

**ORDINANCES AND OUTLINES OF TESTS,
SYLLABI AND COURSE OF READING
FOR
POST GRADUATE DIPLOMA IN COMPUTER APPLICATION
(PGDCA)
(SEMESTER I & II)
FOR
2016-17 & 2017-18 SESSIONS
CREDIT BASED SEMESTER SYSTEM
OF
UNIVERSITY GRANTS COMMISSION**



**DEPARTMENT OF COMPUTER SCIENCE
GENERAL SHIVDEV SINGH DIWAN GURBACHAN SINGH
KHALSA COLLEGE PATIALA**

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

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

The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation systems, 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 (HEIs) 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 HEIs 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. The conversion from marks to letter grades and the letter grades used vary widely across the HEIs 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 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 CBSS 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.

ORDINANCE FOR POST GRADUATE DIPLOMA IN COMPUTER APPLICATION

Applicability of Ordinances for the time being in force.

Notwithstanding the integrated nature of a course spread over 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. The examination for the diploma of Post Graduate Diploma in Computer Application shall be held in one part to be called PGDCA. It will consist of two semesters, viz. Semester 1st and 2nd. The examination shall be held in the months of November/December for 1st and April /May for 2nd semester or on such other dates as may be fixed by the Institute.
2. The PGDCA shall be open to any person who has passed an undergraduate degree examination in any faculty from any university or any other examination recognised as equivalent thereto.
3. A candidate must complete and pass the whole course of one year within a maximum of two years from the date of admission in PGDCA First semester.
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. **Examination Rules**
 - 5.1 Paper Setting/Evaluation will be done by an External Examiner or as decided by the Examination Cell.
 - 5.2 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 only in the theory paper on the payment of the required fee. The candidate will have consecutive two attempts to clear the Supplementary Examination. All reappear candidates of odd semester can appear in even semester and even semester can appear in odd semester. Marks of practical and internal assessment will be carry forward as original.
 - 5.3 Re-evaluation of answer sheet in two subjects is allowed after paying the requisite fee. The application for Re-evaluation should be submitted within 15 days of the declaration of the results. In case there is a difference of more than 10 % between the marking of the First evaluator and the Second evaluator, then the paper would be sent to a Third Evaluator. The mean of the marks of the Second and Third evaluators is then considered as the final marks. The re-evaluated marks will be considered final irrespective of the increase or decrease in marks.
 - 5.4 The Principal can provide Golden Chance (with special chance fee) to students who have been unable to clear their exams even after two attempts.

5.5 Viva- voce/Practical examination shall be conducted by a committee consisting of the following:-

1. One external experts
2. One internal examiner (to be nominated by the Principal of the College/Head of the Department OR his/her nominee).

The quorum of Committee meeting would comprise one external and one internal examiner.

6 Grading System:

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

Grade Assignment Table

Range of Marks	Description	Grade	Grade Point
85-100	Outstanding	O	10
75-84	Excellent	A+	9
65-74	Very Good	A	8
55-64	Good	B+	7
50-54	Above Average	B	6
45-49	Average	C	5
35-44	Pass	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.

7. 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.

$$\text{SGPA (Si)} = \frac{\sum(\text{Earned Credits } C_i \times \text{Grade Point } G_i)}{\sum \text{Earned Credits } C_i}$$
 Where C_i is the number of credits of the i th course and G_i is the Grade Point Scored by the student in the i th course.
- 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.

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

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

- 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			139

Thus, $SGPA = 139/20 = 6.95$

Illustration for CGPA

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

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

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.

8. Division and Position:

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

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

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

- a) Rank shall be solely decided on the final CGPA, on completion of diploma 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.

9. **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.

10. **Equivalence:**

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

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

11. MALPRACTICES/UNFAIR MEANS

11.1 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. Impersonating for a candidate 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.

11.2 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.

11.3 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.

12. Attendance Regulations & Condonation:

12.1 A student shall be eligible to appear for end semester examinations, if he/she acquires a minimum of **75%** of attendance in each subject.

