ

ਭਾਗ ੳ ਅਤੇ ਵਿਆਕਰਨ ਦੇ ਅ-2 ਵਾਲੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ਓ ਵਿੱਚੋਂ ਕਿਸੇ ਇਕਾਂਗੀ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ / ਸਾਰ / ਕਲਾ ਪੱਖ ਅਤੇ ਲੇਖਕ ਦਾ ਯੋਗਦਾਨ।

(ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ)

12 ਅੰਕ

2. ਇਕਾਂਗੀਆਂ ਵਿਚਲੇ ਪਾਤਰਾਂ ਦਾ ਪਾਤਰ- ਚਿਤਰਨ (ਚਾਰ ਵਿੱਚੋਂ ਕੋਈ ਦੋ)

6+6=12 ਅੰਕ

3. ਲੇਖ ਰਚਨਾ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ)

10 ਅੰਕ

4. ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਅ-2 ਨਾਲ ਸਬੰਧਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇੱਕ)

12 ਅੰਕ

5. ਭਾਗ ਏ ਵਿੱਚ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 12 ਪ੍ਰਸ਼ਨ, ਭਾਗ ਓ ਅਤੇ ਅ-2 ਦੀਆਂ ਪੁਸਤਕਾਂ ਵਿੱਚੋਂ ਬਰਾਬਰ ਪੁੱਛੇ ਜਾਣਗੇ।

ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਵਿੱਚ ਉੱਤਰ ਦੇਣੇ ਹੋਣਗੇ ਅਤੇ ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਦੋ ਅੰਕ ਹੋਣਗੇ। $12 \times 2 = 24$ ਅੰਕ

(ਨੋਟ: ਪੇਪਰ ਵਿੱਚ ਭਾਗ ਅ ਦੇ ਅ.1 ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ ਨਹੀਂ ਪੁੱਛੇ ਜਾਣਗੇ)।

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ

30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ: ਅਧਿਆਪਕ, ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਲਈ, ਸਮਾਜਿਕ ਵਰਤਾਰਿਆਂ ਨੂੰ ਡੂੰਘਾਈ ਵਿੱਚ ਸਮਝਣ ਦੀ ਚੇਤਨਾ ਪੈਦਾ ਕਰਨ ਦੇ ਨਾਲ-ਨਾਲ ਉਨ੍ਹਾਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਨੂੰ ਪ੍ਰਫੁੱਲਤ ਕਰਨ ਲਈ ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਪਾਠ-ਕ੍ਰਮ ਨਾਲ ਸੰਬੰਧਿਤ ਗਤੀਵਿਧੀਆਂ ਦਾ ਵਿਹਾਰਕ ਰੂਪ ਵਿੱਚ ਅਭਿਆਸ ਕਰਵਾਏਗਾ। ਇਸ ਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀ ਵੱਖ-ਵੱਖ ਵਿਸ਼ਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਘੱਟੋ-ਘੱਟ ਦੋ ਵਿਗਿਆਪਨ ਤਿਆਰ ਕਰਨਗੇ। 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 ਇੱਕ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਇਆ ਜਾਵੇਗਾ।

ਸਹਾਇਕ ਪਾਠ- ਸਮੱਗਰੀ

1. ਗੁਰਦਿਆਲ ਸਿੰਘ ਫੁੱਲ, **ਪੰਜਾਬੀ ਨਾਟਕ: ਸਰੂਪ ਸਿਧਾਂਤ ਤੇ ਵਿਕਾਸ**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 1988.
2. ਗੁਰਦਿਆਲ ਸਿੰਘ ਫੁੱਲ, **ਪੰਜਾਬੀ ਇਕਾਂਗੀ: ਸਰੂਪ ਸਿਧਾਂਤ ਤੇ ਵਿਕਾਸ**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 1987.
3. ਨਵਨਿੰਦਰਾ ਬਹਿਲ, **ਨਾਟਕੀ ਸਾਹਿਤ**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 1991.
4. ਸਤੀਸ਼ ਕੁਮਾਰ ਵਰਮਾ, **ਪੰਜਾਬੀ ਨਾਟ-ਚਿੰਤਨ**, ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ, ਸਰਹਿੰਦ, 1989.
5. ਜੀ.ਬੀ.ਸਿੰਘ, **ਗੁਰਮੁਖੀ ਲਿਪੀ ਦਾ ਜਨਮ ਤੇ ਵਿਕਾਸ**, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ, 1960.
6. ਗਿ.ਲਾਲ ਸਿੰਘ ਤੇ ਹਰਕੀਰਤ ਸਿੰਘ, **ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ**, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀ.ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।
7. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ: ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ**, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ, 2008.

8. ਪ੍ਰੋਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ, **ਸਿਧਾਂਤਕ ਭਾਸ਼ਾ ਵਿਗਿਆਨ**, ਮਦਾਨ ਪਬਲਿਸਰਜ਼, ਪਟਿਆਲਾ, 2002.

Note:- Those students who have not studied Punjabi up to matriculation can opt for **ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ/ਐਲੀਮਟਰੀ ਪੰਜਾਬੀ)**. Other students will study Punjabi compulsory.

ਜਿਨ੍ਹਾਂ ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਮੈਟ੍ਰਿਕੁਲੇਸ਼ਨ ਤੱਕ ਪੰਜਾਬੀ ਦਾ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ । ਉਹ **ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ/ਐਲੀਮਟਰੀ ਪੰਜਾਬੀ)** ਦਾ ਵਿਸ਼ਾ ਪੜ੍ਹਨਗੇ ਬਾਕੀ ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ ਦਾ ਵਿਸ਼ਾ ਹੀ ਪੜ੍ਹਨਾ ਹੋਵੇਗਾ।

BSNM 301 A: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ/ਐਲੀਮੈਂਟਰੀ ਪੰਜਾਬੀ)

ਕ੍ਰੈਡਿਟ: 04

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਕੁੱਲ ਅੰਕ : 100 ਅੰਕ

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

Course Objectives

1. ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖੋ-ਵੱਖਰੀਆਂ ਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹੋਏ ਪੰਜਾਬੀ ਸਾਹਿਤ ਨੂੰ ਸਮਝਣ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦੇ ਹਨ।
2. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਦੂਜੀ ਭਾਸ਼ਾ ਦੀ ਸ਼ਬਦਬਣਤਰ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।
3. ਇਸ ਰਾਹੀਂ ਬਾਹਰਲੇ ਰਾਜਾਂ ਦੇ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਿੱਚ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਕੇ ਕਿਸੇ ਵੀ ਸਰਕਾਰੀ ਜਾਂ ਪ੍ਰਾਈਵੇਟ ਅਦਾਰੇ ਵਿੱਚ ਸੰਚਾਰ ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।

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

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ

ਭਾਗ-ੳ

ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (Elementary Punjabi) ਭਾਗ ਦੂਜਾ (ਸੋਧਿਆ ਹੋਇਆ ਐਡੀਸ਼ਨ): ਸੰਪਾ. ਪ੍ਰੋ. ਪਰਮਜੀਤ ਕੌਰ, ਡਾ. ਹਰਜੀਤ ਕੌਰ ਇਸ ਪੁਸਤਕ ਵਿੱਚ ਕਵਿਤਾ ਅਤੇ ਨਿਬੰਧ ਵਾਲਾ ਭਾਗ (ਸਮੈਸਟਰ ਤੀਜਾ) ਵਿੱਚ ਪੜ੍ਹਾਇਆ ਜਾਵੇਗਾ। (ਡਾ. ਸੁਰਜੀਤ ਸਿੰਘ ਪਾਤਰ ਅਤੇ ਡਾ. ਜਗਤਾਰ ਪਾਠਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ।)

ਭਾਗ-ਅ

ਅ-1 ਮੁਹਾਵਰੇ (ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (Elementary Punjabi) ਭਾਗ ਦੂਜਾ (ਸੋਧਿਆ ਹੋਇਆ ਐਡੀਸ਼ਨ): ਸੰਪਾ. ਪ੍ਰੋ. ਪਰਮਜੀਤ ਕੌਰ, ਡਾ. ਹਰਜੀਤ ਕੌਰ।

ਅ-2 ਵਿਰੋਧੀ ਸ਼ਬਦ ਅਤੇ ਸਮਾਨ ਅਰਥਕ ਸ਼ਬਦ (ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (Elementary Punjabi) ਭਾਗ ਦੂਜਾ (ਸੋਧਿਆ ਹੋਇਆ ਐਡੀਸ਼ਨ): ਸੰਪਾ. ਪ੍ਰੋ. ਪਰਮਜੀਤ ਕੌਰ, ਡਾ. ਹਰਜੀਤ ਕੌਰ।

ਭਾਗ-ੲ

ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ-ੳ ਵਿਚੋਂ ਸੰਖੇਪ ਉਤਰਾ ਵਾਲੇ ਪਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤ

1. ਪਸ਼ਨਾਂ ਦਾ ਪੱਧਰ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਪੱਧਰ ਅਤੇ ਉਹਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੀ ਸੀਮਾ ਨੂੰ ਧਿਆਨ ਵਿੱਚ ਰੱਖ ਕੇ ਹੀ ਨਿਸ਼ਚਿਤ ਕੀਤਾ ਜਾਵੇ। ਉਹਨਾਂ ਨੂੰ ਸਰਲ ਅਤੇ ਸਪੱਸ਼ਟ ਪਸ਼ਨ ਹੀ ਪੁੱਛੇ ਜਾਣ।
 2. ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟੇ ਜਾਂ ਚੋਟੇ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ।
 3. ਪਸ਼ਨ ਸਾਰੇ ਭਾਗਾਂ ਵਿੱਚ ਪੁੱਛੇ ਜਾਣ।
 4. ਕਿਸੇ ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਵਿਸ਼ਾ –ਵਸਤੂ (ਦੋ ਵਿੱਚ ਇੱਕ) 10 ਅੰਕ
 5. ਕਿਸੇ ਕਵਿਤਾ ਦਾ ਸਾਰ ਜਾਂ ਵਿਸ਼ਾ –ਵਸਤੂ (ਦੋ ਵਿੱਚ ਇੱਕ) 10 ਅੰਕ
 6. ਕੋਈ 12 ਮੁਹਾਵਰਿਆਂ ਵਿੱਚ 10 ਦੇ ਅਰਥ ਦੱਸ ਕੇ ਵਾਕਾਂ ਵਿੱਚ ਵਰਤ 10×1= 10 ਅੰਕ
 7. ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ ਅਤੇ ਵਿਰੋਧੀ ਸ਼ਬਦ 10-10 ਪੁੱਛੇ ਜਾਣਗੇ ਜਿੰਨ੍ਹਾਂ ਵਿੱਚੋਂ 10-10 ਕਰਨੇ ਹੋਣਗੇ। 10 ਅੰਕ
 8. ਉਪਰੋਕਤ ਸਿਲੇਬਸ ਦੇ ਆਧਾਰ 'ਤੇ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ 15 ਪਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਹਰੇਕ ਪਸ਼ਨ ਦਾ ਉਤਰ ਚਾਰ-ਪੰਜ ਸਤਰਾਂ ਵਿੱਚ ਹੋਵੇ। ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਸਾਰੇ ਪਸ਼ਨ ਹੱਲ ਕਰਨ ਹਨ। ਹਰੇਕ ਪਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ। ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ 15 ਪਸ਼ਨ ਕੇਵਲ ਭਾਗ-ੳ ਵਿੱਚ ਹੀ ਪੁੱਛੇ ਜਾਣਗੇ। 15
- x2=30 ਅੰਕ

ਨੋਟ: ਸਾਰਾ ਪਸ਼ਨ -ਪੱਤਰ ਪਾਠ-ਕਮ ਲਈ ਨਿਰਧਾਰਿਤ ਪਾਠ ਪੁਸਤਕ ਵਿੱਚ ਹੀ ਪੁੱਛਿਆ ਜਾਵੇ।

ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ

ਕੁੱਲ = 30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ/ਘਰੇਲੂ ਇਮਤਿਹਾਨ/ ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ: ਅਧਿਆਪਕ, ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਲਈ, ਸਮਾਜਿਕ ਵਰਤਾਰਿਆਂ ਨੂੰ ਡੂੰਘਾਈ ਵਿੱਚ ਸਮਝਣ ਦੀ ਚੇਤਨਾ ਪੈਦਾ ਕਰਨ ਦੇ ਨਾਲ-ਨਾਲ ਉਨ੍ਹਾਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਨੂੰ ਪ੍ਰਫੁੱਲਿਤ ਕਰਨ ਲਈ ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਪਾਠ-ਕ੍ਰਮ ਨਾਲ ਸੰਬੰਧਿਤ ਗਤੀਵਿਧੀਆਂ ਦਾ ਵਿਹਾਰਕ ਰੂਪ ਵਿੱਚ ਅਭਿਆਸ ਕਰਵਾਏਗਾ। ਇਸ ਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀ ਵੱਖ-ਵੱਖ ਵਿਸ਼ਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਘੱਟੋ-ਘੱਟ ਪੰਜ ਵਿਗਿਆਪਨ ਤਿਆਰ ਕਰਨਗੇ। 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 ਇੱਕ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ।

BSNM 302: PHYSICS

THERMAL PHYSICS AND STATISTICAL MECHANICS

Maximum Marks:

External	70	Time Allowed: 3 Hours
Internal	30	Total Teaching hours: 60
Total	100	Pass Marks: 35%

Out of 100 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 30 marks, and the final examination at the end of the semester carries 70 marks.

Instruction for the Paper Setter: The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 10 short answer type questions, which will cover the entire syllabus uniformly. Each question of sections A and B carry 10 marks. Section C will carry 30 marks.

Instruction for the candidates: The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 10 marks and section C carries 30 marks. Use of scientific calculators is allowed

Objective : *The covers laws of thermodynamics and applications, Thermodynamic Potentials, Maxwell's Thermodynamic Relations, Kinetic theory of gases, molecular collisions and real gas behaviour, Equation of State for Real Gases, Joule-Thomson Effect for Real and Van der Waal Gases.*

Section A

Laws of Thermodynamics:

Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First

law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between CP & CV, Work Done during Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient, Reversible & irreversible processes, Second law & Entropy, Carnot's cycle & theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero. (20 Lectures)

Thermodynamic Potentials:

Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations & applications - Cooling produced by adiabatic expansion of the any substance, Adiabatic compression of a substance, Change in internal energy with volume, Expression of $C_p - C_v$ using Maxwell equations. Change in state and Clapeyron's equation. Joule Thomson Effect (Thermodynamic treatment, for vander-waals gas). (10 Lectures)

Section B

Kinetic Theory of Gases:

Derivation of Maxwell's law of distribution of velocities and its experimental verification, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases. (10 Lectures)

Theory of Radiation:

Blackbody radiation, Spectral distribution, Concept of Energy Density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh-Jeans Law, Stefan Boltzmann Law and Wien's displacement law from Planck's law. (10 Lectures)

Statistical Mechanics:

Phase space, Macrostate and Microstate, Entropy and Thermodynamic probability, Maxwell-Boltzmann law - distribution of velocity - Quantum statistics - Fermi-Dirac distribution law - electron gas - Bose-Einstein distribution law - photon gas - comparison of three statistics.

(10 Lectures)

Reference Books:

1. Thermal Physics, S. Garg, R. Bansal and C. Ghosh, 2013, Tata McGraw-Hill.
2. Statistical Physics, Thermodynamics and Kinetic theory, V.S Bhatia, Vishal Publishing (2017).
3. Thermal and Statistical Physics, Sandeep Sharma, Anne Books Pvt. Ltd.(2021).
4. Heat and Thermodynamics, M.W.Zemasky and R. Dittman, 1981, McGraw Hill
5. Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears & G.L.Salinger. 1988, Narosa
6. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
7. A text book of Statistical Mechanics, Suresh Chandra and Mohit Kumar Sharma, CBS

publications (2016).

