ORDINANCE FOR ONE YEAR POST GRADUATE DIPLOMA PROGRAMME
IN
COMPUTER APPLICATIONS
UNDER SEMESTER SYSTEM IN PATNA UNIVERSITY

Preamble
All Post Graduate Diploma Programmes under the faculty of Science commencing from the academic session 2018 henceforth shall have two semesters. The PGD programme shall consist of 08 papers spread over two semesters consisting of theory as well as practical/field work/internship etc. These programme will run under self-financing scheme.

1. The Programme Structure:
The PGD programme shall consist of two semesters having 08 courses/papers each carrying 100 marks. There shall be four courses/papers in first semester and four courses/papers in second semester. The entire curriculum shall be of 800 marks taken together. The details of credits for individual components and individual courses are given in Table.1.

Table 1: Structure of the 1 Yr (Two Semesters) Post Graduate Diploma courses under semester system:

<table>
<thead>
<tr>
<th>Semester</th>
<th>No of COURSE / Papers</th>
<th>Credit per COURSE/ paper</th>
<th>Total credit</th>
<th>Minimum No of Learning Hours#</th>
<th>Nature of course</th>
<th>Nature of course</th>
<th>Nature of course</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>04</td>
<td>05</td>
<td>20</td>
<td>200</td>
<td>3</td>
<td>1</td>
<td>Project work/Fieldwork/Internship etc.</td>
</tr>
<tr>
<td>II</td>
<td>04</td>
<td>05</td>
<td>20</td>
<td>200</td>
<td>3</td>
<td>1 (50 Marks)</td>
<td>1 (50 Marks)</td>
</tr>
</tbody>
</table>

| Total    | 08                     |                          | 40           | 400                            |                 |                 |                 |
#For Tutorial (T)/ Practical (P)/ Field Work (FW)/ Internship etc. extra working hour to be added as per requirement and will be decided by the BOCS of the respective subject.

* Out of the eight courses at least four (04) will be on theoretical concept and the rest shall either theory and/or based on experimental learning i.e. involving Practicals/ Project work/ Field work/ Internship etc.

IMP : It is desirable that all students will be given adequate exposure on experimental learning over and above the class room teaching-learning to enhance the scope of employability.

Table. 2. Description of papers for of the 1 Yr (Two Semesters)
Post Graduate Diploma programme under semester system

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course/ Paper Code</th>
<th>Nature of Course/ Paper</th>
<th>Title of the Course/ Paper</th>
<th>Marks</th>
<th>Marks of CIA</th>
<th>Marks of ESE</th>
<th>Passing Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEMESTER I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 1</td>
<td>Theory</td>
<td>Fundamentals of Computers and Information Technology</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 2</td>
<td>Theory</td>
<td>Office Automation</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 3</td>
<td>Theory</td>
<td>Programming Techniques in either C or C++</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 4</td>
<td>Practical</td>
<td>Practical on course C-2 and C-3 [Office automation and Programming Techniques]</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEMESTER II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 5</td>
<td>Theory</td>
<td>Web Designing using Web Technologies</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 6</td>
<td>Theory</td>
<td>Programming using Java</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 7</td>
<td>Theory</td>
<td>RDBMS</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C- 8</td>
<td>Practical &amp; Project Work/ Internship</td>
<td>A. Practical on Course C-5, C-6 and C-7 [Lab of Web Designing, Java, RDBMS]</td>
<td>100</td>
<td>15</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. Project work/ Internship</td>
<td></td>
<td>15</td>
<td>35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Fee Structure

The Fee Structure for the Post Graduate Diploma (PGD in Computer Applications) under Self financing in the faculty of Science for each semester shall be as mentioned in table. However the fee for both semester shall have to be paid at the time of admission.

**Table. 3: FEE STRUCTURE PER SEMESTER** for Post Graduate Diploma Programme (PGD in Computer Applications)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Head/ Item</th>
<th>For Indian Resident Fee in Indian Rupees.</th>
<th>Non-Residents Indian (NRI) and Foreign Students in US dollar($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Admission Application Form Fee (one time)</td>
<td>500/-</td>
<td>50</td>
</tr>
<tr>
<td>II.</td>
<td>Admission Fee (Per semester)</td>
<td>150/-</td>
<td>90</td>
</tr>
<tr>
<td>III.</td>
<td>Registration fee (one time) if applicable</td>
<td>200/-</td>
<td>20</td>
</tr>
<tr>
<td>IV.</td>
<td>Caution Money (one time)</td>
<td>500/-</td>
<td>200</td>
</tr>
<tr>
<td>V.</td>
<td>Tuition fee (per semester)</td>
<td>4960/-</td>
<td>250</td>
</tr>
<tr>
<td>VI.</td>
<td>Laboratory Charges (per semester)</td>
<td>5000/-</td>
<td>250</td>
</tr>
<tr>
<td>VII.</td>
<td>Ekalaya &amp; Tarang (one time in each Academic Session)</td>
<td>10/-</td>
<td>25</td>
</tr>
<tr>
<td>VIII.</td>
<td><strong>Total</strong></td>
<td><strong>11320/-</strong></td>
<td><strong>885</strong></td>
</tr>
<tr>
<td>IX.</td>
<td>Miscellaneous (Per semester)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Central library</td>
<td>100/-</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Electricity fee</td>
<td>100/-</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Identity card fee</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>NSS fee</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Parking</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Internal Examination fee</td>
<td>300/-</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Library Maintenances Fund</td>
<td>100/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Building Maintenance Fund</td>
<td>100/-</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Medical fee</td>
<td>100/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Athletic Fund (for College)</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Athletic Fund (for University)</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Common room Fund</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Extra-curricular Fee (Cultural)</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Environmental Protection Fee</td>
<td>20/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Student’s Welfare Fee</td>
<td>10/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Poor student’s fund</td>
<td>10/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Student’s Union Fund</td>
<td>20/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Society Subscription</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Magazine Fund</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Hand Book/Directory</td>
<td>50/-</td>
<td>5</td>
</tr>
<tr>
<td>X.</td>
<td><strong>Total</strong></td>
<td><strong>1360/-</strong></td>
<td><strong>135</strong></td>
</tr>
<tr>
<td>XI.</td>
<td><strong>Grand total</strong></td>
<td><strong>12680/-</strong></td>
<td><strong>1020</strong></td>
</tr>
<tr>
<td>XII.</td>
<td>Less Registration fee</td>
<td>200/-</td>
<td>20</td>
</tr>
<tr>
<td>XIII.</td>
<td><strong>Total amount 1st semester</strong></td>
<td><strong>12480/-</strong></td>
<td><strong>1000</strong></td>
</tr>
<tr>
<td>XIV.</td>
<td>Total Amount in Semester II excluding caution money &amp; Registration Charges, admission form</td>
<td>11280/-</td>
<td>730</td>
</tr>
</tbody>
</table>
PATNA UNIVERSITY

