ARYABHATTA KNOWLEDGE UNIVERSITY
PATNA

COURSES OF STUDY

FOR

BACHELOR IN COMPUTER APPLICATIONS
(B.C.A.)

CREDIT BASED SEMESTER SYSTEM

EFFECTIVE FROM JULY 2012
Hon’ble members of “Syllabus & regulation committee for B. C. A & B. B. A”.

1. Prof. (Dr.) S. N. Guha  
   Vice-Chancellor, AKU  
   : Chairman

2. Dr. Dolly Sinha  
   Principal, Magadh Mahila College, Patna  
   : Member

3. Dr. R. N. Jha  
   Head-Management, L. N. M. I. E. S. C, Patna  
   : Member

4. Dr. Vijay Bahadur Singh  
   Head- IT, L. N. M. I. E. S. C, Patna  
   : Member

5. Prof. Somnath Dutta  
   Associate Professor, C. I. M. P  
   : Member

6. Father Nishant  
   Principal, St. Xavier’s College of Mang. & Technology  
   : Member

7. Dr. A. Prasad  
   OSD(Exam), AKU  
   : Member

8. Prof. (Dr.) N. K. Singh  
   Registrar, AKU  
   : Member-Secretary
1: Eligibility:

A candidate seeking admission to B.C.A. Programme must satisfy the following conditions.

1 He/She must be an Intermediate/+2 level in Arts, Science, or Commerce as a regular student or as a student of distance education.

2 Students who did not study Mathematics at the Intermediate/Plus 2 level have to appear for an additional qualifying test for basic Mathematics conducted by the College.

3 He/She must have obtained at least 45% marks overall at intermediate/+2 level. The students from SC/ST/EBC/Differently Abled categories should have 40% marks overall.

2: Admission:

1 Admission will be taken in the month of July in each Academic Year.

2 The University reserves the right to cancel the admission of any student at any stage of his study at the University on grounds of unsatisfactory academic performance, irregular and insufficient attendance, or indiscipline. A minimum of 75% attendance is mandatory in each semester for appearing in semester-end examination.

3 At the time of admission, the student is required to provide the following documents in original:
   
a Matric/ICSE/CBSE/NIOS/Other Board Certificate.

b Pass Certificate of the qualifying examination - Plus 2 or Intermediate.

c Marks Sheet of the qualifying examination – Plus 2 or Intermediate.

d College/School Leaving Certificate (CLC/SLC).


f Migration Certificate (Not necessary for those from Bihar Board).

g Caste Certificate (from DM or competent authority for SC/ST/OBC/EBC/Differently Abled)

3: Registration:

All students must register themselves at the University within the fixed date notified by the University in the first semester itself.
4: Duration of Programme:

1. An academic year is divided into two semesters. In each semester, courses are offered in 15 teaching weeks and the remaining 5 weeks are to be utilized for conduct of examinations and evaluation purposes. Each week has at least 30 working hours spread over 6 days a week.

2. A candidate admitted to the B.C.A. Programme shall undergo a regular course of study for Three Academic Years, that is, Six Semesters. Semester-I shall be from July to December and Semester-II shall be from January to May. There shall be not less than 90 teaching working days which shall comprise not less than 450 teaching working hours for each semester. (Exclusive of the days for the conduct of University or external end-semester examinations).

5: Course Structure:

1. All subjects will have Lecture-Tutorial-Practical (L-T-P) components to indicate the contact hours and will have a credit count. Teaching of subjects will be reckoned in terms of credits.

2. Every paper, identified by a single course identifier, shall be taught by an assigned teacher who may be assisted by adjunct faculty, teaching assistants, and by other members of the faculty concerned.

3. The curriculum for B.C.A. Course will include a “Project Work / Student Internship Programme (SIP)” of 04 weeks duration after the 5th semester. The experience may be obtained in any reputed company/organization belonging to any industry, or any organization of comparable repute. The place of work has to get prior approval of the Department of the College. On completion of the project, the student shall submit a report to the department, which will earn a total of 12 credits after evaluation and viva-voce examination. If there is a serious difficulty in finding placements for project work, writing a Term Paper with empirical data can be considered under a competent faculty. This will be at the discretion of the College Authority.