BSNM 302: PHYSICS LAB

THERMAL PHYSICS AND STATISTICAL MECHANICS

1. To determine Mechanical Equivalent of Heat, J , by Callender and Barne's constant flow method.
2. Measurement of Planck's constant using black body radiation.
3. To determine Stefan's Constant.
4. To determine the coefficient of thermal conductivity of copper by Searle's Apparatus.
5. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
6. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.
7. To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
8. To study the variation of thermo emf across two junctions of a thermocouple with temperature.
9. To record and analyze the cooling temperature of an hot object as a function of time using a thermocouple and suitable data acquisition system
10. To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge.

Reference Books:

1. Practical Physics, Gupta Kumar, Dr. S.L Gupta, Dr. V. Kumar, Pragati Prakashan Edition (2010).
2. B.Sc Practical Physics, C.L Arora, S. Chand Publishing (1957).
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, Kitab Mahal, New Delhi (2011).
4. B.Sc Practical Physics, Harman Singh and Dr P.S Hemne, S. Chand Publishing (2011).

BSNM 303: MATHEMATICS
(PAPER V): 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

BSNM 303: MATHEMATICS

(PAPER VI): 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: $Mdx + Ndy = 0$, 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

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

Method of variation of parameters for solving

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

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. Fra
nk Ayres , *Theory & Problems of Differential Equations*, Macgraw- Hill Book Co., 2010.
7. Zaf
ar Ahsan, *Differential Equations and their applications*, 2nd Edition, PHI Learning Pvt. Ltd., 2009.
8. Ric
hard Bronson, *Theory & Problems of Differential Equations*, Macgraw- Hill Book Company, 2009.
9. S.L
. Ross, *Differential Equations*, 3rd Edition, John Wiley, 2007.

BSNM 304: CHEMISTRY

6 Credits: 4 H (L) + 4H (P)

(i): PHYSICAL CHEMISTRY-II (SOLUTIONS, PHASE EQUILIBRIUM AND ELECTROCHEMISTRY)

(Credits: Theory-02)

Max. Marks: 50

Time Allowed: 3 hours

External theory: 35

Total Teaching Hours: 30

Internal Assessment: 15

Pass marks: 35%

Course Outcomes

- 1. To understand the ideal and non-ideal solutions.**
- 2. To learn the phase diagram of various mixtures.**
- 3. To understand the basic concept of conductance**
- 4. To learn the fundamentals of electrochemistry**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 very short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions from each of Section A & B and Section C is compulsory.

Section A

(15 Lectures)

Solutions

Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions. Vapour pressure-composition and temperature composition curves of ideal and non-ideal solutions. Distillation of solutions. Lever rule. Azeotropes. Partial miscibility of liquids: Critical solution temperature; effect of impurity on partial miscibility of liquids. Immiscibility of liquids- Principle of steam distillation. Nernst distribution law and its applications.

Phase Equilibrium

Phases, components and degrees of freedom of a system, criteria of phase equilibrium. Gibbs Phase Rule and its thermodynamic derivation. Derivation of Clausius–Clapeyron equation and its importance in phase equilibria. Phase diagrams of one-component systems (water and sulphur) and two component systems involving eutectics mixtures, congruent and incongruent melting points (lead-silver, $\text{FeCl}_3\text{-H}_2\text{O}$ and Na-K only).

Section B

(15 Lectures)

Conductance

Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Kohlrausch law of independent migration of ions. Transference number and its experimental determination using Hittorf and Moving boundary methods. Ionic mobility. Applications of conductance measurements: determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt. Conductometric titrations (only acid-base).

Electrochemistry

Reversible and irreversible cells. Concept of EMF of a cell. Measurement of EMF of a cell. Nernst equation and its importance. Types of electrodes. Standard electrode potential. Electrochemical series. Thermodynamics of a reversible cell, calculation of thermodynamic properties: ΔG , ΔH and ΔS from EMF data. Calculation of equilibrium constant from EMF data. Concentration cells with transference and without transference. Liquid junction potential and salt bridge. pH determination using hydrogen electrode and quinhydrone electrode. Potentiometric titrations -qualitative treatment (acid-base and oxidation-reduction only). Introduction to Fuel Cells.

Reference Books:

1. Barrow, G.M. *Physical Chemistry* Tata McGraw-Hill (2007).
2. Castellan, G.W. *Physical Chemistry* 4th Ed. Narosa (2004).
3. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry*, Cengage Learning India Pvt. Ltd.: New Delhi (2009).
4. Mahan, B.H. *University Chemistry*, 3rd Ed. Narosa (1998).
5. Petrucci, R.H. *General Chemistry*, 5th Ed., Macmillan Publishing Co.: NewYork (1985).
6. Samuel Glasstone An Introduction to Electrochemistry, An East-West Ed. (1971).

(ii): ORGANIC CHEMISTRY-III (CARBOXYLIC ACIDS AND AMINES)

(Credits: Theory-02)

Max. Marks: 50

Time Allowed: 3 hours

External theory: 35

Total Teaching Hours: 30

Internal Assessment: 15

Pass marks: 35%

Course Outcomes

1. To learn the various routes for carboxylic and its derivative synthesis.
2. To understand the basic preparation of Amino acids and proteins (biomolecules).
3. To learn the mechanism of organic reactions.
4. To learn the basics of carbohydrate chemistry.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 very short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions from each of Section A & B and Section C is compulsory.

Section A

(15 Lectures)

Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.

Carboxylic acids

Carboxylic acids (aliphatic and aromatic) *Preparation:* Acidic and Alkaline hydrolysis of esters. *Reactions:* Hell – Vohlard - Zelinsky Reaction.

Carboxylic acid derivatives (aliphatic): (Upto 5 carbons) *Preparation:* Acid chlorides, Anhydrides, Esters and Amides from acids and their interconversion. *Reactions:* Comparative study of nucleophilicity of acyl derivatives. Reformatsky Reaction, Perkin condensation.

Amines

Amines (Aliphatic and Aromatic): (Upto 5 carbons) *Preparation*: from alkyl halides, Hofmann Bromamide reaction. *Reactions*: Hofmann vs. Saytzeff elimination, Carbylamine test, Hinsberg test, with HNO_2 , Schotten – Baumann Reaction. Electrophilic substitution (case aniline): nitration, bromination, sulphonation.

Diazonium salts: *Preparation*: from aromatic amines *Reactions*: conversion to benzene, phenol, dyes.

Section B

(15 Lectures)

Amino Acids, Peptides and Proteins:

Preparation of Amino Acids: Strecker synthesis, Gabriel's phthalimide synthesis. Zwitterion, Isoelectric point and Electrophoresis. *Reactions of Amino acids*: Reaction at $-\text{COOH}$ group, and at $-\text{NH}_2$ group, complexation with Cu^{2+} ions, ninhydrin test. Overview of Primary, Secondary, Tertiary and Quaternary Structure of proteins. Determination of Primary structure of Peptides by degradation Edmann degradation (N-terminal) and C-terminal (thiohydantoin and with carboxypeptidase enzyme).

Carbohydrates: Classification, and General Properties including projections, Glucose and Fructose (open chain and cyclic structure), Determination of configuration of monosaccharides, absolute configuration of Glucose and Fructose, Mutarotation, ascending and descending in monosaccharides. Structure of disaccharides (sucrose, cellobiose, maltose, lactose) and polysaccharides (starch and cellulose) excluding their structure elucidation.

Reference Books:

1. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. *Organic Chemistry (Volume 2)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Nelson, D. L. & Cox, M. M. *Lehninger's Principles of Biochemistry 7th Ed.*, W. H. Freeman.
5. Berg, J.M., Tymoczko, J.L. & Stryer, L. *Biochemistry*, W.H. Freeman, 2002.

CHEMISTRY PRACTICAL

(Credits-02)

Max Marks 50

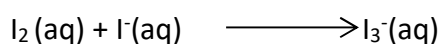
Time 3h

Pass Marks 35 %

Section A: Physical Chemistry

Distribution

Study of the equilibrium of one of the following reactions by the distribution method:



Phase equilibria

- a) Construction of the phase diagram of a binary system.
- b) Determination of the critical solution temperature and composition of the phenol water system and study of the effect of impurities on it.
- c) Study of the variation of mutual solubility temperature with concentration for the phenol water system and determination of the critical solubility temperature.

Conductance

- I. Determination of cell constant
- II. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid.
- III. Perform the following conductometric titrations:
 - i. Strong acid vs. strong base
 - ii. Weak acid vs. strong base

pH

Perform the following titrations:

i. Strong acid vs. strong base

ii. Weak acid vs. strong base

Section B: Organic Chemistry

I Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (-COOH, phenolic, aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative.

II Separation of amino acids by paper chromatography

1. Differentiation between a reducing and a nonreducing sugar.

Reference Books:

Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.

Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry* Orient-Longman, 1960.

Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).

Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry*, Universities Press.

BSNM 304 A: COMPUTER SCIENCE PROGRAMMING USING C

6 CREDIT: 4H (L) + 4H (P)

Time: 3 hours

External Marks: 70 marks

Pass Marks: 35%

Internal Assessment: 30 marks

Total Teaching Hours:45-50

Course Objective

The 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.

INSTRUCTION FOR THE PAPER SETTER

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

INSTRUCTION FOR THE CANDIDATES

The candidates are required to attempt two questions each from section A, B and the entire Section C.

UNIT-I

Fundamentals of C: Introduction, Historical Evolution, Problem Solving Process, General Structure of c program, Preprocessor Directives, 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 and Associativity, Library functions, Input/Output Statements: Formatted and Unformatted.

Control Statements: Decision Control statements - if, if-else, nested if else, else-if ladder, switch Statement, Jumping Statements - break statement, continue statement, goto statement,

Loops Control Statements - while, for, do-while, nested loops.

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

Storage Classes - Automatic, Static, Register and External.

UNIT-II

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 Structure, Array in Structure, Array of Structure, union, Difference between Structure and Union.

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

File Handling: Opening and Closing of files, Input/ Output operation on files, Text and Binary Files.

Suggested Readings:

1. Y. Kanetkar, "Let Us C ", BPB publications
2. E. Balagurusamy, "Programming in C", Tata McGraw Hill.
3. Kamthane, "Programming with ANSI and Turbo C", Pearson Education
4. Dennis Ritchie, "The C Programming Language", Prentice Hall.

SOFTWARE LAB –III (BASED ON PROGRAMMING USING C)

2 CREDIT: 4H (P)

Maximum Marks: 50

Minimum Pass Marks: 35% Internal Assessment: 15

Maximum Time: 3 Hours

The breakup of marks for the practical will be as under:-

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

This laboratory course will comprise of exercises to supplement what is learnt under paper Programming Using C. The candidates are required to write the following programs:

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 using Recursion.
14. To find the nth Fibonacci number using Recursion.
15. To create an employee structure and display the same.

16. Write a function to swap two numbers using pointers.
17. Create a file and store some records in it. Display the contents of the same. Count numbers of characters, words and lines in the file.

BSNM 305 – ENVIRONMENTAL AND ROAD SAFETY AWARENESS

4 CREDIT: 4H (L)

Time Allowed: 3 hours

Total: 100 marks

Total lectures: 50
35 %

Pass marks:

Theory Paper: 70 marks
Assessment: 30 marks

Internal

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).

Unit8: 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)

BSNM 401: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਕ੍ਰੈਡਿਟ: 04

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਕੁੱਲ ਅੰਕ : 100 ਅੰਕ

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

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

ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

Course Objectives

1. ਵਿਦਿਆਰਥੀ ਸਮਕਾਲੀਲੇਖਕਾਂਦੁਆਰਾਸਮਾਜਿਕ, ਆਰਥਿਕ, ਰਾਜਨੀਤਿਕ, ਧਾਰਮਿਕਪ੍ਰਸਥਿਤੀਆਂਨੂੰਸਮਝਦਾਹੋਇਆਉਹਨਾਂਨੂੰ ਉਹ ਨਾਟਕੀ ਅਤੇ ਕਾਵਿਕਅੰਦਾਜ਼ਵਿੱਚਪੇਸ਼ਕਰਨ ਦੇ ਯੋਗ ਬਣ ਜਾਂਦਾ ਹੈ।
2. ਵਿਦਿਆਰਥੀ ਇਸ ਰਾਹੀਂ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਲਿਖਤ ਦੇ ਹੋਂਦਵਿੱਚਆਉਣ ਦੇ ਪੜਾਵਾਂਬਾਰੇਜਾਣਕਾਰੀਹਾਸਿਲਕਰਦਾ ਹੈ ਖਾਸ ਕਰਕੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਲਿਪੀ ਗੁਰਮੁਖੀਬਾਰੇ।
3. ਇਸ ਵਿਸ਼ੇ ਦੇ ਮਾਧਿਅਮਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੇ ਮੁੱਢਲੇ ਪ੍ਰਬੰਧ ਨੂੰ ਸਮਝਕੇ ਕਿਸੇ ਦੂਜੀ ਭਾਸ਼ਾ ਦੇ ਪ੍ਰਬੰਧ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਬਣਦਾ ਹੈ

ਭਾਗ- ਓ

ਕਾਵਿ - ਲਹਿਰਾਂ (ਲੰਮੀਆਂ ਕਵਿਤਾਵਾਂ ਦਾ ਸੰਗ੍ਰਹਿ): ਸੰਪਾਦਕ ਪੇ. ਜਸਵਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ.ਇੰਦਰਜੀਤ ਸਿੰਘ ਚੀਮਾ),ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ,ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ,2015

ਭਾਗ- ਅ

ਅ-1 ਪੁਸਤਕ ਰਿਵਿਊ

ਅ-2 ਵਿਆਕਰਨ

- (i) ਪੰਜਾਬੀ ਭਾਸ਼ਾ:ਨਿਕਾਸ,ਵਿਕਾਸ ਅਤੇ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ
- (ii) ਗੁਰਮੁਖੀ ਲਿਪੀ ਦਾ ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ
- (iii) ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮ

ਭਾਗ ੳ ਤੇ ਵਿਆਕਰਨ ਦੇ ਅ-2 ਵਾਲੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ੳ ਵਿੱਚੋਂ ਕਿਸੇ ਇਕ ਕਵਿਤਾ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ ਸਾਰ/ ਕਾਵਿ ਕਲਾ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 12 ਅੰਕ
2. ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ। (ਚਾਰ ਵਿੱਚੋਂ ਦੋ) 6+6= 12 ਅੰਕ
3. ਪੁਸਤਕ ਰਿਵਿਊ(ਸਮਕਾਲੀ ਪੰਜਾਬੀ ਨਾਟਕ, ਕਾਵਿ ਲਹਿਰਾਂ, ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਨਿਬੰਧ, ਕਥਾ-ਵਾਰਤਾ)(ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ
4. ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਅ-2 ਨਾਲ ਸੰਬੰਧਿਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 12 ਅੰਕ
5. ਭਾਗ ੲ ਵਿੱਚ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 12 ਪ੍ਰਸ਼ਨ, ਭਾਗ ੳ ਅਤੇ ਅ-2 ਦੀਆਂ ਪੁਸਤਕਾਂ ਵਿੱਚੋਂ ਬਰਾਬਰ ਪੁੱਛੇ ਜਾਣਗੇ।

ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਵਿਚ ਉੱਤਰ ਦੇਣੇ ਹੋਣਗੇ ਅਤੇ ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਦੋ ਅੰਕ ਹੋਣਗੇ।

$$12 \times 2 = 24 \text{ ਅੰਕ}$$

(ਨੋਟ: ਪੇਪਰ ਵਿਚ ਭਾਗ ਅ ਦੇ ਅ.1 ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ ਨਹੀਂ ਪੁੱਛੇ ਜਾਣਗੇ।)

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ

30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ: ਅਧਿਆਪਕ, ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਲਈ, ਸਮਾਜਿਕ ਵਰਤਾਰਿਆਂ ਨੂੰ ਡੂੰਘਾਈ ਵਿੱਚ ਸਮਝਣ ਦੀ ਚੇਤਨਾ ਪੈਦਾ ਕਰਨ ਦੇ ਨਾਲ-ਨਾਲ ਉਨ੍ਹਾਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਨੂੰ ਪ੍ਰਫੁੱਲਿਤ ਕਰਨ ਲਈ ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਪਾਠ-ਕ੍ਰਮ ਨਾਲ ਸੰਬੰਧਿਤ ਗਤੀਵਿਧੀਆਂ ਦਾ ਵਿਹਾਰਕ ਰੂਪ ਵਿੱਚ ਅਭਿਆਸ ਕਰਵਾਏਗਾ। ਇਸ ਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀ ਵੱਖ-ਵੱਖ ਵਿਸ਼ਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਘੱਟੋ-ਘੱਟ ਦੋ ਵਿਗਿਆਪਨ ਤਿਆਰ ਕਰਨਗੇ। 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 ਇੱਕ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਇਆ ਜਾਵੇਗਾ।

ਸਹਾਇਕ ਪਾਠ- ਸਮੱਗਰੀ

1. ਗਿ.ਲਾਲ ਸਿੰਘ ਤੇ ਹਰਕੀਰਤ ਸਿੰਘ, **ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ**, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀ.ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।
2. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ, **ਸਿਧਾਂਤਕ ਭਾਸ਼ਾ ਵਿਗਿਆਨ**, ਮਦਾਨ ਪਬਲਿਸਰਜ਼, ਪਟਿਆਲਾ, 2002.

3. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ: ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ, 2008.
4. ਰਾਜਿੰਦਰਪਾਲ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਪੁਨਰ ਚਿੰਤਨ, ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ, ਚੰਡੀਗੜ੍ਹ।
5. ਰਾਜਿੰਦਰਪਾਲ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
6. ਜਸਵਿੰਦਰ ਸਿੰਘ, ਨਵੀਂ ਪੰਜਾਬੀ ਕਵਿਤਾ ਪਛਾਣ ਚਿੰਨ੍ਹ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।

Note:- Those students who have not studied Punjabi up to matriculation can opt for **ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ/ਐਲੀਮਟਰੀ ਪੰਜਾਬੀ)**. Other students will study Punjabi compulsory.

ਜਿੰਨ੍ਹਾਂ ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਮੈਟ੍ਰਿਕੁਲੇਸ਼ਨ ਤੱਕ ਪੰਜਾਬੀ ਦਾ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ। ਉਹ **ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ/ਐਲੀਮਟਰੀ ਪੰਜਾਬੀ)** ਦਾ ਵਿਸ਼ਾ ਪੜ੍ਹਨਗੇ ਬਾਕੀ ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ ਦਾ ਵਿਸ਼ਾ ਹੀ ਪੜ੍ਹਨਾ ਹੋਵੇਗਾ।

BSNM 401 A: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ/ਐਲੀਮੈਂਟਰੀ ਪੰਜਾਬੀ)

ਕ੍ਰੈਡਿਟ: 04

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਕੁੱਲ ਅੰਕ : 100 ਅੰਕ

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

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

Course Objectives

1. ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖੋ-ਵੱਖਰੀਆਂ ਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂਹੁੰਦੇ ਹੋਏ ਪੰਜਾਬੀ ਸਾਹਿਤ ਨੂੰ ਸਮਝਣ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦੇ ਹਨ।
2. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਦੂਜੀ ਭਾਸ਼ਾ ਦੀ ਸ਼ਬਦਬਣਤਰ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।
3. ਇਸ ਰਾਹੀਂ ਬਾਹਰਲੇ ਰਾਜਾਂ ਦੇ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਿੱਚ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਕੇ ਕਿਸੇ ਵੀ ਸਰਕਾਰੀ ਜਾਂ ਪ੍ਰਾਈਵੇਟ ਅਦਾਰੇ ਵਿੱਚ ਸੰਚਾਰ ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ

ਭਾਗ-ੳ

ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (Elementary Punjabi) ਭਾਗ ਦੂਜਾ (ਸੋਧਿਆ ਹੋਇਆ ਐਡੀਸ਼ਨ): ਸੰਪਾ. ਪੇ. ਪਰਮਜੀਤ

ਕੋਰ, ਡਾ. ਹਰਜੀਤ ਕੋਰ। ਇਸ ਪੁਸਤਕ ਵਿੱਚ ਕਹਾਣੀ ਅਤੇ ਇਕਾਗੀ ਵਾਲਾ ਭਾਗ (ਸਮੈਸਟਰ ਚੌਥਾ) ਵਿੱਚ ਪੜ੍ਹਾਇਆ ਜਾਵੇਗਾ।

ਭਾਗ-ਅ

ਅ-1 ਅਖਾਣ (ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (Elementary Punjabi) ਭਾਗ ਦੂਜਾ (ਸੋਧਿਆ ਹੋਇਆ ਐਡੀਸ਼ਨ): ਸੰਪਾ. ਪੇ. ਪਰਮਜੀਤ

ਕੋਰ, ਡਾ. ਹਰਜੀਤ ਕੋਰ।

ਅ-2 ਬਹੁ-ਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇੱਕ ਸ਼ਬਦ (ਮੁੱਢਲਾ ਪੰਜਾਬੀ ਗਿਆਨ (Elementary Punjabi) ਭਾਗ ਦੂਜਾ

(ਸੋਧਿਆ ਹੋਇਆ ਐਡੀਸ਼ਨ): ਸੰਪਾ. ਪੇ. ਪਰਮਜੀਤ ਕੋਰ, ਡਾ. ਹਰਜੀਤ ਕੋਰ।

ਭਾਗ-ਬ

ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ-ੳ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉਤਰਾ ਵਾਲੇ ਪਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪਸ਼ਨਾਂ ਦਾ ਪੱਧਰ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਪੱਧਰ ਅਤੇ ਉਹਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੀ ਸੀਮਾ ਨੂੰ ਧਿਆਨ ਵਿੱਚ ਰੱਖ ਕੇ ਹੀ ਨਿਸ਼ਚਿਤ ਕੀਤਾ ਜਾਵੇ। ਉਹਨਾਂ ਨੂੰ ਸਰਲ ਅਤੇ ਸਪੱਸ਼ਟ ਪਸ਼ਨ ਹੀ ਪੁੱਛੇ ਜਾਣ।

2. ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟੇ ਜਾਂ ਚੋਣ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ।

3. ਪਸ਼ਨ ਸਾਰੇ ਭਾਗਾਂ ਵਿੱਚ ਪੁੱਛੇ ਜਾਣ।

4. ਇਕਾਗਰੀ ਦਾ ਸਾਰ ਜਾਂ ਵਿਸ਼ੇ-ਵਸਤੂ (ਦੇ ਵਿੱਚ ਇੱਕ) 10 ਅੰਕ

5. ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਸਾਰ ਜਾਂ ਵਿਸ਼ਾ-ਵਸਤੂ (ਦੇ ਵਿੱਚ ਇੱਕ) 10 ਅੰਕ

6. ਕੋਈ 12 ਅਖਾਣਾਂ ਵਿੱਚ 10 ਦੇ ਅਰਥ ਦਸ ਕੇ ਵਾਕਾਂ ਵਿੱਚ ਵਰਤ $10 \times 1 = 10$ ਅੰਕ

7. ਬਹੁ-ਅਰਥਕ ਸ਼ਬਦ ਅਤੇ ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇੱਕ ਸ਼ਬਦ 10-10 ਪੁੱਛੇ ਜਾਣਗੇ ਜਿੰਨਾਂ ਵਿੱਚ 10-10 ਕਰਨ ਹੋਣਗੇ।

$10 \times 1 + 10$ ਅੰਕ

8. ਉਪਰੋਕਤ ਸਿਲੇਬਸ ਦੇ ਆਧਾਰ 'ਤੇ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ 15 ਪਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਹਰੇਕ ਪਸ਼ਨ ਦਾ ਉਤਰ ਚਾਰ-ਪੰਜ ਸਤਰਾਂ ਵਿੱਚ ਹੋਵੇ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਾਰੇ ਪਸ਼ਨ ਹੱਲ ਕਰਨ ਹਨ। ਹਰੇਕ ਪਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ। ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ 15 ਪਸ਼ਨ ਕੇਵਲ ਭਾਗ-ੳ ਵਿੱਚ ਹੀ ਪੁੱਛੇ ਜਾਣਗੇ। 15

$\times 2 = 30$ ਅੰਕ

ਨੋਟ: ਸਾਰਾਂ ਪਸ਼ਨ -ਪੱਤਰ ਪਾਠ-ਕਮ ਲਈ ਨਿਰਧਾਰਿਤ ਪਾਠ ਪੁਸਤਕ ਵਿੱਚ ਹੀ ਪੁੱਛਿਆ ਜਾਵੇ।

ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ

ਕੁੱਲ

= 30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ/ਘਰੇਲੂ ਇਮਤਿਹਾਨ/ ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ: ਅਧਿਆਪਕ, ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਲਈ, ਸਮਾਜਿਕ ਵਰਤਾਰਿਆਂ ਨੂੰ ਡੂੰਘਾਈ ਵਿੱਚ ਸਮਝਣ ਦੀ ਚੇਤਨਾ ਪੈਦਾ ਕਰਨ ਦੇ ਨਾਲ-ਨਾਲ ਉਨ੍ਹਾਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਨੂੰ ਪ੍ਰਫੁੱਲਿਤ ਕਰਨ ਲਈ ਕਲਾਸ ਵਿੱਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਪਾਠ-ਕ੍ਰਮ ਨਾਲ ਸੰਬੰਧਿਤ ਗਤੀਵਿਧੀਆਂ ਦਾ ਵਿਹਾਰਕ ਰੂਪ ਵਿੱਚ ਅਭਿਆਸ ਕਰਵਾਏਗਾ। ਇਸ ਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀ ਵੱਖ-ਵੱਖ ਵਿਸ਼ਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਘੱਟੋ-ਘੱਟ ਪੰਜ ਵਿਗਿਆਪਨ ਤਿਆਰ ਕਰਨਗੇ। 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 ਇੱਕ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਇਆ ਜਾਵੇਗਾ।

BSNM 402: PHYSICS

WAVES AND OPTICS

Maximum Marks: External	70	Time Allowed: 3 Hours
Internal	30	Total Teaching hours: 60
Total	100	Pass Marks: 35%

Out of 100 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 30 marks, and the final examination at the end of the semester carries 70 marks.

Instruction for the Paper Setter: The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 10 short answer type questions, which will cover the entire syllabus uniformly. Each question of sections A and B carry 10 marks. Section C will carry 30 marks.

Instruction for the candidates: The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 10 marks and section C carries 30 marks. Use of scientific calculators is allowed

Objective : The course covers the concept of mechanical and em waves. It also covers the interference, diffraction and polarization of light and their applications, with the introduction of lasers.

Section - A

Wave Motion: Types of Mechanical Waves. Plane Progressive (Travelling) Wave. Wave equation of one dimensional wave. Simple harmonic wave. Natural Vibrations in the stretched string, Concept of Standing waves. Concept of particle, wave and group Velocities. Dispersion. Dispersive and non dispersive medium.

(15 Lectures)

Electromagnetic Waves: Maxwell equations for vacuum. Differential equations for e-m wave in vacuum, Velocity of light in vacuum. Transverse nature of e-m wave. Conducting and dielectric media. e-m waves in dielectric and conducting mediums. Expression of attenuation constant and phase constant. Skin Depth. Dispersion of e-m waves in a conductor. Anomalous dispersion.

(15 Lectures)

Section - B

Interference: Concept of coherence, Spatial and Temporal Coherence, Conditions for observing coherence. Interference: Division of amplitude and division of wave front. Young's Double Slit experiment, Interference in thin films, Role of anti-reflection and dielectric coating, Michelson's Interferometer, Multiple beam interference, Fabry Perot Interferometer, Newton's rings.

(15 Lectures)

Diffraction: Huygen's- Fresnel theory of half period zones, Zone plates, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at rectangular and circular apertures, Diffraction Grating and its resolving power.

(5 Lectures)

Polarization: Concept and analytical treatment of unpolarized light, plane polarized and elliptically polarized light, Double refraction, Nicol Prism. (5 Lectures)

Laser Fundamentals: Einstein theory of radiation, concept of stimulated emission and population inversion. (5 Lectures)

Reference Books:

1. A textbook of Optics, Dr. N. Subrahmanyam, Brij Lal, Dr M.N Avadhanulu S. Chand and Company (2019).
2. Optics, Ajoy Ghatak, The Mc-Graw Hill Companies (2017).
3. The Physics of Waves and Oscillations, H.J Pain, Wiley publications (2006).
4. The Physics of Waves and Oscillations, N.K Bajaj, McGraw Hill Education, (2017).
5. Introduction to Electrodynamics, David J. Griffiths, Cambridge University Press (2020).

BSNM 402: PHYSICS LAB

WAVES AND OPTICS (PRACTICAL)

1. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's Experiment and to verify $\lambda^2 \propto T$ Law.
2. Familiarization with Schuster's focusing; determination of angle of prism.
3. To determine the Refractive Index of the Material of a given Prism using Sodium Light.
4. To determine Dispersive Power of the Material of a given Prism using Mercury Light
5. To determine the value of Cauchy Constants of a material of a prism.
6. To determine the Resolving Power of a Prism.
7. To determine wavelength of sodium light using Fresnel Biprism.
8. To determine wavelength of sodium light using Newton's Rings.
9. To determine the wavelength of Laser light using Diffraction of Single Slit.
10. To determine wavelength of (1) Sodium & (2) spectrum of Mercury light using plane diffraction Grating
11. To determine the Resolving Power of a Plane Diffraction Grating.
12. To measure the intensity using photosensor and laser in diffraction patterns of single and double slits.
13. To find the specific rotation of sugar solution by using a polarimeter.

Reference Books:

1. B.Sc Practical Physics, C.L Arora, S. Chand Publishing (1957).
2. B.Sc Practical Physics, Harman Singh and Dr P.S Hemne, S. Chand Publishing (2011).
3. Practical Physics, Gupta Kumar, Dr. S.L Gupta, Dr. V. Kumar, Pragati prakashan Edition (2010).
4. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, Kitab Mahal, New Delhi (2011).

BSNM 403: MATHEMATICS

PAPER VII: 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,

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.

BSNM 403: MATHEMATICS

PAPER VIII: 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. DiPrima 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.

BSNM 404: CHEMISTRY

6 Credits: 4 H (L) + 4H (P)

(i): INORGANIC CHEMISTRY II (TRANSITION METAL COORDINATION CHEMISTRY)

(Credits: Theory-02)

Max. Marks: 50

Time Allowed: 3 hours

External theory: 35

Total Teaching Hours: 30

Internal Assessment: 15

Pass marks: 35%

Course Outcomes

1. To learn the basic properties of d block elements
2. To learn the basic properties of f-block elements
3. To learn the coordinate chemistry and nomenclature of coordinate complexes
4. To learn the fundamentals of crystal field theory

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 very short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions from each of Section A & B and Section C is compulsory.

Section A

(15 Lectures)

General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn^{n+} , Fe^{n+} and Cu^{n+} .

Inner Transition Elements f-Block Lanthanoids and actinoids: Electronic configurations, oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides (ion exchange method only).

Section B

(15 Lectures)

Coordination Chemistry

Valence Bond Theory (VBT): Inner and outer orbital complexes of Cr^{n+} , Fe^{n+} , Co^{n+} , Ni^{n+} and Cu^{n+} (coordination numbers 4 and 6). Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Drawbacks of VBT. IUPAC system of nomenclature.

Crystal Field Theory

Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry. Factors affecting the magnitude of Δ_{o} . Spectrochemical series. Comparison of CFSE for Oh and Td complexes, Tetragonal distortion of octahedral geometry. Jahn-Teller distortion, Square planar coordination.

Reference Books:

1. Petrucci, R.H. *General Chemistry* 5th Ed. Macmillan Publishing Co.: NewYork (1985).
2. Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
3. Shriver, D.F. & Atkins, P.W. *Inorganic Chemistry*, Oxford University Press.
4. Wulfsberg, G. *Inorganic Chemistry*, Viva Books Pvt. Ltd.
5. Rodgers, G.E. *Inorganic & Solid State Chemistry*, Cengage Learning India Ltd., 2008.