Regulations for Examination of Post graduate Diploma Programme
Computer Applications in the
faculty of Science under Semester System, Patna University

1. General
1.1 These regulations shall be called the “Regulations of Examination” for PGD Programme Computer Applications in the Faculty of Science.
1.2 These regulations shall come into force from the academic year 2018-2019.

2. Programme of Study
2.1 The University shall offer Post Graduate Diploma Programme in the following subject in the Faculty of Science:
   Post Graduate Diploma in Computer Applications
2.2 The durations of PGD (Semester System) programme shall be of two semesters spreading over two academic years. Each semester shall be of ninety teaching days.
2.3 Each academic session shall consist of two semesters – I and II:
   Semester I from July to December and II from January to June.
2.4 The PGD (Semester System) programme shall consist of 08 courses/ papers spread over four semesters. There shall be four courses/ papers in first semester and four courses/ papers in second semester carrying 100 marks in each course/paper. The entire curriculum shall be of 800 marks taken together and the class shall be awarded on the performance of the candidate on 08 papers taken together having an aggregate of 800 marks.
2.5 The distribution of papers like theory, practical, field work, project, internship, dissertation etc. with number of credits is specified in each subject in the course structure of the subject concerned of the department.
2.6 The term ‘credit’ means weightage given to a course in relation with the instructional hours assigned to it. One credit will generally consist of ten hours of instruction. The PGD programme shall be of forty credits divided as 20 credit in first semester and 20 credit in second semester. The number of credit for each paper of the PGD programme shall be specified in the course structure of the subject concerned.

[Signatures]

Course Coordinator
Computer Applications Course
Magadh University College
Patna-1

[Signatures]

[Date: 26/10/18]
[Date: 6/12/10]
Table 1: Description of papers for Post graduate Diploma Programme in the faculty of Science under Semester System.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course/ Paper Code</th>
<th>Nature of Course/ Paper</th>
<th>Marks</th>
<th>Marks of CIA</th>
<th>Marks of ESE</th>
<th>Passing criterion</th>
<th>Qualifying Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEMESTER I</td>
<td>C-1</td>
<td>Subject related Compulsory Fundamentals of Computers &amp; Information Technology</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td></td>
<td>C-2</td>
<td>Subject related Compulsory Office Automation</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td></td>
<td>C-3</td>
<td>Subject related Compulsory Programming Techniques in either C or C++</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td></td>
<td>C-4</td>
<td>Subject related Compulsory Practical on course C-2 and C-3 [Office automation and Programming Techniques]</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td>SEMESTER II</td>
<td>C-5</td>
<td>Subject related Compulsory Web Designing using Web Technologies</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td></td>
<td>C-6</td>
<td>Subject related Compulsory Programming using Java</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td></td>
<td>C-7</td>
<td>Subject related Compulsory RDBMS</td>
<td>100</td>
<td>30</td>
<td>70</td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td></td>
<td>C-8</td>
<td>A. Practical on Course C-5,C-6 and C-7 [Lab of Web Deigning, Java, RDBMS]</td>
<td>100</td>
<td></td>
<td></td>
<td>45% in CIA 45% in ESE</td>
<td>Marks decide class/ CGPA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. Project work/ Internship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Marked by: 26/10/18
Course Coordinator
Computer Applications Course
Magadh Mahila College
Patna-1
3. Evaluation of Performance Under Semester System

3.1 The performance of a student in each paper will be assessed on the basis of a Continuous Internal Assessment (CIA) of 30 marks and the End of Semester Examination (ESE) consisting of 70 marks.

3.2 The components of C.I.A. are follows:
- (i) Two mid-semester written tests of one hour duration each = 15 Marks
- (ii) Seminar/Quiz = 05 Marks
- (iii) Assignment = 05 Marks
- (iv) Punctuality and conduct = 05 Marks

Total = 30 Marks

3.3 The concerned teacher of the course/paper shall be responsible for conducting the mid-semester tests and other components of the CIA.

3.4 The ESE will be written examination examinations of 3-hours duration conducted by the University.

3.5 The evaluation of laboratory paper and field work, wherever applicable will also be based on CIA and an end-semester practical examination.

3.6 All such examination shall be as per the provisions of examination board and moderation board of the Patna University.

3.7 Only those students who secured minimum qualifying marks in of 45% in the CIA shall be allowed to fill up the End Semester Examination form.

3.8 The marks of CIA in each paper be submitted by the Department along with the End semester Examination form failing which the student may not be issued admit card for the examination.

4. Examinations:

4.1 The End-Semester-Examination will be conducted by the University. The Mid Semester examinations and other components of CIA shall be conducted and evaluated by the concerned departments. The practical examinations wherever applicable shall be conducted at the department. The Head of the department will appoint external examiner(s) for practical End Semester Examination with the approval of the University. The mid-semester tests will be conducted and evaluated by the teacher concerned. The answer scripts of the mid-semester tests shall be shown to students by the concerned teacher.