12.2 Request to the Principal for Condonation of shortage of attendance after the recommendation of the HOD will be forwarded to Lecture Shortage Condonation Committee. The committee can finally condone the shortage in aggregate up to **15%** on medical grounds in each semester.

12.3 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.

12.4 A Student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester as applicable.

- 12.5 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.
13. 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.
14. Applications for admission to the examination shall be made on the prescribed form attested by the competent authority as per the college rules.
15. Amount of examination fee to be paid by a candidate for each semester shall be as fixed by the College from time to time.
16. The last date by which examination forms and fees must reach the College office shall be as follows:

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

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

17. College medal will be awarded to a candidate who secures first position in the College on the basis of the marks of all the two 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.
18. The syllabus for the session shall be such as prescribed by the institute from time to time.
19. The minimum number of marks required to pass each semester examination will be 35% in each paper and 35% in the aggregate of semester examination. Provided, that in papers with practical, the percentage shall be required separately in written and practical/lab work.
20. The lab file shall be evaluated jointly by the external and internal examiners
21. The medium of instruction and examination shall be English.
22. **Assessment:**
- 22.1 PGDCA course is Credit Based Semester System (CBSS) as described in the Introduction.
- 22.2 The assessment in all semesters of PGDCA will be **30%** internal and **70%** external for each paper. The result for the internal examinations shall be conveyed to the

students/Examination Branch by the Head of the Department as per approved schedule.

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

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

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

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

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

- I. Paper Evaluator
- II. Principal/Head of the Department concerned.
- III. Dean of Faculty concerned
- IV. Controller of Examination

23.5 The marks for attendance in internal assessment would be awarded according to the student's attendance percentage as follows:

91-100% attendance	100% marks of the allotted Internal Assessment marks for attendance
81-90% attendance	80% marks of the allotted Internal Assessment marks for attendance
75-80% attendance	70% marks of the allotted Internal Assessment marks for attendance
Below 75%	Zero marks

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

23.7 Students should be shown the internal assessment before submission. 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.

In case such a paper is dropped from the course of study as a result of any revision the department would indicate a suitable substitute paper in lieu thereof.

24. **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.

25. **Diploma Requirement:**

- 25.1 The result of all the examinations will be declared through the College website.
- 25.2 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-voce/internal assessment/sessional work/skill in teaching/any additional /optional 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-voce and skill in teaching.
- 25.3 The College may from time to time revise, amend and change the regulations or the curriculum, if formed necessary.
26. 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-cum-Diploma Certificate by the College. He/she must also pay all College dues as per rules. Moreover, there should be no case of indiscipline pending against him/her.
27. 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.
28. 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.

Note: - Complete PGDCA course carries 40 credits and each core paper carries 4 credits and practical lab carries 2 credits.

PROGRAMME OF STUDY OF POST GRADUATE DIPLOME IN COMPUTER APPLICATION (REGULAR) COURSE - 2016-17 & 2017-18									
Semester-I									
Paper code	Name of Subject	Contact hours per week			Examination scheme marks				Credit
		L	P	Total	Internal	External	Practical	Total	
PGDCA 1.1	Fundamentals of Information Technology	4		4	30	70		100	4
PGDCA 1.2	Operating System	4		4	30	70		100	4
PGDCA 1.3	Programming Fundamentals through 'C' Language	4		4	30	70		100	4
PGDCA 1.4	Computer Organisation and Architecture	4		4	30	70		100	4
PGDCA 1.5	Software Lab-I Office Automation and Productivity Tools		4	4	30		70	100	2
PGDCA 1.6	Software Lab-II Programming Fundamentals through 'C' Language		4	4	30		70	100	2
	Total	16	8	24	180	280	140	600	20
Semester-II									
Paper code	Name of Subject	Contact hours per week			Examination scheme marks				Credit
		L	P	Total	Internal	External	Practical	Total	
PGDCA 2.1	Data Structures	4		4	30	70		100	4
PGDCA 2.2	Object Oriented Programming using C++	4		4	30	70		100	4
PGDCA 2.3	Database Management System with MS ACCESS	4		4	30	70		100	4
PGDCA 2.4	Fundamentals of Computer Networks, Internet and Scripting Languages	4		4	30	70		100	4
PGDCA 2.5	Software Lab-III Data Structures and Programming with C++		4	4	30		70	100	2
PGDCA 2.6	Software Lab IV MS ACCESS and Scripting Languages		4	4	30		70	100	2
	Total	16	8	24	180	280	140	600	20