(ii): PHYSICAL CHEMISTRY-III (STATES OF MATTER & CHEMICAL KINETICS)

(Credits: Theory-02)

Max. Marks: 50

Time Allowed: 3 hours

External theory: 35

Total Teaching Hours: 30

Internal Assessment: 15

Pass marks: 35%

Course Outcomes

1. To understand the principles of kinetic theory of gases
2. To understand the basic concept of surface tension and viscosity
3. To understand the solid structure of various crystals and basic techniques to identify the crystal structure
4. To understand the fundamental concept of chemical kinetics of various reactions.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 very short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions from each of Section A & B and Section C is compulsory.

Section A

(15 Lectures)

Kinetic Theory of Gases

Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation. Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation. van der Waals equation of state for real gases. Boyle temperature (derivation not required). Critical phenomena, critical constants and their calculation from van der Waals equation. Andrews isotherms of CO₂. Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation – derivation not required) and their importance. Temperature dependence of these distributions. Most probable, average and root mean square velocities (no derivation). Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules. Viscosity of gases

and effect of temperature and pressure on coefficient of viscosity (qualitative treatment only).

Liquids

Surface tension and its determination using stalagmometer. Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).

Section B

(15 Lectures)

Solids

Forms of solids. Elementary idea of symmetry elements (definitions), unit cells, crystal systems, Bravais lattice types and identification of lattice planes. Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices. Miller indices. X-Ray diffraction by crystals, Bragg's law. Structures of NaCl, KCl and CsCl (qualitative treatment only). Defects in crystals. Glasses and liquid crystals.

Chemical Kinetics

The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction. Derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants). Half-life of a reaction. General methods for determination of order of a reaction. Concept of activation energy and its calculation from Arrhenius equation. Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories (qualitative treatment only).

Reference Books:

1. Barrow, G.M. *Physical Chemistry* Tata McGraw-Hill (2007).
2. Castellan, G.W. *Physical Chemistry* 4th Ed. Narosa (2004).
3. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry* Cengage Learning India Pvt. Ltd., New Delhi (2009).
4. Mahan, B.H. *University Chemistry* 3rd Ed. Narosa (1998).

CHEMISTRY PRACTICAL

(Credits-02)

Max Marks 50

Time 3h

Pass Marks 35 %

Section A: Inorganic Chemistry

Semi-micro qualitative analysis (using H_2S or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding insoluble salts) out of the following:

Cations : NH_4^+ , Pb_2^+ , Bi_3^+ , Cu_2^+ , Cd_2^+ , Fe_3^+ , Al_3^+ , Co_2^+ , Ni_2^+ , Mn_2^+ , Zn_2^+ , Ba_2^+ , Sr_2^+ ,

Ca_2^+ , K^+

Anions : CO_3^{2-} , S^{2-} , SO_3^{2-} , $\text{S}_2\text{O}_3^{2-}$, NO_3^- , CH_3COO^- , Cl^- , Br^- , I^- , NO_2^- , SO_4^{2-} , PO_4^{3-} , BO_3^{3-} , $\text{C}_2\text{O}_4^{2-}$, F^-

1. Estimate the amount of nickel present in a given solution as bis(dimethylglyoximate) nickel(II) or aluminium as oximate in a given solution gravimetrically.
2. Estimation of (i) Mg^{2+} or (ii) Zn^{2+} by complexometric titrations using EDTA.
3. Estimation of total hardness of a given sample of water by complexometric titration.

Section B: Physical Chemistry

(I) Surface tension measurement (use of organic solvents excluded).

- a) Determination of the surface tension of a liquid or a dilute solution using a stalagmometer.
- b) Study of the variation of surface tension of a detergent solution with concentration.

(II) Viscosity measurement (use of organic solvents excluded).

- a) Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer.
- b) Study of the variation of viscosity of an aqueous solution with concentration of solute.

(III) Chemical Kinetics

Study the kinetics of the following reactions.

1. Initial rate method: Iodide-persulphate reaction
2. Integrated rate method:

- a. Acid hydrolysis of methyl acetate with hydrochloric acid.
- b. Saponification of ethyl acetate.
- c. Compare the strengths of HCl and H₂SO₄ by studying kinetics of hydrolysis of methyl acetate

Reference Books:

1. Svehla, G. *Vogel's Qualitative Inorganic Analysis*, Pearson Education, 2012.
2. Mendham, J. *Vogel's Quantitative Chemical Analysis*, Pearson, 2009.
3. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*,
4. R. Chand & Co.: New Delhi (2011).

BSNM 404 A: COMPUTER SCIENCE

DATA STRUCTURES

6 CREDIT: 4H (L) + 4H (P)

Time: 3 hours

External Marks: 70

Pass Marks: 35%

Internal Assessment: 30 marks

Total Teaching Hours: 45-50

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: 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.

INSTRUCTION FOR THE PAPER SETTER

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

INSTRUCTION FOR THE CANDIDATES

The candidates are required to attempt two questions each from section A, B and the entire Section C.

UNIT-I

Preliminaries: Definition, Basic terminology, Types of data structure, Operations on data Structures, Basic Mathematical concepts and notations, algorithm complexity, Big O notation, time-space trade off.

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 linked lists, applications.

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 in fix notation to postfix, parenthesis matching.

UNIT-II

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

Trees: Definition, Binary Tree, Properties, Representation of binary tree in memory using array and linked lists, Binary Search Tree, Operations on BST (Traversal Insertion, Deletion), Overview: AVL Tree, B Tree, Threaded Binary Tree.

Graphs: Definition, Basic terminology, Representation of graph in memory using array and Linked Lists, Traversal operations: BFS, DFS, Applications of Graphs.

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 McGraw Hill Company, Delhi.
4. Tanenbaum: "Data Structures Using C", Pearson Education.

SOFTWARE LAB -IV (BASED ON DATA STRUCTURES)

2 CREDIT: 4H (P)

Maximum Marks: 50

Minimum Pass Marks: 35% Internal Assessment: 15

Maximum Time: 3 Hours

The breakup of marks for the practical will be as under:-

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

This laboratory course will comprise of exercises to supplement what is learnt under paper Data Structures using C. The candidates are required to write the following programs:

1. To insert an element into an array.
2. To delete an element from an array.
3. To store an array using sparse representation.
4. To apply various operations on stack.
5. To insert and delete element in a queue.
6. To insert and delete and search a node in a linked list.
7. To insert or delete node in a binary tree.
8. To traverse binary tree.
9. To implement linear search.
10. To implement binary search.
11. To implement Bubble sort.
12. To implement Selection sort.
13. To implement Insertion sort.
14. To implement Merge sort.
15. To implement Quick sort.

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**B.Sc. (NON-MEDICAL) PART-III
(SEMESTER V & VI)**

SEMESTER-V								
Paper code	Subject	Credits			Marks			Total Marks
		Theory	Practical	Total	External Theory	Internal Assessment	Practical	
BSNM 501	Punjabi Compulsory	3	1	4	56	24	20	100
BSNM 501 A	Punjabi Compulsory (Mudla Gyan/Elementary Punjabi)							
BSNM 502	Physics:							
	Quantum Mechanics	2	2	6	35	15	50	150
	Solid State Physics	2			35	15		
BSNM 503	Mathematics:							
	Paper IX: Abstract Algebra	4	0	8	52	23	0	150
	Paper X: Discrete Mathematics	4			52	23		
BSNM 504	Chemistry:							
	Inorganic Chemistry-III: Bioinorganic & Organometallic Chemistry	2	2	6	35	15	50	150
	Physical Chemistry-IV: Quantum Chemistry and Molecular Spectroscopy	2			35	15		
BSNM 504 A	Computer Science: Object Oriented Programming Using C++	4	2	6	70	30	50	150
Total		20	04	24	300	130	120	550

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**B.Sc. (NON-MEDICAL) PART-III
(SEMESTER V & VI)**

SEMESTER-VI								
Paper code	Subject	Credits			Marks			Total Marks
		Theory	Practical	Total	External Theory	Internal Assessment	Practical	
BSNM 601	Punjabi Compulsory	3	1	4	56	24	20	100
BSNM 601 A	Punjabi Compulsory (Mudla Gyan/Elementary Punjabi)							
BSNM 602	Physics:							
	Digital and Analog Circuits and Instrumentation	2	2	6	35	15	50	150
	Nuclear and Particle Physics	2			35	15		
BSNM 603	Mathematics:							
	Paper XI: Linear Algebra	4	0	8	52	23	0	150
	Paper XII: Mechanics	4			52	23		
BSNM 604	Chemistry:							
	Inorganic Chemistry-IV: Metal Complexes And HSAB Theory	2	2	6	35	15	50	150
	Organic Chemistry-IV: Organic Spectroscopy, Heterocyclic Compounds and Polymers	2			35	15		
BSNM 604-A	Computer Science: Computer Network and Internet Technologies	4	2	6	70	30	50	150
Total		20	04	24	300	130	120	550

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SEMESTER-V
BSNM 501: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਕ੍ਰੈਡਿਟ : 4(3+1)

ਕੁੱਲ ਅੰਕ : 100

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਨੋਟ : ਵਿਦਿਆਰਥੀਆਂ ਵੱਲੋਂ ਪਾਸ ਹੋਣ ਲਈ ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿੱਚੋਂ ਅਲੱਗ-ਅਲੱਗ ਤੌਰ 'ਤੇ 35% ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

Course out comes

1. ਇਸ ਵਿਸ਼ੇ ਦੇ ਮਾਧਿਅਮਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਗਲਪੀਵਾਤਾਵਰਣਨੂੰ ਸਮਝਕੇਸੱਚ ਅਤੇ ਝੂਠ ਦਾ ਨਿਖੇੜਾਕਰਦਾਹੋਇਆਨੈਤਿਕਜੀਵਨਜਾਚਨੂੰ ਅਪਨਾਉਣ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦਾ ਹੈ।
2. ਪੁਰਾਤਨਪਰੰਪਰਾਵਾਂ, ਰੀਤੀ-ਰਿਵਾਜ, ਤਿੱਥ-ਤਿਉਹਾਰ, ਰਿਸ਼ਤਾ-ਨਾਤਾਪ੍ਰਣਾਲੀ ਦੀ ਜਾਣਕਾਰੀਹਾਸਿਲ ਕਰਕੇ ਆਧੁਨਿਕਕਾਲ ਰਾਹੀਂ ਬਦਲ ਰਹੇ ਲੋਕਧਾਰਾਈ ਪਰਿਪੇਖਾਂ ਨਾਲ ਤੁਲਨਾਕਰਨ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦਾ ਹੈ।
3. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਸ਼ਬਦ ਤੋਂ ਲੈਕੇਵਾਕਪੱਧਰਤੱਕਵੱਖ-ਵੱਖਸ਼ਬਦਸ਼੍ਰੇਣੀਆਂ ਦੇ ਅਧਿਐਨ ਤੋਂ ਸ਼ੁੱਧਭਾਸ਼ਾਲਿਖਣ ਤੇ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦਾ ਹੈ।
4. ਵਿਦਿਆਰਥੀ ਹੋਰਨਾਂਭਾਸ਼ਾਵਾਂਨੂੰਅਨੁਵਾਦ ਕਰਕੇ ਅਨੁਵਾਦਕ ਦੇ ਤੌਰ 'ਤੇਰੁਜ਼ਗਾਰਪ੍ਰਾਪਤਕਰਨ ਦੇ ਯੋਗ ਬਣ ਸਕਦਾ ਹੈ

ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕ
ਭਾਗ- ਓ

ਮੜ੍ਹੀ ਦਾ ਦੀਵਾ (ਨਾਵਲ) - ਗੁਰਦਿਆਲ ਸਿੰਘ

ਭਾਗ- ਅ

I. ਵਿਆਕਰਨ

(ੳ) ਨਾਂਵ ਵਾਕੰਸ਼: ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਅਤੇ ਪ੍ਰਕਾਰ

(ਅ) ਕਿਰਿਆ ਵਾਕੰਸ਼: ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਅਤੇ ਪ੍ਰਕਾਰ

II. ਲੇਖ ਰਚਨਾ (ਵਿਦਿਅਕ, ਸਭਿਆਚਾਰਕ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਨਾਲ ਸਬੰਧਿਤ)

ਭਾਗ- ਏ

ਭਾਗ ਓ ਅਤੇ ਅ.I ਵਿਅਕਰਨ ਵਾਲੇ ਭਾਗ 'ਤੇ ਆਧਾਰਿਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪੰਦਰਾਂ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪੇਪਰ ਸੈਟਰ, ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਨੂੰ ਉਪਰੋਕਤ ਨਿਰਧਾਰਿਤ ਪਾਠ ਕ੍ਰਮ ਦੇ ਭਾਗ ਓ,ਅ ਅਤੇ ਏ ਅਨੁਸਾਰ ਵੰਡੇਗਾ।
2. ਨਾਵਲ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ ਸਾਰ/ ਕਲਾ ਪੱਖ/ ਲੇਖਕ ਦਾ ਯੋਗਦਾਨ। (ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 12 ਅੰਕ
3. ਨਾਵਲ ਦੇ ਪਾਤਰਾਂ ਦਾ ਪਾਤਰ ਚਿਤਰਨ। (ਚਾਰ ਵਿੱਚੋਂ ਦੋ) 4+4=8 ਅੰਕ
4. ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਵਿੱਚੋਂ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 12 ਅੰਕ
5. ਲੇਖ ਰਚਨਾ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 8 ਅੰਕ
6. ਨਾਵਲ ਅਤੇ ਵਿਆਕਰਨ ਅ-I ਵਾਲੇ ਭਾਗ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪੰਦਰਾਂ ਲਾਜ਼ਮੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
ਹਰੇਕ ਪ੍ਰਸ਼ਨ 2 ਅੰਕਾਂ ਦਾ ਹੋਵੇਗਾ। 15x2=30 ਅੰਕ

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 ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਹੇਠ ਲਿਖੇ ਕਾਰਜ ਕਰਨਗੇ।

- ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਉਚਾਰਣ/ਲਿਖਣ ਦਾ ਅਭਿਆਸ
- ਸਿਰਜਣਾਤਮਕ ਸਾਹਿਤ ਸਬੰਧੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ
- ਪਾਠਕ੍ਰਮ ਨਾਲ ਸਬੰਧਿਤ ਅਸਾਈਮੈਂਟ ਤਿਆਰ ਕਰਨ

ਸਹਾਇਕ ਸਮੱਗਰੀ

1. ਕਿਸ਼ਨ ਸਿੰਘ, **ਗੁਰਦਿਆਲ ਸਿੰਘ ਦੀ ਨਾਵਲ ਚੇਤਨਾ**, ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ, ਚੰਡੀਗੜ੍ਹ, 1986.
2. ਪਰਮਜੀਤ ਕੌਰ, **ਗੁਰਦਿਆਲ ਸਿੰਘ ਦੀ ਸਭਿਆਚਾਰਕ ਚੇਤਨਾ**, ਯੂਨੀਸਟਾਰ ਬੁਕਸ, ਮੁਹਾਲੀ, 2015.

3. ਨਰਵਿੰਦਰ ਸਿੰਘ, ਗੁਰਦਿਆਲ ਸਿੰਘ ਦਾ ਗਲਪ ਪੈਰਾਡਾਈਮ, ਲਾਹੌਰ ਬੁੱਕ ਸ਼ਾਪ, ਲੁਧਿਆਣਾ, ਜੂਨ 1985.
4. ਦੁਨੀ ਚੰਦਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨ, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ, 1964.
5. ਡਾ. ਹਰਕੀਰਤ ਸਿੰਘ, ਰੂਪਾਂਤਰੀ ਵਿਆਕਰਣ, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।
6. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨ (ਭਾਗ-3), ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ, 1994.
7. ਡਾ. ਹਰਕੀਰਤ ਸਿੰਘ ਤੇ ਗਿਆਨੀ ਲਾਲ ਸਿੰਘ, ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ ਤੇ ਲੇਖ-ਮਾਲਾ, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।
8. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ: ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ, 2008.