4.2 The End of Semester Examination (ESE) shall be named as follows:
- (a) PGD Part (I) - Semester I Examination and Semester II Examination respectively.
- (b) Syllabus for each paper shall be divided into at least 5 units. Based on this, the question paper pattern for the End Semester Examination shall have divided into three parts A, B, C comprising of objective type questions with multiple choice, short answer type questions and long answer type questions respectively as mentioned below:
<table>
<thead>
<tr>
<th>Part</th>
<th>Nature of questions</th>
<th>Number of questions to be asked</th>
<th>Number of questions to be answered</th>
<th>Marks of each question</th>
<th>Total marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-A</td>
<td>Objective type questions with multiple choice</td>
<td>10</td>
<td>10</td>
<td>02</td>
<td>20</td>
</tr>
<tr>
<td>Part-B</td>
<td>Short answer type questions</td>
<td>05</td>
<td>04</td>
<td>05</td>
<td>20</td>
</tr>
<tr>
<td>Part-C</td>
<td>Long answer type questions</td>
<td>04</td>
<td>03</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Total Marks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>70</td>
</tr>
</tbody>
</table>

**Part - A**

Ten objective type Questions - All questions to be answered
(Questions shall be picked up from the whole syllabus
Preferably two questions from each unit) \(10 \times 2 = 20\) marks

**Part-B**

Five short Answer Questions – Four questions to be answered
(Questions shall be picked up from the whole syllabus
preferably one question from each unit) \(4 \times 5 = 20\) marks

**Part - C**

Five long answer Questions - Three questions to be answered.
(Questions shall be picked up from the whole syllabus
preferably one question from each unit) \(3 \times 10 = 30\) marks

4.2 The examination of I semester, shall be generally held in the month of November-December and that of II semester shall be held in the month of May-June.

4.3 In formulating the entire programme of studies, each Department shall be guided by the consideration that at the Postgraduate level, students should be familiar with all the sub-disciplines, trends and paradigms of the subject contributing to the knowledge pool and also the value education and employability factor. Keeping this in view the Department will decide subject based 8 papers

4.4 Paper Setting: For ESE, 50% examiners will be engaged from outside the university by the parent University as per the provisions of the examination board.

4.5 In Subjects, where there is Practical /Project / Field Study/ Internship/ Dissertation etc. generally not more than 4-5 credits should be allowed for such papers in each semester. The distribution of marks for CIA and ESE for such papers shall be decided by the Board of Courses and Study (BOCS) of the respective subject with the approval of the University and details mentioned the syllabus for which 50 marks will be for CIA and 50 marks for ESE.

4.6 All practical papers shall be evaluated by two external examiners. The distribution of CIA marks in practical papers shall be as per the course structure.

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**Signatures**

- Course Coordinator
- Computer Applications Course
- Magadh Mahila College
- Patna-1
- Date: 26/1/19
- Date: 6/12/10
5. Passing of Examinations and Promotions Rules

Promotion Rules

5.1 There shall be no supplementary examination in any of the papers in any semester (I and II).

5.2 The candidates who have been admitted to the First Semester of a one year Postgraduate Diploma Programme in a session can be placed in the following categories on the basis of their attendance in the Semester.

(i) Those who have cleared the CIA and attended the required minimum percentage (75%) of attendance of lectures/practical classes separately.

(ii) Those who have not attended the required minimum percentage of attendance (75%) both in Theory and Practical shall in no case be permitted to appear in the End Semester Examinations.

5.3 After appearing at the Semester Examination, the candidates can be placed in following categories in the context of declaration of the results of the Semester Examination (ESE):

(i) To be declared passed in End Semester Examination in any subject, a candidate must secure at least 45% marks in each paper separately in CIA, theory and practical, wherever applicable.

(ii) If a candidate secures 45% marks in at least three papers in his/her First End Semester Examination he/she shall be promoted to next higher semester.

(iii) Candidates shall have to clear their backlog paper(s) in the next end semester examination of that semester whenever it is available.

(iv) Even if a student is promoted to Second Semester, his/her final result will only be declared when he/she has cleared all their backlog papers.

(v) Final result of PGDCA Course shall be published on the basis of candidate’s performance in the 8 papers spread over two semesters.

(vi) The Final result will be published only after he/she has cleared all the 8 papers securing minimum qualifying marks.

(vii) Since it is a continuous evaluation programme, student shall be awarded Grade Point (GP) at the End of each Semester Examination and cumulative Grade Point (CGP) at the End of Final End Semester Examinations in 10 point scoring system.

(viii) There shall be no supplementary examination. A student has to score minimum 45% marks in his CIA. Failing to secure minimum marks he/she shall have to repeat the CIA along with the students of the same semester of the next academic session.

(ix) If students fail to secure minimum 45% marks in CIA of any paper his/her result will be declared as failed in that paper. Students shall have to reappear in that paper in the same semester of next academic session.

(x) The name of the promoted candidate/candidates will not be included in the merit list of that subject.

(xi) A promoted candidate, if he has passed in CIA but fails in theory paper/papers, he/she shall retain his/her CIA score and will reappear in the theory paper only of the semester whenever available. However, if a
candidate is declared fail in any End Semester Examination, shall retain nothing and will have to redo the course work of failed semester again and he has to appear again in CIA as-well-as theory paper.

6. Improvement of Result:
If candidate passes in End Semester Examination (ESE), he/she may apply for the improvement of his/her result in maximum of two papers of the second semester. He/she can avail this facility only in theory papers. Better of the two results will be treated as final result of candidates in those papers.
However, the name of such candidates with improved result will not be included in the merit list.