6: Examinations:

1. There shall be examinations at the end of each semester as per the academic calendar of the University.

2. A candidate who does not pass the examination in any paper(s) shall be permitted to appear in such failed paper(s) in the subsequent examinations to be held in December/January or May/June. Those who fail in odd-semesters will appear in a subsequent examinations of odd-semesters only. For example, if a student fails in a paper(s) in the 1st semester, s/he can appear in 3rd or 5th semester examinations only. The same applies to even-semesters. After the declaration of the result of the sixth semester examinations, special examinations will be
conducted for clearing the backlog of 5th and 6th semesters.

3 A candidate should get enrolled/registered for the first semester examination. If enrollment/registration is not possible in the preceding semesters owing to shortage of attendance beyond condonation limit/regulations prescribed OR belated joining OR on medical grounds, the candidates are not permitted to move to the next semester. Such candidates shall redo the semester in the following academic year as a regular student.

4 Student must have 75% of attendance in each paper for appearing in the end Semester examination. A shortage of attendance upto 10% can be condoned by the Principal as per his/her discretion and beyond that by the Vice-Chancellor as per the University rules.

7: Passing of Examinations and Promotion Rules:

A student will be promoted from second semester to the third semester and from fourth semester to the fifth semester if s/he has secured a minimum CGPA of 5.

8: Evaluation:

1. Pattern of Evaluation of the End-semester examinations will be as per the rules of the University.

2. The performance of a student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade points. Evaluation for each course shall be done by a continuous internal assessment (CIA) by the course teacher concerned as well as by an end semester examination and will be consolidated at the end of the course. The ratio of marks to be allotted to continuous internal assessment and to end semester examination is 40:60. The evaluation of practical work, wherever applicable, will also be based on continuous internal assessment and on an end-semester practical examination.

3. The details of the Continuous Internal Assessment (CIA) should be worked out by the College and a copy should be given to the University. All the relevant records of the CIA should be preserved by the College till the student passes out.

4. The passing minimum for CIA (Continuous Internal Assessment) shall be 40% out of 40 marks (i.e. 16 marks). Failed candidates in the Internal Assessment are permitted to improve their Internal Assessment marks by writing a re-test or by submitting assignments as per the decision of the College Authority.

The passing minimum for theory component shall be 40%.
9. Awarding of Degree

Degree will be awarded to a student provided, s/he fulfills the following conditions;

1. The student passes in all examinations and thus earns the required number of credits;

2. S/he completes the requirement of spending 30 hours during the period of three years in involving herself/himself in social work in order to raise the social consciousness of the students and make a small contribution to society. This could be in a village/NGO/Charitable Institutions or NSS or Adult Literacy Programme, etc. A declaration letter from the College regarding the completion of required number of hours to the University is a must.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Name of the Paper</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practical</th>
<th>MSE</th>
<th>ESE</th>
<th>Sub-Total</th>
<th>Credit</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 101</td>
<td>Communicative English</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>BCA 102</td>
<td>Basic Mathematics</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 103</td>
<td>Information Technology &amp; Application</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BCA 104</td>
<td>Principles of Management &amp; Organization</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 105</td>
<td>Python Programming (Elective 1)</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BCA 106</td>
<td>Problem Solving &amp; Programming Concept (Elective 2)</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Either Elective 1 or Elective 2 can be opted.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Lab Code</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practical</th>
<th>CPA</th>
<th>ESE</th>
<th>Sub-Total</th>
<th>Credit</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 107</td>
<td>Lab 103</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>BCA 108</td>
<td>Lab 105</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>BCA 109</td>
<td>Lab 106</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td></td>
<td>26 29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Name of the Paper</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practical</th>
<th>MSE</th>
<th>ESE</th>
<th>Sub-Total</th>
<th>Credit</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 201</td>
<td>Business English</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>BCA 202</td>
<td>Mathematics (Numerical Techniques)</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 203</td>
<td>System Analysis &amp; Design</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 204</td>
<td>Problem Solving Technique &amp; Programming in C</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BCA 205</td>
<td>Operating System &amp; Unix</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Sessional

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Lab Code</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practical</th>
<th>CPA</th>
<th>ESE</th>
<th>Sub-Total</th>
<th>Credit</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 206</td>
<td>Lab 204</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>BCA 207</td>
<td>Lab 205</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td></td>
<td>26 29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Name of the Paper</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practical</th>
<th>MSE</th>
<th>ESE</th>
<th>Sub-Total</th>
<th>Credit</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 301</td>
<td>Objected Oriented Programming using C++</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BCA 302</td>
<td>Internet &amp; Web Designing</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 303</td>
<td>Java Programming</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BCA 304</td>
<td>Software Engineering</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Sessional