BSNM 501-A: ਮੁੱਢਲਾ ਗਿਆਨ (Mudla Gyan)

ਕ੍ਰੈਡਿਟ : 4(3+1)

ਕੁੱਲ ਅੰਕ : 100

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਨੋਟ : ਵਿਦਿਆਰਥੀਆਂ ਵੱਲੋਂ ਪਾਸ ਹੋਣ ਲਈ ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿੱਚੋਂ ਅਲੱਗ-ਅਲੱਗ ਤੌਰ 'ਤੇ 35% ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

1. ਬਾਹਰਲੇ ਰਾਜਾਂ ਦੇ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਦੇ ਹੋਏ, ਪੰਜਾਬ ਦੇ ਕਿੱਤੇ, ਰੀਤੀ-ਰਿਵਾਜ, ਵਹਿਮ-ਭਰਮ, ਪੰਜਾਬ ਦੀਆਂ ਲੋਕ-ਖੇਡਾਂ ਤੋਂ ਜਾਣੂ ਹੋਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।
2. ਬਾਹਰਲੇ ਰਾਜਾਂ ਦੇ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਜਾਣਕਾਰੀ ਰਾਹੀਂ ਪੰਜਾਬੀ ਸਮਾਜ ਨੂੰ ਸਮਝਣ ਤੇ ਵਿਚਰਨ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦੇ ਹਨ।
3. ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਵਾਕਬਣਤਰ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਪਾਠ-ਪੁਸਤਕ **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**, ਸੰਪਾ. ਸ਼੍ਰੀ ਮਤੀ ਰਜਿੰਦਰ ਚੌਹਾਨ, ਪੰਜਾਬ ਸਕੂਲ ਸਿਖਿਆ ਬੋਰਡ, ਸਾਹਿਬਜ਼ਾਦਾ ਅਜੀਤ ਸਿੰਘ ਨਗਰ, 2015.

ਭਾਗ-ੳ ਪਾਠ-ਪੁਸਤਕ **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ** ਦੇ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਜਾਣ-ਪਛਾਣ ਭਾਗ ਦੇ 1 ਤੋਂ 4 ਤੱਕ ਲੇਖ।

ਭਾਗ-ਅ ਵਿਆਕਰਨ

(ਅ.1) ਵਾਕ: ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਅਤੇ ਕਾਰਜ ਦੇ ਅਧਾਰ 'ਤੇ ਕਿਸਮਾਂ।

(ਅ.2) ਅਨੁਵਾਦ (ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ)

ਭਾਗ-ੲ ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ ੳ ਅਤੇ ਅ.1 'ਤੇ ਅਧਾਰਿਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈੱਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਦਾ ਪੱਧਰ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਪੱਧਰ ਅਤੇ ਉਹਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੀ ਸੀਮਾ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰੱਖ ਕੇ ਹੀ ਨਿਸ਼ਚਿਤ ਕੀਤਾ। ਉਹਨਾਂ ਨੂੰ ਸਰਲ ਅਤੇ ਸਪੱਸ਼ਟ ਪ੍ਰਸ਼ਨ ਹੀ ਪੁੱਛੇ ਜਾਣ।
2. ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟੇ ਜਾਂ ਚੋਣ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ।
3. ਪ੍ਰਸ਼ਨ ਸਾਰੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣ।
4. ਲੇਖਾਂ ਦਾ ਸੰਖੇਪ ਸਾਰ/ ਵਿਸ਼ਾ ਵਸਤੂ ਜਾਂ ਲੇਖਾਂ ਵਿੱਚੋਂ ਹੋਰ ਕੋਈ ਸਰਲ ਪ੍ਰਸ਼ਨ। (ਚਾਰ ਵਿੱਚੋਂ ਦੋ) $9+9=18$ ਅੰਕ
5. ਪੈਰ੍ਹੇ ਦਾ ਅਨੁਵਾਦ (ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ) 10 ਅੰਕ
6. ਭਾਗ ਅ.1 ਵਿੱਚੋਂ ਵਾਕ ਨਾਲ ਸਬੰਧਤ ਸੰਖੇਪ ਅਤੇ ਸਰਲ ਪ੍ਰਸ਼ਨ। (ਪੰਜਾਂ ਵਿੱਚੋਂ ਤਿੰਨ) $3 \times 4=12$ ਅੰਕ
7. ਭਾਗ ੳ 'ਤੇ ਆਧਾਰਿਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 8 ਪ੍ਰਸ਼ਨ ਅਤੇ ਅ.1 ਵਿੱਚੋਂ ਵਿਹਾਰਕ ਵਿਆਕਰਣਕ ਵਿਸ਼ਲੇਸ਼ਣ ਨਾਲ ਸਬੰਧਤ 7 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ। $15 \times 2 = 30$ ਅੰਕ

ਨੋਟ: ਪ੍ਰਸ਼ਨ - ਪੱਤਰ ਪਾਠ-ਕ੍ਰਮ ਲਈ ਨਿਰਧਾਰਿਤ ਪਾਠ ਪੁਸਤਕ ਵਿੱਚੋਂ ਹੀ ਪੁੱਛਿਆ ਜਾਵੇ।

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ

30 ਅੰਕ

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ:- ਅਧਿਆਪਕ, ਕਲਾਸ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਨੂੰ ਸ਼ੁੱਧ ਰੂਪ ਵਿਚ ਬੋਲਣ, ਲਿਖਣ ਦੀ ਮੁਹਾਰਤ ਪੈਦਾ ਕਰਨ ਅਤੇ ਉਨ੍ਹਾਂ ਦੀ ਬਹੁ-ਪੱਖੀ ਸਖ਼ਸ਼ੀਅਤ ਉਸਾਰੀ ਲਈ ਪ੍ਰੈਕਟੀਕਲ ਵਜੋਂ ਕੰਮ ਕਰਵਾਉਣਗੇ। ਬੌਧਿਕ ਵਿਕਾਸ ਲਈ, ਸਮਾਜਿਕ ਵਰਤਾਰਿਆਂ ਨੂੰ ਡੂੰਘਾਈ ਵਿਚ ਸਮਝਣ ਦੀ ਚੇਤਨਤਾ ਪੈਦਾ ਕਰਨ ਦੇ ਨਾਲ-ਨਾਲ ਉਨ੍ਹਾਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀ ਨੂੰ ਪ੍ਰਫਲਿੱਤ ਕਰਨ ਲਈ ਕਲਾਸ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਪਾਠ-ਕ੍ਰਮ ਨਾਲ ਸੰਬੰਧਿਤ ਗਤੀਵਿਧੀਆਂ ਨੂੰ ਵੀ ਪ੍ਰੈਕਟੀਕਲ ਦਾ ਹਿੱਸਾ ਬਣਾਉਣਗੇ। ਅਧਿਆਪਕ ਵੱਲੋਂ ਕਰਵਾਏ ਗਏ ਕਾਰਜਾਂ 'ਤੇ ਆਧਾਰਿਤ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਇਕ ਫਾਇਲ ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ। ਇਸ ਲਈ ਦੋ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ।

ਸਹਾਇਕ ਪਾਠ ਸਮੱਗਰੀ

- 1.ਜੀਤ ਸਿੰਘ ਜੋਸ਼ੀ, ਸਭਿਆਚਾਰ ਅਤੇ ਲੋਕਧਾਰਾ, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮਿਤਸਰ, 1991
- 2.ਬਲਵੀਰ ਸਿੰਘ ਪੂਨੀ,ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮਿਤਸਰ, 1992
- 3.ਜਗੀਰ ਸਿੰਘ ਨੂਰ (ਡਾ.),ਪੰਜਾਬੀ ਲੋਕ ਮਨਰੰਜਨ, ਸਰੋਤ ਅਤੇ ਪਰੰਪਰਾ, ਪਲਾਹਾ ਪਬਲਿਸ਼ਿੰਗ ਕੰਪਨੀ,ਜਲੰਧਰ, 2005.

BSNM 502: PHYSICS PAPER: QUANTUM MECHANICS

(Credits-02)

Maximum Marks: External 35

Internal 15

Total 50

Time Allowed: 3 Hours

Total Teaching hours: 30

Pass Marks: 35%

Course Outcomes

After successful completion of the course, the student is expected to gain knowledge about:

CO1: the basics of formalism of wave mechanics

CO2: gain knowledge about Uncertainty Principle

CO3; Schrodinger Wave equation

CO4: hydrogen atom problem

CO5: atoms in electric and magnetic fields.

Out of 50 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 15 marks, and the final examination at the end of the semester carries 35 marks.

INSTRUCTION FOR THE PAPER SETTER:

The question paper will consist of three sections A, B and C. Each of sections A and B will have 04 questions from respective sections of the syllabus. Section C will have 11 short answer type questions, which will cover the entire syllabus uniformly. Each question of sections A and B carry 06 marks and Section C will carry 01 mark.

INSTRUCTION FOR THE CANDIDATES:

The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 06 marks and section C carries 01 mark. Use of scientific calculators is allowed.

Section A

Time dependent Schrodinger equation: Time dependent Schrodinger equation and dynamical evolution of a quantum state; Properties of Wave Function. Interpretation of Wave Function Probability, Conditions for Physical Acceptability of Wave Functions. Normalization. Eigenvalues and Eigenfunctions. Position, momentum & Energy operators; commutator of position and momentum operators; Expectation values of position and momentum.

Time independent Schrodinger equation: Hamiltonian, stationary states and energy eigen values; General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states; Application to the spread of Gaussian wavepacket for a free particle in one dimension, Position-momentum uncertainty principle.

Section B

General discussion of bound states in an arbitrary potential; Application to one-dimensional problem- square well potential; Quantum mechanics of simple harmonic oscillator.

Quantum theory of hydrogen-like atoms: Time independent Schrodinger equation in spherical polar coordinates; separation of variables for the second order partial differential equation.

Atoms in Electric and Magnetic Fields:-Electron Angular Momentum. Electron Spin and Spin Angular Momentum. Spin Magnetic Moment. Zeeman Effect.

Reference Books:

-) A Text book of Quantum Mechanics, P.M. Mathews & K. Venkatesan, 2nd Ed., 2010, McGraw Hill
-) Quantum Mechanics, Robert Eisberg and Robert Resnick, 2ndEdn., 2002, Wiley.
-) Quantum Mechanics, Leonard I. Schiff, 3rdEdn. 2010, Tata McGraw Hill.

-) Quantum Mechanics, G. Aruldas, 2ndEdn. 2002, PHI Learning of India.
-) Quantum Mechanics, Bruce Cameron Reed, 2008, Jones and Bartlett Learning.
-) Quantum Mechanics for Scientists & Engineers, D.A.B. Miller, 2008, Cambridge University Press

Additional Books for Reference

-) Quantum Mechanics, EugenMerzbacher, 2004, John Wiley and Sons, Inc.
-) Introduction to Quantum Mechanics, David J. Griffith, 2nd Ed. 2005, Pearson Education
-) Quantum Mechanics, Walter Greiner, 4thEdn., 2001, Springer

BSNM 502: PHYSICS PAPER: SOLID STATE PHYSICS

(Credits-02)

Maximum Marks: External 35

Internal 15

Total 50

Time Allowed: 3 Hours

Total Teaching hours: 30

Pass Marks: 35%

After successful completion of the course, the student is expected to have knowledge about:

CO1: The crystal structures

CO2: Elementary lattice dynamics and magnetic properties of matter

CO3: Dielectric properties of materials

CO4: Elementary band theory

CO5: Superconductivity

Out of 50 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 15 marks, and the final examination at the end of the semester carries 35 marks.

INSTRUCTION FOR THE PAPER SETTER:

The question paper will consist of three sections A, B and C. Each of sections A and B will have 04 questions from respective sections of the syllabus. Section C will have 11 short answer type questions, which will cover the entire syllabus uniformly. Each question of sections A and B carry 06 marks and section C will carry 01 mark.

INSTRUCTION FOR THE CANDIDATES:

The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 06 marks and section C carries 01 mark. Use of scientific calculators is allowed.

Section A

Crystal Structure: Solids: Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis – Central and Non-Central Elements. Unit Cell. Miller Indices. Reciprocal Lattice. Types of Lattices. Diffraction of X-rays by Crystals. Bragg's Law.

Elementary Lattice Dynamics: Lattice Vibrations and Phonons: Linear Monoatomic and Diatomic Chains..Dulong and Petit's Law, Einstein and Debye theories of specific heat of solids. T^3 law.

Section B

Magnetic Properties of Matter: Dia-, Para-and Ferromagnetic Materials. Classical Langevin Theory of dia – and Paramagnetic Domains. Quantum Mechanical Treatment of Paramagnetism. Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss.

Elementary band theory: Kronig Penny model. Band Gaps. Conductors, Semiconductors and insulators. P and N type Semiconductors. Conductivity of Semiconductors, mobility, Hall Effect, Hall coefficient.

Superconductivity: Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, Isotope effect.

Reference Books:

) Introduction to Solid State Physics, Charles Kittel, 8th Ed., 2004, Wiley India Pvt. Ltd.

-) Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India
-) Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill
-) Solid State Physics, Neil W. Ashcroft and N. David Mermin, 1976, Cengage Learning
-) Solid State Physics, Rita John, 2014, McGraw Hill
-) Solid-state Physics, H. Ibach and H Luth, 2009, Springer
-) Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India
-) Solid State Physics, M.A. Wahab, 2011, Narosa Publications

**BSNM 502: PRACTICAL-DSE LAB: QUANTUM MECHANICS AND SOLID STATE
PHYSICS
(CREDITS:02)
LABORATORY BASED EXPERIMENTS: MAXIMUM MARKS: 50**

DO ANY 8-10 PRACTICALS

1. To draw the BH curve of iron using a Solenoid and determine the energy loss from Hysteresis.
To measure the resistivity of a semiconductor (Ge) crystal with temperature by four-probe.
method (from room temperature to 150 °C) and to determine its band gap.
2. To determine the Hall coefficient of a semiconductor sample.
3. To determine the curie temperature of ferroelectric material.
4. To study the characteristics of thermistor, and find its parameters.
5. To study the photoelectric effect and find out the value of Planck's constant.
6. To study the characteristics of the solar cell.
7. To measure the Magnetic susceptibility of Solids.
8. Study the Franck Hertz experiment for quantization of Bohr model of atom.
9. Study of Electron spin resonance- determine magnetic field as a function of the resonance frequency.
10. Study of Zeeman Effect: with external magnetic field; Hyperfine splitting
11. To study the quantum tunneling effect with solid state device, e.g. tunneling current in backward diode or tunnel diode.

BSNM-503: MATHEMATICS
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. Khannna, S. K. Bhambri, *A Course in Abstract Algebra*, 5th Edition, Vikas Publishing House, 2016.

BSNM-503: MATHEMATICS
DISCRETE MATHEMATICS
Credit: 4:4H (L)

Duration: 3 Hrs.

Internal Assessment: 23

52

Max. Marks: 75

External Examination:

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.

BSNM 504: INORGANIC CHEMISTRY-III
BIOINORGANIC & ORGANOMETALLIC CHEMISTRY

(Credits: Theory-02)

Max Marks: 50

Semester Paper: 35

Internal Assessment: 15

Theory: 30 Lectures

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

Objectives: The students will be able to:

O1. Proficiently understand the basic principles of bioinorganic chemistry and biochemistry.

O2. Understand the role of metal ions that are involved in different processes like oxygen transport, electron transfer reactions etc. in biological systems.

O3. Summarize the role of metal centres in the metallo-enzymes that are involved in the catalysis of various biological reactions.

O4. Describe and explain catalytic processes using an organometallic compound as a catalyst and explain how organometallic compounds are used as catalysts in organic synthesis.

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

CO1. Predict the structure and stability of organometallic cluster compounds based on the electron count and explain the chemical behaviour and reactivity of organometallic compounds.

CO2. Develop practical skills in the preparation of organometallic compounds and their precursors.

CO3. Apply the EAN concept and Wade's rules to any organometallic system and predict its stability, structure and bonding.

CO4. Illustrate the catalytic cycles using an organometallic compound as a catalyst for industrial synthesis of some organic compounds.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions selecting two questions from each of Sections A & B and Section C (9th question) being compulsory.