7. Declaration of Result:
The following grading system shall be used by Teacher/Examination department:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percentage Range</th>
<th>Numerical of Letter Grade</th>
<th>Description of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>100-91</td>
<td>10</td>
<td>Outstanding</td>
</tr>
<tr>
<td>A++</td>
<td>90-81</td>
<td>9</td>
<td>Excellent</td>
</tr>
<tr>
<td>A+</td>
<td>80-71</td>
<td>8</td>
<td>Very Good</td>
</tr>
<tr>
<td>A</td>
<td>70-61</td>
<td>7</td>
<td>Good</td>
</tr>
<tr>
<td>B+</td>
<td>60-51</td>
<td>6</td>
<td>Average</td>
</tr>
<tr>
<td>B</td>
<td>50-45</td>
<td>5</td>
<td>Pass</td>
</tr>
<tr>
<td>F</td>
<td>Less than 45</td>
<td>Less than 5</td>
<td>Fail</td>
</tr>
</tbody>
</table>

8. Examinations:
8.1 The End Semester Examinations (ESE) shall be conducted by the University. The continuous Internal Examinations (CIA) shall be conducted by the concerned department.

9. Passing of Examination:
9.1 A student shall be declared to have 'passed' and promoted to the next semester when he/she earns 'B' grade or above grade as mentioned in the table in section 7 in the semester examination covering continuous evaluation, mid-term and end-term examinations in all the courses for which he/she was registered in the said semester.
   (i) In order to be promoted from Semester I to Semester II, a candidate has to pass in at least three papers in Semester I Examinations.
   (ii) In Semester II, a candidate needs to have cleared all the eight papers for the award of the Degree.
   (iii) A Student passed or promoted to the next Semester shall be entitled to get admitted in the Semester to which he/she has been declared passed/promoted.

9.2 A student will be deemed as 'FAILED' in a semester when he/she gets 'F' grade in more than 50% of the papers offered in the examinations to meet the requirements. Such students will be advised by the University to repeat the semester on payment of semester fee or the half of the academic year fee.

9.3 A student who has secured less than 'B' GRADE in one or more course may also be promoted to the next semester if he/she has not otherwise failed as per section above.
However, he/she will have to re-appear at the examination of such courses one time only as and when it is held or at the time of regular End-semester examination (ESE) in which he/she has been promoted.

9.4 A student shall be declared to have failed in the programme when he/she fails to qualify for promotion to the next semester after two successive attempts.

9.5 Grades that may be shown in the award sheet of a student without any numerical value are N.A (Not Applied) and S.P (Satisfactory Performance) for course(s) extending beyond a semester such as Project Work.

9.6 There shall be a Grade Point Average (GPA) calculated for each semester on the basis of grades obtained in that semester. The GPA for the Jth Semester is calculated as:

\[
\text{GPA} = \frac{\sum_{i=1}^{n} m_i o_i}{\sum_{i=1}^{n} o_i}
\]

Where \(n\) is the number of course in the Jth semester, \(m_i\) denotes the numerical value of the grade obtained in the Jth course of the semester denotes the number of credits for the Jth course of the semester.

Example:
Let us consider the numerical grade and credit of a student given in the table below GPA for Jth semester can be calculated.

<table>
<thead>
<tr>
<th>Course</th>
<th>Paper I</th>
<th>Paper II</th>
<th>Paper III</th>
<th>Paper IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Numerical Grade</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

The GPA for the Jth semester is calculated as:

\[
\text{GPA} = \frac{7 \times 5 + 8 \times 5 + 5 \times 5 + 7 \times 5}{5+5+5+5} = \frac{135}{20} = 6.75
\]

The cumulative Grade Point Average (CGPA) for \(k\) semester is given as:

\[
\text{CGPA} = \frac{\sum_{j=1}^{k} (\text{GPA}_j \times C_j)}{\sum_{j=1}^{k} C_j}
\]

where \(C_j\) is the total number of credits in the jth Semester.

For example, consider the GPA's obtain by a student in four semester along with total credit in each semester is given as follows.

<table>
<thead>
<tr>
<th>Semester</th>
<th>First</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>6.75</td>
<td>6.00</td>
</tr>
</tbody>
</table>

[Signature]

Course Coordinator
Computer Application course
Magadh Mahatma College
Patisa-1
\[
\text{CGPA} = \frac{(6.75 \times 16) + (6.00 \times 20)}{16 + 20} \\
= \frac{108 + 120}{36} \\
= \frac{228}{36} = 6.33
\]

9.7 The award sheet of the students will show the grades obtained in all the courses offered in each semester, grades/categories without numerical value (if applicable), the GPA and the promotion status.

9.8 To be eligible for the award of Post Graduate Diploma, students must obtain a minimum final cumulative Grade Point Average (CGPA) of 5.0.

9.9 To find percent equivalent to CGPA the following formula may be used; percent = CGPA x 10

9.10 Answer books or sheets will be coded before being passed on the examiner and decoded before tabulation work.

\[\text{Course Coordinator} \]
\[\text{Computer Applications Course} \]
\[\text{Magadh Mahila College} \]
\[\text{Patan-1} \]
1. COMPUTER - A Definition.
   Data, Processing, Information.

2. Basic Anatomy of Computers-
   Bits, bytes and words, Input, Output, CPU, Peripheral devices, Backing Storage.
   Input interface, Output interface.

3. Classification of Computers-

4. Computer Applications -
   In Business & Industry, Science & Technology, Education, Health, Communication, Banking & other Public Services

5. Peripheral Devices –
   Input Device
   Keyboard, Mouse, Punch card, Joystick, Touch Panels, OMR, OCR, MICR, Image Scanners, Light Pen, Voice System

   Output Devices
   Printers
   Impact printers and Non impact printers Character printers, line printers and page printers Dot Matrix, Daisy wheel, Thermal, Laser, Ink Jet, Drum Printer, Chain Printer

   Plotters
   Drum and Flat Bed Plotters

   VDU
   Visual Display Adapters, LCD

Secondary Storage Device
   Magnetic Disk( Winchester and hard disks). Magnetic Tape, Floppy disk, Optical disk

6. Memory and register -
   Primary memory, Secondary memory
   RAM - SRAM, DRAM
   ROM - PROM, EPROM, EEPROM, CDROM
   ROM BIOS, Buses,
   Registers- Program counter, Memory buffer register, Memory CACHE MEMORY

7. Computer Codes and Arithmetic -
   Number system
   1. Positional
      Decimal, Binary, Octal, Hexadecimal.
   2. Non Positional (Roman)
      Conversion of Decimal numbers in other systems and vice-versa. Binary Arithmetic -
      Addition, Subtraction (1's complement, 2's complement), Multiplication, Division
      Basic Gates (OR, AND, NAND, NOT, XOR, NOR).