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Lab Code</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practical</th>
<th>CPA</th>
<th>ESE</th>
<th>Sub-Total</th>
<th>Credit</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 305</td>
<td>Lab 301</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>BCA 306</td>
<td>Lab 303</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td></td>
<td>24 26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CODE</td>
<td>NAME OF THE PAPER</td>
<td>Theory Period</td>
<td>Evaluation Scheme</td>
<td>CREDIT</td>
<td>HOURS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>--------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCA 401</td>
<td>Relational Data Management System</td>
<td>5</td>
<td>MSE 40 ESE 60</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCA 402</td>
<td>Digital Electronics, Computer System Architecture, and Organisation</td>
<td>4</td>
<td>MSE 40 ESE 60</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCA 403</td>
<td>File &amp; Data Structure</td>
<td>4</td>
<td>MSE 40 ESE 60</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCA 404</td>
<td>Introduction to Statistics</td>
<td>3</td>
<td>MSE 40 ESE 60</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sessional**

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME OF THE PAPER</th>
<th>Period</th>
<th>Evaluation Scheme</th>
<th>CREDIT</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 405</td>
<td>Lab 401</td>
<td>0</td>
<td>CPA 40 ESE 60</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>BCA 406</td>
<td>Lab 403</td>
<td>0</td>
<td>CPA 40 ESE 60</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td>24</td>
</tr>
</tbody>
</table>

**YEAR 3**

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME OF THE PAPER</th>
<th>Theory Period</th>
<th>Evaluation Scheme</th>
<th>CREDIT</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 501</td>
<td>Windows Programming using VB Net</td>
<td>4</td>
<td>MSE 40 ESE 60</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BCA 502</td>
<td>Graphics &amp; Multimedia</td>
<td>4</td>
<td>MSE 40 ESE 60</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BCA 503</td>
<td>Computer Network, Data Communication, and Client Server Technology</td>
<td>4</td>
<td>MSE 40 ESE 60</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 504</td>
<td>Business Accounting &amp; ERP</td>
<td>3</td>
<td>MSE 40 ESE 60</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**Sessional**

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME OF THE PAPER</th>
<th>Period</th>
<th>Evaluation Scheme</th>
<th>CREDIT</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 505</td>
<td>Lab 501</td>
<td>0</td>
<td>CPA 40 ESE 60</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>BCA 506</td>
<td>Lab 502</td>
<td>0</td>
<td>CPA 40 ESE 60</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td>23</td>
</tr>
</tbody>
</table>

**SEMESTER 6**

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME OF THE PAPER</th>
<th>Theory Period</th>
<th>Evaluation Scheme</th>
<th>CREDIT</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 601 A</td>
<td>Web Technology (Elective 1)</td>
<td>5</td>
<td>MSE 40 ESE 60</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 601 B</td>
<td>Concept of Data Mising &amp; Data Warehousing (Elective 2)</td>
<td>5</td>
<td>MSE 40 ESE 60</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 602</td>
<td>E-Commerce</td>
<td>4</td>
<td>MSE 40 ESE 60</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BCA 603</td>
<td>Project &amp; Viva</td>
<td>n/a</td>
<td>MSE 40</td>
<td>12</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Either Elective 1 or Elective 2 can be opted.

**Sessional**

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME OF THE PAPER</th>
<th>Period</th>
<th>Evaluation Scheme</th>
<th>CREDIT</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA 604</td>
<td>Lab 601 A</td>
<td>0</td>
<td>CPA 40 ESE 60</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>BCA 605</td>
<td>Lab 601 B</td>
<td>0</td>
<td>CPA 40 ESE 60</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td>24</td>
</tr>
</tbody>
</table>

**GRAND TOTAL:**

**CREDITS = 147**

**MARKS = 3600**
BACHELOR IN COMPUTER APPLICATIONS

Year 1: Semester I

BCA-101 COMMUNICATIVE ENGLISH

Business Correspondence:

Government Correspondence:
Memo, Agenda, Minutes, Proposals

Writing Skills:
Report Writing, Composition (argumentative, explanatory, descriptive and narrative), Paragraph writing

Grammar:

Selected Short Stories:
Three short stories from the book, “Added Value: The Life Stories of Indian Business Leaders.” by Peter Church, Lotus Collection, New Delhi

1. Rahul Bajaj/ Bajaj Group (Page No. 20)
2. Subhash Chandra/ Essel Group/Zee TV (Page No. 40)
3. NR Narayana Murthy/Infosys (Page No. 148)

Preparation for Job:
Writing Applications for Jobs, Preparing Curriculum Vitae, Preparing for Interviews, Preparing for Group Discussions.