SECTION-A

I. Boranes, Silicones and Phosphazenes

5 Hrs.

Boranes: Diboranes- Preparation, Properties and structure; higher boranes-classification, Wade's rule and styx formula. Silicones and Phosphazenes as examples of inorganic polymers, nature of bonding in triphosphazenes.

II. Bioinorganic Chemistry

10 Hrs.

Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{+2} , Nitrogen fixation.

SECTION-B

III. Organometallic Chemistry

9 Hrs.

Definition, Nomenclature and classification of organometallic compounds. Effective atomic number (EAN) rule. Preparation, properties, bonding and applications of alkyls and aryls of Li, Grignard Reagent, a brief account of metal-ethylene complexes, metallocene complex.

IV. Homogeneous Catalysis by Organometallic Compounds

6 Hrs.

Catalytic steps involved in homogeneous catalysis, Organometallic Compounds for Study of the following industrial processes and their mechanisms:

1. Alkene hydrogenation (Wilkinson's Catalyst)
2. Hydroformylation (Co salts)
3. Synthetic gasoline (Fischer Tropsch reaction)
4. Wacker Process

BSNM 504: PHYSICAL CHEMISTRY-IV: QUANTUM CHEMISTRY AND MOLECULAR SPECTROSCOPY

(Credits: Theory-02)

Max Marks: 50

Semester Paper: 35

Internal Assessment: 15

Theory: 30 Lectures

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

Objectives: The students will be able to:

O1. Demonstrate a sound knowledge of the photochemistry principles and their application.

O2. Understand the underlying principles involved in transitions (rotational, vibrational, Raman) and interpretation of the corresponding spectra and applications.

O3. Solve elementary model problems in quantum mechanics like particle in a 1-D box, harmonic oscillator, hydrogen & hydrogen like atoms.

O4. Relate concepts that were originally introduced purely as modern atomic physics to molecular systems through harmonic oscillator, spin and rigid rotator.

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

CO1. Apply principles of microwave, infrared and electronic spectroscopies to identify the fingerprint region of small molecules in gas and solution phases.

CO2. Understand the laws of absorption of light energy by molecules and the subsequent photochemical reactions

CO3. Explain the quantum numbers and their importance in depicting wave functions like radial wave function and angular wave functions.

CO4. Construct Jablonski diagram and explain the various photo-physical processes

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions selecting two questions from each of Sections A & B and Section C (9th question) being compulsory.

SECTION-A

I. Elementary Quantum Mechanics:

15 Hrs

Black-body radiations, Planck's radiation law, photoelectric effect, heat capacity of solids.

Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one dimensional box.

Schrodinger wave equation for H-atom, separation into three equations (without derivation), quantum numbers and their importance, hydrogen like wave functions, radial wave functions, angular wave functions.

Introduction: Electromagnetic radiation, regions of spectrum, basic features of different spectrometers, statement of Born-Oppenheimer approximation, degrees of freedom.

Rotational Spectrum: Diatomic molecules. Energy levels of a rigid rotor (semi-classical principles), selection rules, spectral intensity, determination of bond length, qualitative description of non-rigid rotor, isotope effect.

SECTION-B

II. Raman Spectrum:

8

hrs

Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules.

III. Vibrational Spectrum:

Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.

IV. Photochemistry

7 Hrs.

Difference between thermal and photochemical process. Laws of photochemistry: Grothus-Draper law, Stark-Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions- energy transfer processes (simple examples). Basic concepts of Laser and Maser.

BOOKS SUGGESTED (THEORY COURSES)

Books Suggested:

1. *Basic Inorganic Chemistry*, F.A. Cotton, G Willdson and P.L. Gaus, Wiley.
2. *Concise Inorganic Chemistry*, J.D. Lee, ELBS.
3. *Concept of models of Inorganic Chemistry*, B. Douglas, D. McDaniel, and J. Alexander, Jolin Wiley.
4. *Inorganic Chemistry*, D. E. Shriver, P. W. Atkins and C.H. Langford, Oxford.
5. *Inorganic Chemistry*, W. W. Porterfield Addison-Welsey.
6. *Inorganic Chemistry*, A. G Sharpe, ELBS
7. *Inorganic Chemistry*, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. *Inorganic Chemistry*, Morrison and Boyd, Prentice-Hall.
9. *Inorganic Chemistry*, L.G Wade Jr. Prentice-Hall.
10. *Physical Chemistry*, G.M. Barrow, International Student edition, McGraw Hill.
11. *University General Chemistry*, C.N.R. Rao. Macmillan.
12. *Physical Chemistry*, R.A Alberty, Wiley Eastern Ltd.
13. *The Elements of Physical Chemistry*, P. W. Atkins, Oxford.
14. *Physical Chemistry Through Problems*, S.K. Dogra and S. Dogra, Willey Eastern Ltd.
15. *Fundamentals of Photochemistry*, Rohtga and Mukherji.

**BSNM 504: CHEMISTRY
PRACTICAL**

Max. Marks: 50

Time: 4 hrs

6 Periods/Week

INSTRUCTIONS FOR EXAMINERS AND CANDIDATES

Candidate are required to prepare perform column Chromatography experiment and the physical experiments. The candidate will perform experiments from physical, chemistry. Distribution of marks will be as under:

1. Viva-Voce = 10
2. Note Books = 5
3. Column Chromatography = 15
4. Physical Experiments = 20* (5 for initial write up both experiments)

* (Full credit may be given for error upto 10% and one mark may be deducted for additional 5% error.)

Laboratory Techniques

1. Column Chromatography
2. Separation of fluorescein and methylene blue.
3. Separation of leaf pigments from spinach leaves.
4. Physical Experiments
 - (a) To determine the strength of the given acid conductometrically using standard alkali solution.
 - (b) To determine the solubility and solubility product of a given sparingly soluble electrolyte conductometrically.
 - (c) To study the saponification of ethyl acetate conductometrically.
 - (d) To determine the ionisation constant of a weak acid conductometrically.
 - (e) To determine the strength of the given acid solution pH- metrically by using standard alkali solution.
 - (f) To determine the molar refraction of methanol, ethanol and propanol.
 - (g) To study the distribution of benzoic acid between toluene, ether and water

BOOKS SUGGESTED (LABORATORY COURSES)

1. *Vogel's Qualitative Inorganic Analysis*, revised, Svehla, Orient P Longman.
2. *Vogel's Text book of Quantitative Inorganic Analysis* (revised), J. Bassett, R. C. Denney, G.H. Jeffery and J. Mendham, ELBS.
3. *Standard Methods of Chemical Analysis*, W. W. Scott, The Technical Press.
4. *Experimental Inorganic Chemistry*, W. G. Palmer, Cambridge.
5. *Handbook of Preparative Inorganic Chemistry*, Vol. I & II, Brauer, Academic Press.
6. *Inorganic Synthesis*, Mc-Graw Hill.
7. *Experimental Organic Chemistry*, Vol. I & II, P. R. Singh, D.S. Gupta, and Bajpai, Tata Mc-Graw Hill.
8. *Laboratory Manual In Organic Chemistry*, R. K. Bansal, Wiley Eastern.
9. *Vogel's Textbook of Practical Organic Chemistry*, B. S. Furniss, Al Hannaford, V. frogers, P.W.G. Smith and AR. Tatchell, ELBS
10. *Experiments in General Chemistry*, C.N.R. Rao and U.C. Agarwal, East-West Press.

11. *Experiments in Physical Chemistry*, R.C. Das, and B. Behra, Tata Mc-graw Hill.
12. *Advanced Practical Physical Chemistry*, J.B. Yadav, Goel Publishing House.
13. *Advanced Exp. Chemistry, Vol. I-Physical*, J.N. Gurutu and R. Kapoor, S. Chand & Co.
14. *Selected Exp. in Physical Chemistry*, N.G. Mukherjee, J.N. Ghose & Sons.
15. *Exp. in Physical Chemistry*, J.C. Ghosh, Bharti Bhavan.

B.SC. NM III (SEMESTER-V)
BSNM 504-A: OBJECT ORIENTED PROGRAMMING USING C++
4 CREDIT: 4H (L)

Time: 3 hours

External Marks: 70 marks Pass Marks:

35%

Internal Assessment: 30 marks Total Teaching Hours: 45-50

Course Learning Outcomes:

After completion of this course students will able to:

CO1: Understand the difference between object-oriented programming and procedural oriented language and data types in C++.

CO2: Explore C++ programming features such as composition of objects, operator overloading, inheritance, Polymorphism etc.

CO3: Simulate the problem in the subjects like Operating system, Computer networks and real-world problems.

CO4: Understand various file handling concepts

INSTRUCTION FOR THE PAPER SETTER

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

Instructions for the candidates: The candidates are required to attempt two questions each from section A, B and the entire section C.

UNIT-I

Introduction to OOP:- Procedure Oriented Programming, OOP Paradigm, Difference between Object Oriented Programming languages and Procedure Oriented Programming Languages, Characteristics of Object Oriented Programming Language- Class, Object, Data Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability.

Manipulators & Functions: Input and Output streams, managing output with manipulators. Function Declaration, Definition and calling Function, Methods of Parameter Passing - Call by Value, Call by Reference and Call by Address, Recursion, Arrays, Strings and Pointers.

Classes and Objects: Class Specification, Data Members, Member Functions, Private and Public Members, Declaring Objects, making functions inline, Nesting of member functions, this pointer, Object as function arguments, Array of Objects, Functions Returning Objects, Static data members and Static member functions.

Constructors: Definition, Types of Constructor- Default, parameterized and copy Constructor, Dynamic constructor, Constructor Overloading,

UNIT-II

Destructors: Definition, Virtual Destructor, Dynamic memory allocation using new and delete Operators.

Inheritance: Introduction, Defining Derived Class, Types of Inheritance- Single, Multilevel, Hierarchical, Multiple and Hybrid Inheritance, Access specifiers - public, private, and protected.

Polymorphism: Methods of achieving polymorphic behaviour, Function Overloading, Operator Overloading, rules for overloading operators, overloading binary operator, overloading unary operators, operator overloading using friend function.

Files and streams: Classes for file stream operations, opening and closing of files, reading and

writing text files and binary files.

Suggested Readings:

1. *Robert Lafore, Object Oriented Programming with C++, Galgotia.*
2. *J Marget A. Ellis and Bjarne Stroustrup , The Annotated C++ reference manual, Addison Wesley New York.*
3. *E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.*
4. *Yashavant Kanetkar, Let Us C++, BPB Publications.*

B.Sc.NM-III Semester-V
SOFTWARE LAB –V (Based on Object Oriented Programming using C++)
2 Credits: 4H (P)

Maximum Marks: 50

Minimum Pass Marks: 35% Internal Assessment: 15

Maximum Time: 3 Hours

The breakup of marks for the practical will be as under:-

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

Students are required to develop the following programs

1. To perform arithmetic operations.
2. To convert temperature from Fahrenheit to Celsius.
3. To find simple interest and compound interest.
4. To check whether the given number is even number or odd.
5. To accept three numbers and find the largest among them.
6. To find factorial of a number.
7. To check whether a number is prime or not.
8. To print all the Armstrong numbers between any 2 given limits.
9. To find largest element in an array.
10. To check whether a string is Palindrome or not.
11. To perform matrix addition.
12. To perform matrix multiplication.
13. To swap two numbers using call by value and call by reference method.
14. To find the factorial of a number using Recursion.
15. To create an employee structure and display the same.
16. Using classes and objects write a program to calculate area of rectangle.
17. Create a class student and display record of 5 students using array of objects.
18. Using classes and objects write a program to calculate area of rectangle and triangle using function overloading.
19. Write a program to calculate the average of n numbers using friend function.
20. Write a program to calculate the area and perimeter of rectangle using constructor overloading and destructor.
21. Create the Person class. Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create and display objects of these two classes.
22. To write and read an object in/from a binary file.

SEMESTER-VI
BSNM 601: ਪੇਪਰ - ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਕ੍ਰੈਡਿਟ : 4(3+1)

ਕੁੱਲ ਅੰਕ : 100

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਨੋਟ : ਵਿਦਿਆਰਥੀਆਂ ਵੱਲੋਂ ਪਾਸ ਹੋਣ ਲਈ ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿਚੋਂ ਅਲੱਗ-ਅਲੱਗ ਤੌਰ 'ਤੇ 35% ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

Course Learning Outcomes

1. ਇਸ ਵਿਸ਼ੇ ਦੇ ਮਾਧਿਅਮ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਗਲਪੀਵਾਤਾਵਰਣਨੂੰ ਸਮਝਕੇ ਸੱਚ ਅਤੇ ਝੂਠ ਦਾ ਨਿਖੇੜਾ ਕਰਦਾ ਹੋਇਆ ਨੈਤਿਕ ਜੀਵਨ ਜਾਚ ਨੂੰ ਅਪਨਾਉਣ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦਾ ਹੈ।
2. ਪੁਰਾਤਨ ਪਰੰਪਰਾਵਾਂ, ਰੀਤੀ-ਰਿਵਾਜ, ਤਿੱਥ-ਤਿਉਹਾਰ, ਰਿਸ਼ਤਾ-ਨਾਤਾ ਪ੍ਰਣਾਲੀ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਆਧੁਨਿਕ ਕਾਲ ਰਾਹੀਂ ਬਦਲ ਰਹੇ ਲੋਕਧਾਰਾਈ ਪਰਿਪੇਖਾਂ ਨਾਲ ਤੁਲਨਾ ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦਾ ਹੈ।
3. ਇਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਸ਼ਬਦ ਤੋਂ ਲੈਕੇ ਵਾਕ ਪੱਧਰ ਤੱਕ ਵੱਖ-ਵੱਖ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਦੇ ਅਧਿਐਨ ਤੋਂ ਸ਼ੁੱਧ ਭਾਸ਼ਾ ਲਿਖਣ ਤੇ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦਾ ਹੈ।
4. ਵਿਦਿਆਰਥੀ ਹੋਰਨਾਂ ਭਾਸ਼ਾਵਾਂ ਨੂੰ ਅਨੁਵਾਦ ਕਰਕੇ ਅਨੁਵਾਦਕ ਦੇ ਤੌਰ 'ਤੇ ਰੁਜ਼ਗਾਰ ਪ੍ਰਾਪਤ ਕਰਨ ਦੇ ਯੋਗ ਬਣ ਸਕਦਾ ਹੈ।

ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਭਾਗ-ੳ

ਲੋਕਧਾਰਾ ਦੀ ਭੂਮਿਕਾ, ਸੰਪਾ. ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਖਹਿਰਾ, ਡਾ. ਸੁਰਜੀਤ ਸਿੰਘ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ।

ਭਾਗ-ਅ

I. ਵਿਆਕਰਨ

1. ਕਾਰਕ ਅਤੇ ਕਾਰਕੀ ਸਬੰਧ
2. ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ- ਮੇਲ ਅਤੇ ਅਧਿਕਾਰ

II. ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ

ਭਾਗ-ੲ

ਭਾਗ ੳ ਅਤੇ ਅ.I ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ 'ਤੇ ਆਧਾਰਿਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪੰਦਰਾਂ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪੇਪਰ ਸੈਟਰ, ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਨੂੰ ਉਪਰੋਕਤ ਨਿਰਧਾਰਿਤ ਪਾਠ ਕ੍ਰਮ ਦੇ ਭਾਗ ੳ, ਅ ਅਤੇ ੲ ਅਨੁਸਾਰ ਵੰਡੇਗਾ।
2. ਕਿਸੇ ਇਕ ਨਿਬੰਧ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ। (ਦੋ ਵਿਚੋਂ ਇਕ) 12 ਅੰਕ
3. ਨਿਬੰਧਾਂ ਵਿਚਲੇ ਵਿਚਾਰਾਂ ਸਬੰਧੀ ਪ੍ਰਸ਼ਨ। (ਚਾਰ ਵਿਚੋਂ ਦੋ) 4+4=08 ਅੰਕ
4. ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਵਿਚੋਂ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ। (ਦੋ ਵਿਚੋਂ ਇਕ) 12 ਅੰਕ
5. ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ। 08 ਅੰਕ
6. ਭਾਗ-ੲ ਵਿਚ ਪਾਠ-ਪੁਸਤਕ ਅਤੇ ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਵਿਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 15 ਲਾਜ਼ਮੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ 2 ਅੰਕਾਂ ਦਾ ਹੋਵੇਗਾ। 15x2=30 ਅੰਕ

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 ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਹੇਠ ਲਿਖੇ ਕਾਰਜ ਕਰਨਗੇ।

- ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਉਚਾਰਣ/ਲਿਖਣ ਦਾ ਅਭਿਆਸ
- ਸਿਰਜਣਾਤਮਕ ਸਾਹਿਤ ਸਬੰਧੀ ਰਿਪੋਰਟ ਤਿਆਰ ਕਰਨਾ
- ਪਾਠਕ੍ਰਮ ਨਾਲ ਸਬੰਧਿਤ ਅਸਾਈਮੈਂਟ ਤਿਆਰ ਕਰਨ

ਸਹਾਇਕ ਪੁਸਤਕ ਸੂਚੀ

1. ਦੁਨੀ ਚੰਦਰ, **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨ**, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ, 1964.
2. ਡਾ. ਹਰਕੀਰਤ ਸਿੰਘ, **ਰੂਪਾਂਤਰੀ ਵਿਆਕਰਣ**, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।
3. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨ-ਭਾਗ-3**, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ, 1994.
4. ਡਾ. ਹਰਕੀਰਤ ਸਿੰਘ ਤੇ ਗਿਆਨੀ ਲਾਲ ਸਿੰਘ, **ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ ਤੇ ਲੇਖ-ਮਾਲਾ**, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।
5. ਡਾ. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ: ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਕੋਸ਼**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ.