Note:

The break-up of marks for practical exam (external) will be as under:

- | | | |
|--------------------------------------|---|----|
| 1) Viva voce (External Examination) | = | 30 |
| 2) Programme Development & Execution | = | 30 |
| 3) File Record | = | 10 |

PGDCA (Semester-I)
PGDCA-1.1 Fundamentals of Information Technology
4 Credits: 4H (L)

Teaching Hours per week: 4
 Time Allowed: 3 Hrs.
 Pass % Marks: 35%

Internal Assessment : 30 Marks
 Theory : 70 Marks

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Fundamentals of Information Technology.

UNIT-I

Historical Evolution of Computer: Block Diagram of computer, characterisation of computers, types of computers, the computer generations.

Basic Anatomy of Computers: memory unit, input-output unit, arithmetic logic unit, control unit, central processing unit, RAM, ROM, PROM, EPROM.

Input-Output Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Voice Recognition Devices, Optical Recognition devices, Dot matrix, Character and Line printer, DeskJet printer, Laser printer, and plotters.

Number System: Non-positional and positional number systems, Base conversion, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other.

Binary Arithmetic: Addition, subtraction and multiplication.

Computer Codes: weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode, XS-3, Grey Codes.

UNIT-II

Computer Software: Introduction, types of software, systems software, GUI, operating system, high level languages, assemblers, compilers and interpreters, system utilities, application packages, stages in the development of software, program testing and debugging, program documentation, concept of firmware.

Applications of Information Technology and Trends: IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application - AI, Virtual Reports, voice recognition, Robots, Multimedia Technology.

E-Commerce: Meaning, its advantages & limitations, Infrastructure for E-commerce, Types of E-Commerce Applications. **Multimedia:** Concepts, Components and Application.

References:

1. P.K. Sinha and P. Sinha, Foundations of Computing, First Edition, 2002, BPB.
2. Vishal Goyal, Lalit Goyal, Pawan Kumar, A Simplified Approach to Data Structures, Shroff Publications.
3. Shubhnandan S. Jamwal, Programming in C, Pearson Publications.
4. Chetan Srivastva, Fundamentals of Information Technology, Kalyani Publishers.
5. Turban Mclean and Wetbrete, Information Technology and Management, Second Edition, 2001, John Wiley & Sons.

PGDCA (Semester-I)
PGDCA-1.2 Operating Systems
4 Credits: 4H (L)

Teaching Hours per week: 4
 Time Allowed: 3 Hrs.
 Pass % Marks: 35%

Internal Assessment: 30 Marks
 Theory : 70 Marks

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Operating Systems in Computer Application.

UNIT-I

Introduction to Operating System: Definition, its need and Operating system services, Types of operating systems: Batch processing operating system, Multiprogramming operating system, Time Sharing operating system, Multi-tasking operating system, Distributed operating system, Network operating system, Real time operating system, Multi-processor system and parallel processing.

Process Management: Process concept, types of Process scheduling, CPU Scheduling, Scheduling criteria, and scheduling algorithms: FCFS, SJF. Round Robin Algorithms,

UNIT-II

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Unix: Structure of Unix, Kernel and shell, Commands of Unix, Unix file system, own file system, Electronic mail.

Vi Editor: Editing text, screen controls

Printing and spooling

Unix Administration: Superuser, Booting, Backup, Creating and managing new accounts.

References:

1. Silverschatz, "Operating system concepts", Pearson Education India.
2. Operating Systems: A Concept-Based Approach by D. M. Dhamdhere.
3. Operating Systems: Internals and Design Principles by William Stallings.
4. Operating System: A Design-oriented Approach by Charles Crowley.
5. Stan Kelly-Bootley, Understanding UNIX, Sybex Tech asian edition.