Text Books:

1. Added Value: The Life Stories of Indian Business Leaders; Peter Church; Roli Books.
2. Organisations - Structures, Processes and Outcomes; Richard h Hall; Prentice Hall India.
3. English for the Secretary; Yvonne Hoban; Tata McGraw Hill.

Reference Book:

1. Human Behavior at Work; John W Newstorm & Keith Davis; Tata McGraw Hill.
2. The Most Common Mistakes in English Usage; Thomas Elliot Berry, Tata McGraw Hill.
BCA-102 BASIC MATHEMATICS

Objectives: To know about Logical operators, validity of arguments, set theory and set operations, relations and functions, Linear operations, Binary algebra, Permutations & Combinations, Differentiation, Straight lines, pair of straight lines, Circles

MODULE I: SYMBOLIC LOGIC & SET THEORY:
Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi-conditional operators, converse, Inverse, Contra Positive, logically equivalent, tautology and contradiction. Arguments and validity of arguments. Set operations, Venn diagram, Properties of sets, number of elements in a set, Cartesian product, relations & functions, Relations: Equivalence relation. Equivalence class, Partially and Totally Ordered sets, Functions: Types of Functions, Composition of Functions.

MODULE II: DIFFERENTIAL CALCULUS
Differentiation, successive differentiation, Leibnitz theorem, partial differentiation, Applications of differentiation, Tangent and normal, angle between two curves, Maximum and Minimum values (Second derivative test), Curvature and radius of Curvature (Cartesian coordinates), Envelopes.

MODULE III: INTEGRAL CALCULUS
Definite Integral and its application for area, length and volume. Multiple Integrals. Change of order of Integration. Transformation of integral from Cartesian to polar. Applications in Areas, volume and surfaces.

MODULE IV: TWO DIMENSIONAL ANALYTICAL GEOMETRY

Text Books:
1. Das BC and Mukherjee, Differential Calculus, Calcutta, U.N. Dhar Publishers
2. Das BC and Mukherjee, Integral Calculus, Calcutta, U.N. Dhar Publishers
BCA-103 INFORMATION TECHNOLOGY AND APPLICATION

Introduction To Computers

Input / Output devices and Memory

Software Concepts


Data Communication And Computer Network

MS-Office – MS-Word, MS-Excel, Ms-Power Point.

Text Books:
BCA-104 PRINCIPLES OF MANAGEMENT & ORGANIZATION

Concept of Management: Definition, Nature, and scope, and overall view of Management, Relation with other social sciences and industry.

Evolution of Management thought:

(A) Classical Theory of Management.
   (A2) Scientific Management - F.W. Taylor and his followers.
   (A3) Process Management - H. Fayol and others.
   (B) Neoclassical Theory of Management.
   (B1) Human Relations - B.E. Mayo and Roethlisberger
   (B2) Behavioral Science approach - By D. McGregor, A. Maslow & others.
   (C) Modern Management theories: Peter Drucker.

Management Functions: Planning, Organizing, Staffing, Directing, and Controlling.

Executive Functions: Production, Marketing, Finance, Personnel.


Staffing: Selection, Recruitment, Training, Development and Welfare

Directing: Leadership and Supervision, Motivation and Communication

Controlling: The Elements, Process and style of Control, Techniques of control. Social Responsibility of business

Text Books:


Reference Books:

1. P.F. Drucker - Management - Task and Responsibility
2. P.F. Drucker - The Practice of Management
4. E.F.L. Beach- The Principles and Practical Management
5. H.F. Merril - Classics in Management – Preface
6. Mee J.E. - Management Thought in a Dynamic Economy
8. S. N. Banerjee - Principles of Management
BCA-105: Python Programming (Elective 1)

**Overview:** Environment, Basic Syntax, Variable Types, Basic Operators, Installing Python. Very Simple Programs, Scripts Loops, Conditionals Functions. Tuples, Lists, Dictionaries for Loop Classes Importing Modules File I/O Error Handling.