ਕ੍ਰੈਡਿਟ : 4(3+1)

ਕੁੱਲ ਅੰਕ : 100

ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ : 70 ਅੰਕ

ਨੋਟ : ਵਿਦਿਆਰਥੀਆਂ ਵੱਲੋਂ ਪਾਸ ਹੋਣ ਲਈ ਲਿਖਤੀ ਪ੍ਰੀਖਿਆ ਅਤੇ ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਦੇ ਅੰਕਾਂ ਵਿੱਚੋਂ ਅਲੱਗ-ਅਲੱਗ ਤੌਰ 'ਤੇ 35% ਅੰਕ ਲੈਣੇ ਜ਼ਰੂਰੀ ਹਨ।

ਅਧਿਆਪਨ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 05

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਅੰਕ : 35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 30 ਅੰਕ

Course Learning Outcomes

1. ਬਾਹਰਲੇ ਰਾਜਾਂ ਦੇ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਦੇ ਹੋਏ, ਪੰਜਾਬ ਦੇ ਕਿੱਤੇ, ਰੀਤੀ-ਰਿਵਾਜ, ਵਹਿਮ-ਭਰਮ, ਪੰਜਾਬ ਦੀਆਂ ਲੋਕ-ਖੇਡਾਂ ਤੋਂ ਜਾਣੂ ਹੋਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।
2. ਬਾਹਰਲੇ ਰਾਜਾਂ ਦੇ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਜਾਣਕਾਰੀ ਰਾਹੀਂ ਪੰਜਾਬੀ ਸਮਾਜ ਨੂੰ ਸਮਝਣ ਤੇ ਵਿਚਰਨ ਦੇ ਯੋਗ ਹੋ ਜਾਂਦੇ ਹਨ।
3. ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਵਾਕ ਬਣਤਰ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੋ ਜਾਂਦੇ ਹਨ।

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕ

ਪਾਠ-ਪੁਸਤਕ **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**, ਸੰਪਾ. ਸ਼੍ਰੀ ਮਤੀ ਰਜਿੰਦਰ ਚੌਹਾਨ, ਪੰਜਾਬ ਸਕੂਲ ਸਿਖਿਆ ਬੋਰਡ, ਸਾਹਿਬਜ਼ਾਦਾ ਅਜੀਤ ਸਿੰਘ ਨਗਰ, 2015.

ਭਾਗ-ੳ ਪਾਠ-ਪੁਸਤਕ **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ** ਦੇ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਜਾਣ-ਪਛਾਣ ਵਾਲੇ ਭਾਗ ਦੇ 5 ਤੋਂ 8 ਤੱਕ ਲੇਖ।

ਭਾਗ-ਅ ਵਿਆਕਰਨ

(ਅ.1) ਉਪਵਾਕ: ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਅਤੇ ਕਾਰਜ ਦੇ ਅਧਾਰ 'ਤੇ ਕਿਸਮਾਂ।

(ਅ.2) ਸੰਖੇਪ ਰਚਨਾ

ਭਾਗ-ੲ ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ ੳ ਅਤੇ ਅ.1 'ਤੇ ਆਧਾਰਿਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈੱਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਦਾ ਪੱਧਰ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਪੱਧਰ ਅਤੇ ਉਹਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੀ ਸੀਮਾ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰੱਖ ਕੇ ਹੀ ਨਿਸ਼ਚਿਤ ਕੀਤਾ। ਉਹਨਾਂ ਨੂੰ ਸਰਲ ਅਤੇ ਸਪੱਸ਼ਟ ਪ੍ਰਸ਼ਨ ਹੀ ਪੁੱਛੇ ਜਾਣ।
2. ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟੇ ਜਾਂ ਚੋਣ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ।
3. ਪ੍ਰਸ਼ਨ ਸਾਰੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣ।
4. ਲੇਖਾਂ ਦਾ ਸੰਖੇਪ ਸਾਰ/ ਵਿਸ਼ਾ ਵਸਤੂ ਜਾਂ ਲੇਖਾਂ ਵਿੱਚੋਂ ਹੋਰ ਕੋਈ ਸਰਲ ਪ੍ਰਸ਼ਨ। (ਚਾਰ ਵਿੱਚੋਂ ਦੋ) $9+9=18$ ਅੰਕ
5. ਸੰਖੇਪ ਰਚਨਾ 10 ਅੰਕ
6. ਭਾਗ ਅ.1 ਵਿੱਚੋਂ ਉਪਵਾਕ ਨਾਲ ਸਬੰਧਤ ਸੰਖੇਪ ਅਤੇ ਸਰਲ ਪ੍ਰਸ਼ਨ। (ਪੰਜਾਂ ਵਿੱਚੋਂ ਤਿੰਨ) $3 \times 4=12$ ਅੰਕ
7. ਭਾਗ ੳ 'ਤੇ ਆਧਾਰਿਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 8 ਪ੍ਰਸ਼ਨ ਅਤੇ ਅ.1 ਵਿੱਚੋਂ ਵਿਹਾਰਕ ਵਿਆਕਰਣਕ ਵਿਸ਼ਲੇਸ਼ਣ ਨਾਲ ਸਬੰਧਤ 7 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ। $15 \times 2 = 30$ ਅੰਕ

ਨੋਟ: ਪ੍ਰਸ਼ਨ - ਪੱਤਰ ਪਾਠ-ਕ੍ਰਮ ਲਈ ਨਿਰਧਾਰਿਤ ਪਾਠ ਪੁਸਤਕ ਵਿੱਚੋਂ ਹੀ ਪੁੱਛਿਆ ਜਾਵੇ।

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ**30 ਅੰਕ**

ਕਲਾਸ ਹਾਜ਼ਰੀ, ਘਰੇਲੂ ਇਮਤਿਹਾਨ, ਅੰਦਰੂਨੀ ਪ੍ਰਯੋਗੀ ਅਭਿਆਸ

ਨੋਟ:- ਅਧਿਆਪਕ, ਕਲਾਸ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਨੂੰ ਸ਼ੁੱਧ ਰੂਪ ਵਿਚ ਬੋਲਣ, ਲਿਖਣ ਦੀ ਮੁਹਾਰਤ ਪੈਦਾ ਕਰਨ ਅਤੇ ਉਨ੍ਹਾਂ ਦੀ ਬਹੁ-ਪੱਖੀ ਸਖ਼ਸ਼ੀਅਤ ਉਸਾਰੀ ਲਈ ਪ੍ਰੈਕਟੀਕਲ ਵਜੋਂ ਕੰਮ ਕਰਵਾਉਣਗੇ। ਬੌਧਿਕ ਵਿਕਾਸ ਲਈ, ਸਮਾਜਿਕ ਵਰਤਾਰਿਆਂ ਨੂੰ ਡੂੰਘਾਈ ਵਿਚ ਸਮਝਣ ਦੀ ਚੇਤਨਤਾ ਪੈਦਾ ਕਰਨ ਦੇ ਨਾਲ-ਨਾਲ ਉਨ੍ਹਾਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀ ਨੂੰ ਪ੍ਰਫੁੱਲਤ ਕਰਨ ਲਈ ਕਲਾਸ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਪਾਠ-ਕ੍ਰਮ ਨਾਲ ਸੰਬੰਧਿਤ ਗਤੀਵਿਧੀਆਂ ਨੂੰ ਵੀ ਪ੍ਰੈਕਟੀਕਲ ਦਾ ਹਿੱਸਾ ਬਣਾਉਣਗੇ। ਅਧਿਆਪਕ ਵੱਲੋਂ ਕਰਵਾਏ ਗਏ ਕਾਰਜਾਂ 'ਤੇ ਆਧਾਰਿਤ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਇਕ ਫਾਇਲ ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ। ਇਸ ਲਈ ਦੇ ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ ਲਗਾਏ ਜਾਣਗੇ।

ਸਹਾਇਕ ਪਾਠ ਸਮੱਗਰੀ

- 1.ਜੀਤ ਸਿੰਘ ਜੋਸ਼ੀ, *ਸਭਿਆਚਾਰ ਅਤੇ ਲੋਕਧਾਰਾ*, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮਿਤਸਰ, 1991
- 2.ਬਲਵੀਰ ਸਿੰਘ ਪੁਨੀ, *ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ*, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮਿਤਸਰ, 1992
- 3.ਜਗੀਰ ਸਿੰਘ ਨੂਰ (ਡਾ.), *ਪੰਜਾਬੀ ਲੋਕ ਮਨਰੰਜਨ, ਸਰੋਤ ਅਤੇ ਪਰੰਪਰਾ*, ਪਲਾਹਾ ਪਬਲਿਸ਼ਿੰਗ ਕੰਪਨੀ, ਜਲੰਧਰ, 2005.

BSNM 602: PHYSICS
DIGITAL AND ANALOG CIRCUITS AND INSTRUMENTATION
(Credits-02)

Maximum Marks: External 35
Internal 15
Total 50

Time Allowed: 3 Hours
Total Teaching hours: 30
Pass Marks: 35%

Out of 50 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 15 marks, and the final examination at the end of the semester carries 35 marks.

After successful completion of the course, the student is expected to

CO1: have a basic knowledge digital-circuits.

CO2: grasp the knowledge of semiconductor diodes and their applications.

CO3: understand the transistors and their properties.

CO4: understand operational amplifiers and their applications.

CO5: acquire the knowledge of rectifiers and Zener diodes.

Instruction for the Paper Setter: The question paper will consist of three sections A, B and C. Each of sections A and B will have 04 questions from respective sections of the syllabus. Section C will have 11 short answer type questions, which will cover the entire syllabus uniformly. Each question of sections A and B carry 06 marks and section C will carry 01 mark.

Instruction for the candidates: The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 06 marks and section C carries 01 mark. Use of scientific calculators is allowed.

Section-A

Digital Circuits

Difference between Analog and Digital Circuits. Binary Numbers. Decimal to Binary and Binary to Decimal Conversion, AND, OR and NOT Gates (Realization using Diodes and Transistor). NAND and NOR Gates as Universal Gates. XOR and XNOR Gates.

Semiconductor Devices and Amplifiers:

Barrier Formation in PN Junction Diode. Qualitative Idea of Current Flow Mechanism in Forward and Reverse Biased Diode. PN junction and its characteristics. Static and Dynamic Resistance. Principle and structure of (1) LEDs (2) Photodiode. Bipolar Junction transistors: n-p-n and p-n-p Transistors. Characteristics of CB, CE Configurations. Active, Cutoff, and Saturation Regions. Current gains α and β . Relations between α and β . Load Line analysis of Transistors. DC Load line and Q-point. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model.

Section B

Operational Amplifiers (Black Box approach):

Characteristics of an Ideal and Practical Op-Amp (IC 741), Open-loop & Closed-loop Gain. CMRR, concept of Virtual ground. Applications of Op-Amps: (1) Inverting and Non-inverting Amplifiers.

Instrumentations:

Power Supply: Half-wave Rectifiers. Centre-tapped and Bridge Full-wave Rectifiers Calculation of Ripple Factor and Rectification Efficiency, Basic idea about filters, Zener Diode and Voltage Regulation.

Reference Books:

J Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.

-) Electronic devices and circuits, S. Salivahanan and N. Suresh Kumar, 2012, Tata Mc-Graw Hill.
-) Microelectronic Circuits, M.H. Rashid, 2ndEdn.,2011, Cengage Learning.
-) Modern Electronic Instrumentation & Measurement Tech., Helfrick&Cooper,1990, PHI Learning
-) Digital Principles & Applications, A.P. Malvino, D.P. Leach &Saha, 7th Ed.,2011, Tata McGraw Hill
-) Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6thEdn., Oxford University Press.
-) Fundamentals of Digital Circuits, A. Anand Kumar, 2nd Edition, 2009, PHI Learning Pvt. Ltd.
-) OP-AMP and Linear Digital Circuits, R.A. Gayakwad, 2000, PHI Learning Pvt. Ltd.

BSNM 602: PHYSICS
NUCLEAR AND PARTICLE PHYSICS
(Credits-02)

Maximum Marks: External 35
Internal 15
Total 50

Time Allowed: 3 Hours
Total Teaching hours: 30
Pass Marks: 35%

Out of 50 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 15 marks, and the final examination at the end of the semester carries 35 marks.

After successful completion of the course, the student is expected to have knowledge about

CO1: General properties of nuclei and Nuclear Models

CO2: Radioactivity Decays and Nuclear Reactions

CO3: Interaction of Nuclear Radiations with Matter

CO4: Nuclear Detectors and accelerators

CO5: Particle Physics

Instruction for the Paper Setter: The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 11 short answer type questions, which will cover the entire syllabus uniformly. Each question of sections A and B carry 06 marks and section C will carry 01 mark.

Instruction for the candidates: The candidates are required to attempt two questions each from sections A and B, and the entire section C. Each question of sections A and B carries 06 marks and section C carries 01 mark. Use of scientific calculators is allowed

Section-A

General Properties of Nuclei: Constituents of nucleus and their Intrinsic properties, quantitative facts about size, mass, charge density (matter energy), main features of binding energy versus mass number curve.

Nuclear Models: Liquid drop model approach, semi empirical mass formula, nuclear magic numbers, basic assumption of shell model.

Radioactivity decay: (a) Alpha decay: basics of α -decay processes, Geiger Nuttall law (b) basics of β -decay, neutrino hypothesis. (c) Gamma decay, internal conversion.

Nuclear Reactions: Types of Reactions, Conservation Laws, Q-value, reaction cross section.

Section B

Interaction of Nuclear Radiation with matter: Energy loss due to ionization (Bethe-Block formula), energy loss of electrons, Gamma ray interaction through matter.

Particle Accelerators: Linear accelerator, Betatron, Synchrotrons.

Particle physics: Particle interactions; basic features, types of particles and its families. Conservation Laws, parity, baryon number, Lepton number, Isospin, Strangeness and charm, concept of quark model, color quantum number and gluons.