PGDCA (Semester-I)

PGDCA- 1.3 Programming Fundamentals through 'C' Language

4 Credits: 4H (L)

Teaching Hours per week: 4

Time Allowed: 3 Hrs.

Pass % Marks: 35%

Internal Assessment: 30 Marks

Theory : 70 Marks

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Programming Fundamentals in Computer Application.

UNIT-I

Programming process: Problem definition, program design, coding, compilation and debugging.

Fundamentals of C: Identifiers and keywords, data types, input and output, type conversion, operators and expressions: Arithmetic, logical, relational, assignment, conditional, unary operator and library functions.

Control statements: branching, looping using for, while and do-while statements, nested control structures, switch, break and continue statement.

Functions: definition, call, prototype and passing arguments to a function, recursion.

UNIT-II

Storage classes: automatic, external and static variables.

Arrays: Definition, accessing elements, initialization, one and multi dimensional arrays, strings.

Structures: variables, accessing members, nested structures, pointer to structures.

Pointers: address and referencing operators, declaration, assignment, passing pointer to functions, pointer and arrays, introduction to files.

References:

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. Rajaraman, V, "Fundamentals of Computers", PHI
5. B.W. Kerrighan and D.M.Richie, "The C programming language", 2nd edition, PHI

PGDCA (Semester-I)

PGDCA- 1.4 Computer Organisation and Architecture

4 Credits: 4H (L)

Teaching Hours per week: 4

Time Allowed: 3 Hrs.

Pass % Marks: 35%

Internal Assessment: 30 Marks

Theory : 70 Marks

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Computer Organisation and Architecture in Computer Application.

UNIT –I

Logic Gates: AND, OR, NOT, NOR, NAND, XOR, XNOR.

Boolean Algebra and Minimization techniques: Simplification of Boolean expressions using Laws, Rules, Duality Principle and Demorgan's Theorems.

Canonical SOP and POS Forms: SOP and POS representation of Logic functions, K-Map representation and simplification up to 4 variable expressions, Don't care condition.

Combinational logic design: Half-adder, Full adder, Binary adder.

Sequential circuits: concept, flip-flops (D, RS, JK, T), Counters: Asynchronous, Synchronous (overview only).

UNIT-II

Central Processing Unit: General register organization, Instruction codes, Instruction formats, Instruction cycle, Addressing modes.

Register Transfer and Micro-operations: Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit.

Memory Organisation: Memory hierarchy, cache memory, associative memory.

I/O organization: I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA.

References:

1. M.M. Mano, "Computer System Architecture". Third Edition, Prentice-Hall of India, 2002.
2. A.S.Tannenbaum, "Structured Computer Organisation". Prentice-Hall of India, 1999.
3. William Stallings, "Computer Organisation and Architecture". 6th Edition, Pearson Education, 2002.
4. Computer Architecture and Organization by John P Hayes, Tata McGraw Hill, 1996.
5. Computer Organization by VC Hamatcher et, Tata McGraw Hill, 1996.

PGDCA (Semester-I)**PGDCA -1. 5 Software Lab-I
(Office Automation & Productivity Tools)
2 Credits: 4H (P)**

Teaching Hours per week: 4

Time Allowed: 3 Hrs.

Pass % Marks = 35%

Internal Assessment : 30 Marks

Theory: 70 Marks

This laboratory course will comprise as exercises to implement the basic concepts of MS-Office (Excel, Word & PowerPoint)

PGDCA (Semester-I)
PGDCA -1. 6 Software Lab-II
Programming Fundamentals through 'C' Language
2 Credits: 4H (P)

Teaching Hours per week: 4

Time Allowed: 3 Hrs.

Pass % Marks = 35%

Internal Assessment : 30 Marks

Theory : 70 Marks

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA-1.3 Programming Fundamentals through 'C' Language. Students are required to develop programs.

PGDCA (Semester-II)
PGDCA 2.1 Data Structures
4 Credits: 4H (L)

Teaching Hours per week: 4
 Time Allowed: 3 Hrs.
 Pass % Marks: 35%

Internal Assessment : 30 Marks
 Theory : 70 Marks

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Data Structure in Computer Application.