8. Types of processing -

9. Introduction to -
   OS, Utilities, Compilers/Interpreters, Assemblers Multiprogramming, Multitasking, Multiprocessor.

10. Networking -
    Topologies (Bus, Star, Ring, Mixed), Advantages and Disadvantages of networking, LAN, WAN

DOS
   - Internal Commands
   - External Commands

Directory Structure
   File naming convention and valid characters for filenames

Internal Commands -
   CLS, DIR, COPY, CON, TYPE, REN, COPY, DATE, TIME, DEL, MD, RD, CD, ERASE, PROMPT, ECHO,
   PATH, PAUSE, SET, VER, VOL.

WILDCARD CHARACTERS * AND ?
   (.) current directory, (..) root directory

External Commands -
   FORMAT, CHKDSK, SCAN DISK, DSKCOPY, SORT, FIND, ATTRIB, XCOPY, TREE, UNDELETE,
   EDIT, DELTREE, MOVE, DEFRAG, MORE

Redirection, Pipes
   Executable files, Text files, Batch files
OFFICE AUTOMATION

GETTING STARTED
Starting Windows95. Tip of the day, Windows95 desktop and taskbar, Double-clicking to start programs, Quitting programs, Shutting down and quitting windows, Running DOS programs & Startup group

WINDOWS BASICS
Parent and child windows, parts of a window, Opening, activating, hiding(minimizing), resizing, scrolling, arranging and closing a window, Moving information from one window to another HELP, Context Sensitive Help & Search for Help.

WORKING WITH DISKS, FOLDERS, AND FILES
Disk icons and their windows, The Windows Explorer, Creating and naming new folders, Moving and copying folders and files, Deleting folders and files, Emptying the Recycle Bin, Naming files, File types in windows95, Associating files with programs, Renaming files & Finding lost files.

IMPORTANT TECHNIQUES AND TIMESAVERS
Moving or copying by dragging and dropping, Moving or copying by creating scraps, Shortcut icons, Property settings, Object linking and embedding.

PERSONALIZING WINDOWS95
The welcome screen and tips, Adding programs to the start menu, Clock, calendar, regional settings, Mouse behaviour and mouse property window, Desktop pattern and wallpaper.
Windows color scheme & Screen savers.

ACCESSORIES
MS Paint, Notepad, Calculator & WordPad.

MICROSOFT EXCEL

GETTING STARTED
Excel Basics, Enter Data, Select Cells, Using AutoFill, Move Through a Worksheet & Getting Help.

SAVING AND OPENING WORKBOOKS
Save a Workbook, Close a Workbook, Exit Excel, Open a Workbook, Create a New Workbook & Switch Between Workbooks.

EDITING WORKSHEETS
Edit Data, Clear Data, Undo Last Change, Move Data, Copy Data & Check Spelling.

USING FORMULAS AND FUNCTIONS
Formulas, Enter a Formula, Functions, Enter a Function, Add Numbers & Copy Formulas.

WORKING WITH ROWS AND COLUMNS
Insert a Row or Column, Delete a Row or Column, Change Column Width & Change Row Height

FORMATTING WORKSHEETS
Change Appearance of Numbers, Align Data, Center Data Across Column, Bold, Italic and Underline, Clear Formats, Change Fonts & Add Borders.

PRINTING WORKSHEETS
Preview a Worksheet, Change margins, Print a Worksheet & Add a Header or Footer.

USING MULTIPLE WORKSHEETS
Switch Between Worksheets & Copy or Move Data-Between Worksheets.

CHARTING DATA
Create a Chart, Move a Chart, Size a Chart, Print a Chart & Change Chart Type.

DATABASE MANAGEMENT
Goal seek Data sort Data filtering Sub-totaling Pivot table Scenario Manager

Introduction to macro
POWER POINT

GETTING STARTED
Create new slide, Select slide, Enter data & Getting help.

SAVING AND OPENING SLIDES
Save a new Slide, Close a Slide & Exit Power Point.

EDITING SLIDES
Insert Slide, Delete Slide, Clear Slide & Duplicate slide.

VIEWING SLIDES
Normal view, Outline view, Slide sorter & Slide Presentation.

USING MULTIPLE SLIDES
Create new slide, Insert time, date, page no., Copy slides from file, Copy objects from WORD &
Copy graphs from EXCEL.

FORMATTING SLIDES
Change data alignment, Change fonts, Create bullets & numbers Create periods.

SLIDE PRESENTATION
Presentation templates, Change wizards, Change slide background & Change Slide
colour. DRAWING SHAPES
Group slides, Rotate picture, Change picture colour & Crop picture.

MICROSOFT WORD

GETTING STARTED
Enter Text, Move Through a Document, Select Text & Getting Help.

EDITING DOCUMENTS
Insert Text, Delete Text, Replace Selected Text, Undo Changes, Redo Changes,
Change the Case of Text, Move Text, Copy Text & Change Views.

SMART EDITING
Find Text, Replace Text, Check Spelling, Using AutoCorrect, Using the Thesaurus &
Check Grammar. SAVING AND OPENING DOCUMENTS
Save a New document, Close a Document, Exit Word & Open a Document.

USING MULTIPLE DOCUMENTS
Create a New Document, Arrange Open Documents, Copy or Move Text Between Documents,
Maximize a Document & Switch Between Documents.

PRINTING DOCUMENTS
Preview a Document, Print a Document.

FORMAT CHARACTERS
Bold, Underline and Italics, Change Fonts & Insert a Symbol.