Reference Books:

-] Introductory nuclear Physics by Kenneth S. Krane (Wiley India Pvt. Ltd., 2008).
-] Concepts of nuclear physics by Bernard L. Cohen. (Tata Mcgraw Hill, 1998).
-] Introduction to the physics of nuclei & particles, R.A. Dunlap. (Thomson Asia, 2004)

-) Introduction to Elementary Particles, D. Griffith, John Wiley & Sons
-) Quarks and Leptons, F. Halzen and A.D. Martin, Wiley India, New Delhi
-) Basic ideas and concepts in Nuclear Physics - An Introductory Approach by K. Heyde (IOP- Institute of Physics Publishing, 2004).
-) Radiation detection and measurement, G.F. Knoll (John Wiley & Sons, 2000).
-) Theoretical Nuclear Physics, J.M. Blatt & V.F. Weisskopf (Dover Pub. Inc., 1991)

**PRACTICALS - DSE LAB: DIGITAL AND ANALOG CIRCUITS AND INSTRUMENTS AND
NUCLEAR AND PARTICLE PHYSICS**

(Credits:02)

LABORATORY BASED EXPERIMENTS: MAXIMUM MARKS: 50

DO ANY 8-10 PRACTICALS

1. To verify and design AND, OR, NOT and XOR gates using NAND gates.
2. Study of diode as clipping and clamping element.
3. To draw the forward and reverse biased characteristics of pn junction diode and draw a load line.
4. To plot common base characteristics and determine h-parameters of a given transistor.
5. To study the gain of the amplifier at different frequencies and to find band width and gain bandwidth product.
6. To study the characteristics of FET.
7. To study the stabilization of the output voltage of the power supply with zener diode.
8. To draw the plateau of a GM counter and find its operating voltage.
9. To study the statistical fluctuations of GM counter to find its standard deviation.
10. To study the absorption of γ -particles in aluminum using GM counter and determine the absorption coefficient of γ -particles from it.
11. To measure the efficiency and ripple factor for (a) Half wave (b) Full wave (c) Bridge rectifier circuit.

BSNM-603: MATHEMATICS

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

BSNM-603: MATHEMATICS
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.

**BSNM 604: INORGANIC CHEMISTRY-IV
METAL COMPLEXES AND HSAB THEORY**

(Credits: Theory-02)

Max Marks: 50

Semester Paper: 35

Internal Assessment: 15

Theory: 30 Lectures

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C (9th question) being compulsory.

Objectives: The students will be able to:

O1. Understand the concept of acid and bases on the basis of various theories like Arrhenius, Bronsted-Lowry and Lewis concept.

O2. Classify the acids bases as soft, hard and border line acid bases.

O3. Differentiate between thermodynamic stability and kinetic stability and apply it to transition metal complexes.

O4. Analyze the magnetic properties of the transition metal complexes as well as interpret the effect of temperature on magnetic properties

Outcomes: On successful completion of the course, the student will be able to:

CO1. Depict the electronic spectra of transition metal complexes.

CO2. Understand the various factors involved in stabilising the transition metal complexes.

CO3. Determine the strength of acids and bases by using the concept of levelling effect.

CO4. Evaluate term symbols and microstates which are further useful in depicting the electronic transitions in transition metal complexes

SECTION-A

I. Introduction to Acid and base

6 Hrs.

Arrhenius, Bronsted-Lowry Concept, the Lux-Flood solvent system and Lewis concepts of acids and bases. Trends in acid strength, effect of solvents on the acid strength (Levelling effect), strength of oxoacids, role of solvent on the strength of lewis acids and base.

II Hard and Soft acids and Bases (HSAB)

6 Hrs.

Classification of acids and bases as a hard and soft, Pearson's HSAB concept, Application of HSAB Principle, Limitations of HSAB Principle, Symbiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.

III. Thermodynamic and Kinetic Aspects of Metal Complexes

3 Hrs.

A brief outline of thermodynamic stability and kinetic stability of metal complexes and factors affecting the stability. Trans effect and its theories.

SECTION -B

IV. Magnetic Properties of Transition Metal Complexes

7 Hrs.

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, Correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moment, application of magnetic moment data for 3d-metal complexes.

V. Electronic Spectra of Transition Metal Complexes.

8 Hrs.

Basics of electron absorption, term symbols and coupling scheme, Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, determination of ground state terms, calculation of microstates, spectrochemical series. Orgel-energy level diagram for d^1 and d^9 states, discussion of electronic spectrum of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ complex.

BSNM 604: ORGANIC CHEMISTRY-IV

ORGANIC SPECTROSCOPY, HETEROCYCLIC COMPOUNDS AND POLYMERS

(Credits: Theory-02)

Max Marks: 50

Semester Paper: 35

Internal Assessment: 15

Theory: 30 Lectures

30 hours

Time allowed - 3 hrs

Pass Marks: 35%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 6 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C (9th question) being compulsory.

Objectives: The students will be able to:

- O1.** Identify, name and classify the various heterocyclic compounds.
- O2.** Understand various types of polymerization reactions along with the mechanism involved in different steps.
- O3.** Understand the interactions of matter with electromagnetic radiations.
- O4.** Solve the problems related to the structure of compounds on the basis of spectroscopic data given.

Outcomes: On successful completion of the course, the student will be able to:

- CO1.** Describe the structure, diverse reactions and syntheses of pyrrole, furan, thiophene and pyridine heterocycles.
- CO2.** Describe the principles of IR, UV and NMR spectroscopy.
- CO3.** Predict the structures of organic compounds based on the given ^1H NMR, IR and UV data.
- CO4.** Determine the molecular weight, PDI, degree of polymerization of polymers.

Section -A

I. Spectroscopy:

5 hrs.

Introduction to basic concept of spectroscopy, electromagnetic radiations, electromagnetic spectrum, types of spectroscopy and their general applications

II. Electromagnetic spectrum: Absorption Spectra:

5 hrs.

Ultraviolet (UV) absorption spectroscopy, (Beer-Lambert's law, Molar absorptivity, presentation and analysis of UV Spectra, types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones.

III Infrared (IR) Spectroscopy:

5 hrs.

Infrared (IR) absorption spectroscopy-molecular vibrations, Hooke's law, Selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorption of various

functional groups and Interpretation of IR spectra of simple organic compounds.

Problems pertaining to the structure elucidation of simple organic compounds using UV, IR, and PMR spectroscopic techniques.

IV Nuclear magnetic resonance (NMR) spectroscopy:

Proton magnetic resonance (^1H NMR) spectroscopy, nuclear shielding and deshielding, chemical shift and molecular structure, spin-spin splitting and coupling constants, areas of signals interpretation of PMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde, 1,1,2 tribromoethane, ethyl acetate, toluene and acetophenone.

Section B

V. Heterocyclic Compounds

7

hrs.

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reaction in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.

Introduction to condensed five and six membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fischer indole synthesis, Skraup synthesis and Bischler- Napieralski synthesis. Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinoline.

VI. Synthesis of Polymers

8

hrs.

Introduction and classification including di-block, tri-block and amphiphilic polymers; Number average molecular weight, Weight average molecular weight, Degree of polymerization, Polydispersity Index.

Polymerisation reactions -Addition and condensation -Mechanism of cationic, anionic and free radical addition polymerization; Metallocene-based Ziegler-Natta polymerisation of alkenes; Preparation and applications of plastics - thermosetting (phenol-formaldehyde, Polyurethanes) and thermosoftening (PVC, polythene); vinyl polymers. Condensation or step growth polymerization. Urea formaldehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubbers.

BOOKS SUGGESTED (THEORY COURSES)

1. *Basic Inorganic Chemistry*, F.A. Cotton, G Willdson and P.L. Gaus, Wiley.
2. *Concise Inorganic Chemistry*, J.D. Lee, ELBS.
3. *Concept of models of Inorganic Chemistry*, B. Douglas, D. McDaniel, and J. Alexander, Jolin Wiley.
4. *Inorganic Chemistry*, D. E. Shriver, P. W. Atkins and C.H. Langford, Oxford.
5. *Inorganic Chemistry*, W. W. Porterfield Addison-Welley.

6. *Inorganic Chemistry*, A. G Sharpe, ELBS
7. *Inorganic Chemistry*, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. *Inorganic Chemistry*, Morrison and Boyd, Prentice-Hall.
9. *Inorganic Chemistry*, L.G Wade Jr. Prentice-Hall.
10. *Fundamentals of Organic Chemistry*, Solomons, John Wiley.
11. *Organic Chemistry*, Vol. I, II & III, S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd. (New Age International).
12. *Organic Chemistry*, F.A Carey, McGraw-Hill, Inc.
13. R. M. Acheson : Chemistry of Heterocyclics.
14. A.R. Katritzky : Handbook Of Heterocyclics.
15. Lee A. Paquette : Principles of Modern Heterocyclic Chemistry.
16. William Kemp, Organic Spectroscopy, P edition, ELKS, MacMillan, Hampshire, UK, 1991.
17. D. H. Williams and I. Fleming, Spectroscopic Methods in Organic Chemistry.
18. R. M. Silverstein, G. C. Bassler and F.C Morrill Spectroscopic Identification of Organic Compounds.

**BSNM 604: CHEMISTRY
PRACTICALS**

Max. Marks: 50

Time: 4 Hrs.

6 Periods/Week

INSTRUCTIONS FOR EXAMINERS AND CANDIDATES

Candidates are required to prepare inorganic complex and synthesise organic compound. The candidate will perform experiments. Distribution of marks will be as under:

1.	Viva-Voce	= 10
2.	Note Books	= 5
3.	Inorganic Complex	= 15 (5 for initial write up)
4.	Organic Synthesis	= 15 (5 for initial write up)
5.	Assignment	= 5
Total		=50

Synthesis and Analysis

- (a) Preparation of sodium trioxalatoferrate(III), $\text{Na}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$ and determination of its composition by permagnetometry.
- (b) Preparation of Ni-DMG complex, $[\text{Ni}(\text{DMG})_2]^{2+}$
- (c) Preparation of copper tetra-ammine complex. $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$.
- (d) Preparation of cis-and trans-bis (oxalato) diaquachromate(III) ion.

Synthesis or Organic Compounds

- (a) Iodoform from ethanol and acetone
 - (b) Aromatic electrophilic substitution of benzene
1. p-nitroacetanilide
 2. 2,4,6-tribromophenol

Diazotization/Coupling

3. Preparation of methyl orange and methyl red
4. Preparation of benzoic acid from toluene
5. Reduction

Preparation of m-nitroaniline from m-dinitrobenzene

6. Knowledge of Stereochemical Study of Organic Compounds with suitable examples:-

Configuration: geometrical and optical isomerism.

Enantiomerism, diastereomerism, Meso compounds. Threo and Erythro. D and L, Cis and Trans nomenclature. CIP rules: R/S and E/Z nomenclature.

BOOKS SUGGESTED (LABORATORY COURSES)

1. *Vogel's Qualitative Inorganic Analysis*, revised, Svehla, Orient P Longman.
2. *Vogel's Text book of Quantitative Inorganic Analysis* (revised), J. Bassett, R. C. Denney, G.H. Jeffery and J. Mendham, ELBS.
3. *Standard Methods of Chemical Analysis*, W. W. Scott, The Technical Press.
4. *Experimental Inorganic Chemistry*, W. G. Palmer, Cambridge.
5. *Handbook of Preparative Inorganic Chemistry*, Vol. I & II, Brauer, Academic Press.
6. *Inorganic Synthesis*, Mc-Graw Hill.
7. *Experimental Organic Chemistry*, Vol. I & II, P. R. Singh, D.S. Gupta, and Bajpai, Tata Mc-Graw Hill.
8. *Laboratory Manual In Organic Chemistry*, R. K. Bansal, Wiley Eastern.
9. *Vogel's Textbook of Practical Organic Chemistry*, B. S. Furniss, Al Hannaford, V. frogers, P.W.G. Smith and AR. Tatchell, ELBS
10. *Experiments in General Chemistry*, C.N.R. Rao and U.C. Agarwal, East-West Press.
11. *Experiments in Physical Chemistry*, R.C. Das, and B. Behra, Tata Mc-graw Hill.

12. *Advanced Practical Physical Chemistry*, J.B. Yadav, Goel Publishing House.
13. *Advanced Exp. Chemistry, Vol. I-Physical*, J.N. Gurutu and R. Kapoor, S. Chand & Co.
14. *Selected Exp. in Physical Chemistry*, N.G. Mukherjee, J.N. Ghose & Sons.
15. *Exp. in Physical Chemistry*, J.C. Ghosh, Bharti Bhavan.

B.Sc.NM III Semester-VI
SUBJECT: COMPUTERSCIENCE

BSNM 604-A: COMPUTER APPLICATION COMPUTER NETWORKS AND INTERNET TECHNOLOGIES

4 CREDIT: 4H (L)

Time: 3 hours

External Marks: 70 marks

Pass Marks: 35%

Internal Assessment: 30 marks

Total Teaching Hours: 45-50

INSTRUCTION FOR THE PAPER SETTER

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

Course Objective

The objective of the course is to understand the basics of Computer Networks and Internet Technologies and to make students aware of the networking and creating websites.

Course Learning Outcomes:

After completion of this course students will able to:

CO1: Describe how communication works in computer networks and to understand the basic terminology of computer networks, reference models and transmission media.

CO2: Learn basic concepts of internet technologies, browsers and e-mails.

CO3: Understand the basics of HTML, its structuring and creating websites with style sheets.

CO4: Design a media-rich dynamic websites using text, fonts, colors, images, tables, hyperlinks and client side scripting.

Instructions for the candidates: The candidates are required to attempt two questions each from section A, B and the entire section C.

UNIT-I

Computer Networks: Communication, Mode of communication (simplex, half duplex and full duplex), Network (definition ,components ,features and its applications),Classification of networks(LAN,WAN,MAN),Network topologies.

Transmission media: Twisted pair, coaxial cables, fibre optics, radio transmission, microwave transmission, infrared waves and Line of sight transmission, Cellular radio and communication Satellites.

Reference Models: Layering Approach, Brief description of OSI & TCP/IP reference Model, Compare and Contrast OSI and TCP/IP Reference Model.

Internet: Definition, its advantages and disadvantages, Hardware (repeaters, hub, switch, routers, gateway) & software, internet facilities through WWW, Web Browser/Server, Client/server architecture.

UNIT-II

Uniform Resource Locator(URL): Types of URL: Absolutes and relative, Domain name system, FTP, HTTP, SMTP, Telnet, E- Mail: architecture, various aspects, the user agent, message format, message transfer.

HTML: Introduction to HTML, SGML, Web structure of HTML document, Text formatting, using lists to organize information, Organizing Data with Tables: Table tag, layout and presentation

Hyper Links and Anchors: Hyper Links, Internal linking and external linking. Images: Adding Images to web page, using images as links, creating menus with image maps, image formats-GIF, JPEG etc.

HTML Forms: Forms, Elements: INPUT, BUTTON, SELECT, TEXT AREA, LABEL, FIELDSET and LEGEND. Form security.

Suggested Readings:

1. *Andrew S. Tanenbaum, "Computer Networks", Third Edition, PHI Publications.*
2. *Corner, Internetworking with TCP-IP: Principles, Protocols and Architecture, Prentice Hall*
3. *Stephan Mack, Janan Platt, HTML 4.0 No Experience Required, BPB Publication.*
4. *Rick Darnell et al, HTML 4 Unleashed, Tech media Publications.*

B.Sc. NM-III Semester-VI
SOFTWARE LAB –VI (Based on COMPUTER NETWORKS AND INTERNET TECHNOLOGIES)
2 Credits: 4H (P)

Maximum Marks: 30

Maximum Time: 3 hours

Minimum Pass Marks: 35%

The breakup of marks for the practical will be as under:-

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

Students are required to perform the following activities

1. Create a web page to show the structure of HTML using following tags:
 - a) Text
 - b) Marquee
 - c) Character formatting tags such as B, I, U.
2. Create a web page using font Color, font face, font size, background color.
3. Show the use of formatting tags in HTML such as strike, sup, sub etc.
4. Create a web page using lists.
5. Write HTML code to show the use of absolute and relative URL with anchor tag.
6. Create a web page using Image tag
7. Create a web page using Table tag:
 - a) Rows and Columns
 - b) Having border, border size, and border color.
 - c) Image in a particular cell.
 - d) Using row span and column span
 - e) Background Image in a table.
8. Create Admission Form for your college.
9. Create Time table for your department.

APPROVED

Member Secretary
Academic Council

APPROVED

Principal
General Shivdev Singh Diwan Gurbachan Singh
Khalsa College Patiala