UNIT-I

Basic concept and notations, data structures and data structures operations, mathematical notation and functions, algorithmic complexity, Big 'O' notations and time space trade off.

Arrays: Linear array, representation of linear array in memory, Traversing linear array, insertion and deletion in an array, multi-dimensional array: row-major, column major order, sparse array.

Stacks: Push and Pop in stack. Representation of stack in memory (linked and sequential) applications of Stack: conversion from infix notation to post fix notations, evolution of postfix notation, matching of Parenthesis, recursion, Tower of Hanoi.

UNIT-II

Linked list: representation of linked list using static and dynamic data structures, Comparison of Linear and non-linear data structures, Insertion and deletion of a node from a linear linked list, Introduction to doubly and circular linked lists, Application of linked lists.

Searching and Sorting: Linear and binary search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort and Quick Sort comparison of various searching and sorting algorithms.

References:

1. Seymour Lipschutz "Theory & Practice of Data Structures", McGraw Hil, 1998.
2. Thomas Naps and Bhagat Singh, Introduction to Data Structures.
3. Vishal Goyal, Lalit Goyal, Pawan Kumar, A Simplified Approach to Data Structures, Shroff Publications.
4. A. Tanenbaum, Y. Lanhsam and A.J. Augenstein, "Data Structures Using C", Prentice Hall of India, 1990
5. Seymour Lipschultz, "Theory and Practice of Data Structures", McGraw-Hill, 1988.

PGDCA (Semester-II)
PGDCA 2.2 Object Oriented Programming using C++
4 Credits: 4H (L)

Teaching Hours per week: 4
 Time Allowed: 3 Hrs.
 Pass % Marks: 35%

Internal Assessment : 30 Marks
 Theory : 70 Marks

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Object Oriented Programming using C++

UNIT-I

Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming.

Introduction to C++: Identifier, Keywords, Constants, Operators: Arithmetic, relational, logical, conditional and assignment. Size of operator, Operator precedence and associativity. Type conversion, Variable declaration, expressions, statements, manipulators. Input and Output statements, stream I/O.

Control Structures: Conditional and Iterative statements, breaking control statements, Type casting, Storage Classes, Arrays, Arrays as Character Strings, Structures, Unions, Bit fields, Enumerations and User defined types, Pointer declaration.

UNIT-II

Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing: by functions, recursion, function overloading, Default Arguments.

Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control, this pointer, array of objects, Static data member and Static member functions, Friend functions.

Constructors and Destructors: Properties, types of constructors, multiple constructors in classes. Dynamic memory allocation using new and delete operators.

Inheritance: Defining derived classes, single inheritance, multiple inheritance, types of derivation, function redefining, constructors in derived class, Types of base classes.

References:

1. Herbert Schildt. "The Complete Reference C++", Tata McGraw-Hill, 2001
2. Deitel and Deitel, "C++ How to Program", Pearson Education, 2001
3. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications, 1994.
 Bjarne Strastrup, "The C++ Programming Language", Addison-Wesley Publication Co., 2001.
4. Stanley B. Lippman, Josee Lajoie, "C++ Primer", Pearson Education, 2002
5. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw-Hill, 2001.

PGDCA (Semester-II)
PGDCA-2.3 Database Management System with MS ACCESS
4 Credits: 4H (L)

Teaching Hours per week: 4
 Time Allowed: 3 Hrs.
 Pass % Marks: 35%

Internal Assessment : 30 Marks
 Theory : 70 Marks

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Database Management System with MS ACCESS in Computer Application

UNIT -I

Database Management System: Traditional file processing system, Data base management system, Definition, Characteristics, advantages over traditional file processing system, Users of database, DBA and its responsibilities, Database schema, instance.

DBMS architecture, data independence, mapping between different levels, Data Models.

Database languages: DDL, DML, DCL, Data Dictionary, Meta data. **Keys:** Super, candidate, primary, unique, foreign.

Entity relationship model: concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, converting ER diagrams to tables.

Overview of Network, Hierarchical model and Relational Model.