FORMAT PARAGRAPHS
Change Line Spacing, Change Paragraph Alignment, Display or Hide the Ruler, Change
Tab Settings
Indent Paragraphs & Create Numbered and Bulleted Lists.

FORMAT PAGES
Insert a Page Break, Create a New Section, Change Margins, Add Headers or Footers & Center a Page.

WORKING WITH TABLES
Create a Table, Type Text, Add a Row or Column, Delete a Row a Column, Change
Column Width &
Format a Table.

Books referred:

1. Windows95 for Busy People
   - Ron Mansfield
2. Easy Guide To Windows95
   - Alan Simpson
3. Microsoft Office Professional For Windows95
1. Programming Techniques
   Techniques of programming (flowchart, pseudocodes).

2. Introduction to 'C' Programming
   - Data Types in 'C'
   - Operators & Expressions
   - Control Flow
   - Arrays
   - Pointers
   - Structures and unions
   - Pointers to Structure
   - Sorting
   - File Handling

Details Covered:
1. Programming Techniques
   - Data, Constants, Variables
   - Flowchart
   - Structured Flowcharts
   - Introduction To Pseudocode
   - Selection
   - Iteration
   - Modular Approach
   - Array
   - Sorting (LINEAR, BUBBLE)
   - Searching (SEQUENTIAL, BINARY)
   - Structured programming

2. 'C' Programming
   1. Features of 'C' language, character set, tokens, identifiers, keywords, constants, variables, storage class (auto, static, register, extern)
   2. Data types and sizes (char, int, float, short int, long int, unsigned, double, numeraled), Operations and expressions (Arithmetic, logical, relational, bit - wise, compound, assignment, increment and decrement, conditional and special, typedef statement, type conversion).
   3. Header files, library files, preprocessor directives (#include, #define), linking and compilation process

4. Control flow
   Statements and blocks. if, if-else, n

5. Library Functions
   I/O functions:
   - getc(), putc(), getchar(), putchar(), puts(),gets(), scanf(), printf(), getch(), fflush().
   - String functions:
     - strcpy(), strcmp(), strcat(), strlen()
   - Character functions:
     - isupper(), islower(), isalpha(), isdigit(), ispunct(), isalnum(), isspace(), tolower(), toupper().
   - Mathematical functions:
     - abs(), atof(), rand(), atoi(), exp(), log(), pow(), sqrt(), sin(), cos(), tan()
   - Some other general functions:
     - sleep(), system(), itoa(), calloc(), malloc(), free(), exit().

User functions:
function components, passing data to function, function return data type, parameter passing(call by value, call by reference), recursive functions, storage class (local variables, global variables)

6. Arrays
   operations on arrays, single and multi dimensional arrays, passing array to function.

7. Structure and union
   structure declaration and definition, accessing, nesting of structure, array of structure, structures and functions, unions, difference between structure and union

8. Pointer and its operator
   &, * , pointer arithmetic, pointers to constants, constant pointers, array of pointers, pointer to function, pointer to structure.

9. Command line arguments
   *argv[] & argc


11. Files
    Opening modes, FILE, fread(), fopen(), fwrite(), feof(), fgetc(), fputc(), fgetss(), fputs(), rewind(), fsccaf(), fprintf(), fclose(), ftell(), fseek()

Books referred:
1. ANSI C
   - E. Balaguru Swamy
2. Let us C
   - Yashwant Kanetkar.
BUSINESS DATA PROCESSING

Details Covered:

1. Introduction to data processing, data collection, preparation, verification, editing and validation. Types of information, qualities of information, various ways of collecting information, Data input methods (on-line & off-line), Data processing methods (on-line & batch processing).
   Classification of files: Master files, Transaction files, Work files, Audit files.
4. Overview of various Business Applications; Characteristics of business organisations, Use of computer in various areas of business: Sales control and accounting, Cost accounting, Inventory control, Payroll etc.

COBOL Programming

1. Introduction to Cobol
   Structure of a COBOL Program, DIVISIONS, SECTIONS, PARAGRAPHS etc. COBOL Character set, Digits, Letters & Special Characters Words, Literals, Figurative constants, Identifiers, PICTURE clause, edit characters (Z, *, +, -, CR, DB, / etc).

2. IDENTIFICATION DIVISION

3. ENVIRONMENT DIVISION
   Configuration Section, Input-output Section, File-control & select - assign - organization - access

4. DATA DIVISION
   File Section (Sequential, Line sequential & Indexed file), Screen section, Working-Storage Section, Table Handling, Index Data Items, Condition Names, Linkage Section, Other clauses like VALUE, USAGE, SIGN IS, BLANK WHEN ZERO, JUSTIFIED, REDEFINES, OCCURS.
   Levels of data - 01 to 49, 77 & 88.

5. PROCEDURE DIVISION

Control Statements:
   PERFORM IF and ELSE, SORT, MERGE and SEARCH Interprogram Communication CALL USING

Books referred:

1. Structured COBOL Programming
   - Stern & Stern
2. Cobol Programming
   - M.K.Roy & D.Ghosh Dastidar
3. Analyses and Design Of Information System
   - V.Rajaraman
4. O LEVEL (Module III)
   System Design And Business Application
   - V.K.Jain

Programming Lab I

Writing 'C' program and COBOL program.
Using mail merge or any other tools of MS-WORD; Creating charts or data handling in EXCEL; Preparing slides and importing files like chart from EXCEL in POWERPOINT etc.
1. Forms and controls, Toolbox objects, System objects, Property, method, event, statement

2. Project: window, Different files and their extensions, File commands, Concept of focus, Caption, form name, border style, min button, Max button, control box, window state, backedor, font style, fore color, code window

3. Text controls, containers, buttons, scroll bars, adding control to a form and setting its properties, event procedure for a control, naming conventions, coded statements and methods, print method, assigning text to a text box, multiline property, label auto size property, label word-wrap and border style property.