UNIT-II

Database Design: Functional dependency, Fully Functional dependency, Transitive dependency, Multi-valued dependency,

Normalization: 1NF, 2NF, 3NF, 4NF, BCNF, 5NF.

MS-ACCESS: Introduction to MS-ACCESS, working with database and tables, queries in Access, Applying integrity constraints, Introduction to forms, sorting and filtering, Controls, Reports and Macro: creating reports, using Macros.

References:

1. B.P. Desai, "Database management system" BPB publications, New Delhi.
2. C.J. Date, "An Introduction to Data Base Systems", 3rd Ed., Narosa Publishers, 1997
3. Jeffrey D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Pub., 1984.
4. D. Kroenke., "Database Processing", Galgotia Publications, 1987.
5. Henry F. Korth, "Database System Concepts", McGraw Hill. Inc., 1997.

PGDCA (Semester-II)

PGDCA-2.4 Fundamentals of Computer Networks, Internet and Scripting Languages 4 Credits: 4H (L)

Teaching Hours per week: 4

Internal Assessment : 30 Marks

Time Allowed: 3 Hrs.

Theory: 70 Marks

Pass % Marks: 35%

Instructions for Paper Setter/Examiners

The Question paper will consist of three sections-A, B & C. Section A and B (Consist of unit I and II of the syllabus, respectively) will have four questions each from the respective units and will carry 10 marks each. Candidates are required to attempt two questions each from section A and B. Section C will consist of 10 short answer type questions covering entire syllabus and will carry 3 marks each. Section C is Compulsory.

Objective: The objective of this paper is to familiarize the students with concept of Fundamentals of Computer Networks, Internet and Scripting Languages in Computer Application.

UNIT-I

Computer Networks: Introduction, Applications, Network hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less), Network structure and architecture - point to point, multicast, broadcast, Classification of networks-LAN, MAN and WAN. Reference models - the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / IP models.

Internet: Introduction, Relays, Repeaters, Bridges, Routers, Gateways.

Internetworking: How networks differ, concatenated virtual circuits, connectionless internetworking, tunnelling, internetwork Routing, fragmentation, Firewalls, internet architecture.

UNIT-II

Application layer: The DNS Name Space, Electronic Mail, The World Wide Web, FTP: introduction, data transfer and distributed computation, Generalised File Transfer, The File Transfer Protocol.

Network security: Introduction to cryptography, substitution ciphers, transposition ciphers, one-time pads, two fundamental cryptographic principles.

HTML: Introduction to HTML, HTML and the World Wide Web, HTML elements, basic structure elements of HTML, the two categories of body elements – block level and text level, creating HTML pages, viewing pages in different browsers, rule for nesting.

HTML tags, colours and fonts, formatting the body section, creating links, creating external links, creating internal links.

References:

1. Douglas E. Comer, "Computer Networks and Internets" 2nd Edition, Addison Wesley.
2. D. Bertsekas and R. Gallager, "Data Networks", 2nd Edition, Prentice Hall, 1992.
3. Andrew S. Tanenbaum, "Computer Networks", Third Edition, PHI Publications, 1997.
4. B Forousan, Introduction to data communication and networking.
5. Larry L. Peterson & Bruce S. Davie, "Computer Networks – A systems Approach", Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2007.

PGDCA (Semester-II)
PGDCA-2.5 Software Lab – III
(Data Structures and Programming with C++)
2 Credits: 4H (P)

Teaching Hours per week: 4
Time Allowed: 3 Hrs.
Pass % Marks = 35%

Internal Assessment : 30 Marks
Theory : 70 Marks

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA-2.1: Data Structures and PGDCA 2.2: Object Oriented Programming with C++. Students are required to develop programs.

PGDCA (Semester-II)
PGDCA 2.6 Software Lab-IV
(MS ACCESS and Scripting languages)
2 Credits: 4H (P)

Teaching Hours per week: 4

Time Allowed: 3 Hrs.

Pass % Marks = 35%

Internal Assessment : 30 Marks

Theory : 70 Marks

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA-2.3: Database Management System with MS ACCESS and PGDCA 2.4: Fundamentals of Computer Networks, Internet and Scripting Languages. Students are required to develop programs.