4. Design- and run-time properties to manipulate list and combo boxes: list box properties, combo box style properties, add item method, form load() event, manipulating items in a list box and combo box, tab order, control option buttons with a frame, tab index property, tab stop, enable or disable a control, menu bar, code for a menu control, scroll bar basics - scroll and change procedures

5. Visual basic coordinate system, shape controls, manipulating shape controls in design—time and run—time, image control and it's special properties, load picture function,

6. Variables and constants: types of variables and naming convention, option explicit, integer, long integer, single precision and double precision, currency, boolean variables, fixed and variable length string variables, string concatenation, vartype, type name, time, date, now and datediff functions

7. Math operators and formulas: operators and operands, seven types of operators, Val() and str() functions

8. Defining variable and procedure scope: dim, public, static keyword, local, module and global scope, Load and show more than one form, load and show statement, benefits of sub main n() code and standard module procedures, call statement, adding own procedure

9. Inputting values and printing results: Input box function, Message box function, Pop-up menu, formatting numbers, dates and time If-then-else logic, And, Or, Xor, Not, Eqv, Imp logical operators

10. For-next loops and control arrays, DoEvents and Exit For statements Do-Loops, While-Loops, and Timer Control, The select-Case statement, GoTo and GoSub..Return statements

11. List and arrays: select an element from a list box, the selected property, select an element from a combo box, select multiple items from a list, Dim and Radim statements, Ubound and Lbound functions, Declaring and accessing arrays Multi-dimensional Arrays, Tables, and the Grid control: Design a multicolumn list, use the grid control, User-defined type

12. Numeric functions and String functions
Features of structured systems analysis and design.
Different stages of the system life cycle and the forms generated at each level - conception, initiation, analysis, design, construction (project request form, system proposal, functional specifications, information requirement table) system acceptance criteria, role of the systems analyst
Context analysis diagram
Data flow diagram -
external entity, data flow, data store, process
Data dictionary and its organisation
data structure, data element, data flows, data stores & process (decision tree, decision table, structured english)
Levelled data flow diagrams
balancing of levelled DFD's, local data stores, current physical DFD, current logical DFD, proposed logical DFD, proposed physical DFD, automation boundary
Normalization
1st, 2nd & 3rd normal form
Structured charts
Couples:
data coupling, control coupling, stamp coupling, common coupling, content coupling
Cohesion:
functional cohesion, sequential cohesion, communicational cohesion, temporal cohesion, procedural cohesion, logical cohesion
Transform analysis & transaction analysis
Factoring, span of control, system shape, scope of effect, scope of control, scope of effect / scope of control conflicts System packaging & the factors considered while packaging -
batch / on-line boundaries, frequency boundaries, output requirements, safety and defensive requirements, two-in-one reports, library routines, interfaces, menus Need for different controls in handling errors - control totals, hash totals
Handling erroneous data -
screen design as a means of reducing errors, coding scheme - serial, block serial, hierarchical Storage media considerations Parameters considered for
Introduction to DBMS:
Purpose of Database Systems
Data Abstraction
Data Models
Instances and Schemes
Data Independence
Data Definition Language
Data Manipulation Language
Database Manager
Database Administrator
Database Users
Overall System Structure
Basic concepts of
Relational Model Network Model Hierarchical Model
Programming in FoxPro:
- Introduction to FoxPro
- Commands
- Memory Variables in FoxPro
- Programming Structures
- Indexing
- File Updation Programs
- Procedures
- Reports
- FoxPro Report Writer
- Multiple File Handling
- Windows and Menus
- Popups
- Trapping Keys
- String Handling Functions
- Memo Field Handling
- Arrays
- UDF's

Details covered in FoxPro:
Tables, Catalog manager, Menu Options, Command Window, CREATE, USE, CLOSE, DATA, CLOSE ALL, LIST, APPEND, APPEND BLANK, CHANGE, BROWSE, GOTO, DELETE, RECALL, PACK, ZAP, Changing Fonts, Modify Structure, Index files, .IDX, .CDX, SET INDEX TO, SET ORDER TO, LIST FOR/WHILE, Relational & Logical Operators, Indexing, Sorting, ?, Upper( ), Substr()


Writing Programs: MODIFY COMMAND, DISPLAY MEMORY, DISPLAY STRUCTURE, SPACE(N), Field Type Conversion, SET DATE BRITISH.
Simple Programs of IF...ELSE...ENDIF and CASE...ENDCASE, DO...WHILE, FOR...ENDFOR. Drawing Lines & Boxes, @..TO, @CLEAR TO, EXIT, Validating Input: VALID, RANGE, WHEN, ERROR, DEFAULT, MESSAGE. SET MESSAGE TO, Trapping Keys, READKEY, SEEK, LOCATE... CONTINUE, FTND, REPLACE, COPY STRUCTURE TO, COPY TO DELIMITED/SDF, COPY FILE ... TO ..., SET SAFETY OFF, EMPTY(), CLEAR GETS.

Addition, Modification, Deletion in a database using programs.
Procedures, Usage of Procedures in a records deletion program. SET, DELETED ON, SET ESCAPE OFF, DELETED
Mathematical Commands and Functions:
SET DECIMAL TO, SQRT(), LOG, LOG10(), INT, FLOOR(), CEILING, ABS(), ROUND(), MIN(), MAX(), BETWEEN(), MOD(), EXP(n), SIGN(), LEN(), SUM, AVERAGE, COUNT, RECN0(), RECCOUNT(), CALCULATE, SET PROCEDURE TO, SUSPEND, RESUME, PRIVATE, CLEAR ALL, CLEAR MEMORY, Passing information to called Procedures.
String Functions : LEFT(), RIGHT(), STRTRAN(), STUFF, REPLICATE, LTRIM(), RTRIM(), ALTRIM(), SUBSTR(), ISUPPER(), ISLOWER(), ISALPHA(), ISDIGIT(), LOWER(), UPPER(), AT(), ATC(), STR().
Arrays, COPY TO, APPEND FROM, SCATTER TO, GATHER FROM. CHANGE/EDIT with Options.
REPORTS : SCAN...ENDSCAN, ?, ??, System Memory Variables : _PLENGTH, _PLINENO, _ALIGNMENT, _PCOLNO, _WRAP, _LMARGIN, _RMARGIN. ON PAGE AT LINE, PRINTJOB...ENDPRINTJOB Control Break Programs, Multiple file handling, SELECT, ->, ., SET RELATION TO, CLOSE ALL, SET SKIP TO.
WINDOWS : DEFINE WINDOW, ACTIVATE WINDOW, SHOW WINDOW, DEACTIVATE WINDOW, RELEASE WINDOW. MENU : DEFINE MENU, DEFINE PAD, ACTIVATE MENU, ON SELECTION PAD, DEACTIVATE MENU, RELEASE MENU.
POPUPS : DEFINE POPUP, DEFINE BAR, ON SELECTION POPUP, ON SELECTION BAR, BAR(), PROMPT(), DEACTIVATE POPUP, HIDE POPUP, SHOW POPUP, RELEASE POPUP, ON PAD.
$ Operator, MODIFY MEMO, CLOSE MEMO, ON KEY LABEL, SET MEMO WIDTH TO, MEMLINES(), MLINE(), ATLINE(), ATCLINE(), APPEND MEMO, COPY MEMO.
Using the Screen Builder Tool Using RQBE in FoxPro.
PATNA UNIVERSITY PGDCA (Vocational) PAPER IX (SEMESTER TWO)

1. OPERATING SYSTEM

Introduction to various categories of software's. Various components of operating system. Device management. Introduction to memory management techniques. Introduction to memory management techniques. Examples of multiprocessing operating systems.

2. UNIX - UNIX as a MULTIUSER, MULTITASKING OS

- Time Sharing (a review.)
- UNIX Kernel & Shell (Functions)
- The DIRECTORY STRUCTURE (inodes)
- The UNIX File
- Basic Commands
- ls (with options), cp, mv, cat, sort, rmdir, mkdir, rm, banner, date/time, pwd, chmod, ps, kill,
- The UNIX Editor (vi commands)
- Other Commands (Wall, Who, Write etc.) - Grep
- Shell Programming
- Redirection
- Pipes & Filters

Details Covered:

OPERATING SYSTEM

1. Introduction to various categories of software's. Operating system and its functions. Interaction of operating system with hardware and user programs.

2. Various components of operating system with reference to DOS, BIOS, BIOS and DOS interrupts. Single user operating system. Task loader. Memory management.

3. Device management, Control of various devices.

Device drivers

Interrupt driven and poll driven data transfers. Need of software and hardware protocols.

1. Multi-user, multi tasking, multiprocessing and real time operating systems. Introduction to memory management techniques.


3. Special requirements and facilities for multiprocessing environment.

UNIX

Introduction to unix

History of UNIX, Features, Structure, booting process, UNIX File System (etc, bin, dev, usr, lib, tmp) pathnames (relative & absolute), redirection & pipes

Types of files (ordinary, special & directory files) File system components - boot block, super block, ilist, data block. i-number, wild card characters (*, ?, [a.. z]), standard files - stderr, stdin, stdout. Environment variables - HOME, PATH, MAIL,
TERM, IFS, LOGNAME, PS1, PS2 Files opened by UNIX - stdin(©), stdout(1), stderr(2) Shell variables - HOME, PATH, TERM, LOGNAME, PS1 , MAIL.

UNIX commands -

Commands -
l s [options- A,d,F,i,l,r,R,t,u,x] [files..]
wild card characters *, ?, [a..z]
c at, rm [options -i,r] [files..], cal, tee, date [m,h,a,D,x,V],
banner, passwd,
pwd, echo, who[options- H,u], who am i, logname, clear, tty,
tput clear, mkdir, cd, rmdir,
comm, diff, cmp,
chmod, chgrp, chown
Redirection & pipes (<, >, > >, [ ]
cp [options -i,r] [files..], tee, ln, mv,
df, du, ps [option-a,e,u],
we [options-1,w,J] [files..], grep [options-c,i,1,n,v],
passwd, pg, more, sleep, sort, find
mail, write, msg, wall,
pack, unpack, peat, split,
l p [cm(n number)], pr, ps [options-a,e,u], kill [-9] <pid>.
vi -
modes of vi - command mode & edit mode.
vi +n file, vi /pattern file
exiting - ZZ, :wq, :q!, :q, :x
window movement- ^d, ^u, ^f, ^b, z., z-
text entry - a, i, o, A, 0, I
cursor movement - 1, k, j, h, ^, $, [n]w, [n]b,[n]e,),),,return, H, M, L
delation of text-[n]x, [n]X, [n]r, R, [n]s, d$, d^undo- u & U, redraw screen - ^1 pattern searching - /pattern, ?pattern, /^pattern,
/pattern$, ?^pattern, ?pattern$, /?, ?n, N, "
rearranging text - J, P, p
operators- d, c, y (dd, dw, d$, d^, cw, c$, cc, yy, yw, y$) [n] dd, [n]yy, cc vi
options - :set, :set all
ai, aw, ic, nu, eb, wm, warnnu, showmode last line commands contd...
: w !, : w <filename> , : w! <filename> , : w , : r < name> PROGRAMMING THE
BOURNE SHELL echo, ic, \ t, \ n, \ v, \ \ executing a shell script test <expression>
files -: r,w,x,f,d,e,s string -: z,n,s1-s2,s1!=s2 numerics -: nl [opt] n2
opt - gt,lt,eq,ne,ge,le expr,
read <variable> if.. then .. fi , if ..then..elif.else..fi, case... esac, while..do..done,
until1..do ..done, for..do..done. $# , $*, $$, $!, $?, $@
Books Referred:
-UNIX Concepts and Applications by Sumitabha Das -Operating System by
Silberchatz.