**Structures:** if...else , while Loop , for Loop , Loop Control. Numbers, Strings, Lists, Tuples, Dictionary, Date & Time. Functions, Modules, Files I/O, Exceptions. Classes / Objects, Reg Expressions, GUI Programming.

**Text Books and References:**
1. Programming Python: Powerful Object Oriented Programming; Mark Lutz; Shroff/O'Reilly; 2010.
2. Beginning Python: Using Python 2.6 & Python 3.1; James Payne; Wiley India; 2011.
3. Head First Programming: A Learner's Guide to Programming using Python Language; Barry & Griffiths; Shroff/O'Reilly; 2009.

BCA-106 : PROBLEM SOLVING AND PROGRAMMING CONCEPTS (Elective 2)


**Logic Structures:** Introduction to Programming structure – Modules and their functions – Local and Global Variables – Four Logic structures – Problems solving with Sequential and Decision Logic Structures.

**Loop & Case Logic Structure:** Loop Logic structure – While/While Wend Structure, Repeat / Until Structure, Automatic Counter loop, Nested Loops and Recursion.

**Array Data Structure & File Concepts:** Processing Arrays – Arrays, one dimensional arrays, 2D arrays, Multidimensional arrays – Searching and Sorting Techniques. Definition – Record, File – Primary and Secondary Keys – Sequential Access File Applications.


**Text Books and References:**
2. Compilation Notes, Department of Information Technology, SRM University.
PRACTICALS

BCA 107 LAB: (103)

BCA-108 LAB: (105)

BCA-109 LAB: (106)
Year 1: Semester II

BCA 201 Business English

Section I: Grammar
Expressing in Style; Words often confused; One-word substitution; Phrases; Idioms.

Section II: Advanced Reading
Paraphrasing; Interpreting visual information: Tables, Graphs, Charts; Speed Reading.

Section III: Effective Writing
Business Correspondences: Fax, Email; Taking Notes; Making Inquiries; Placing Orders; Asking & Giving Information; Registering Complaints; Handling Complaints; Drafting Notices; Job Applications; Expository Composition; Argumentative Composition; Techniques of Argument; Logical Presentation; Descriptive Composition; Narrative Composition; Summary Writing, Proposal; Abstract, Agenda, Minutes.

Section IV: Speaking
Business Etiquettes; Impromptu Speech; Debate; Role Play; Presentations.

Section IV: Listening
Business-related Conversation Exercises.

Reference Books:

1. Spencer Johnson; Who Moved My Cheese; Vermilion; (2009).
BCA-202 MATHEMATICS [NUMERICAL TECHNIQUES]


**Interpolation:** Introduction, Errors in Polynomial Interpolation, Finite Differences – Forward, Backward and Central, Detection of errors using Difference tables, Differences of a Polynomial, Newton’s formulae for Interpolation, Central Difference Interpolation.

**Formulae:** Gauss’s Central Difference Formula, Interpolation with unevenly spaced points, Lagrange’s Interpolation Formula, Divided Differences and their properties- Newton’s General Interpolation Formula


**Text Book:**

**Reference Books:**
BCA-203 SYSTEM ANALYSIS & DESIGN

Introduction to SAD

Systems Analyst-A Profession

Process of System Development

Introduction to Documentation of Systems

Planning and Designing Systems

Modular and Structured Design

System Design and Modelling

More Design Issues and CASE Tools
Audit and Security of Computer Systems
Introduction, Definition of Audit, Objectives of Audit.

Text Book:
1. Ellas M. Award : System Analysis and design; Galgotia
2. James A. Sen : Analysis of Design of Information System TMH

Reference Book :
1. J. L. Whitten & L. D. Bentley : System Analysis and Design Method; TMH
2. J. B. Dixit & Rajkumar : Structured system Analysis and Design; University Science Press
3. K.C. Landon & J. P.Landon : MIS ; Macmillan
BCA-204 PROBLEM SOLVING TECHNIQUE & PROGRAMMING IN C

Fundamentals of C: Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions. Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.

Functions - Definition - prototypes - Passing arguments - Recursion - Storage Classes - Automatic, External, Static, Register Variables.

Arrays - Defining and Processing - Passing arrays to functions - Multi-dimension arrays - Arrays and Strings.

Structures and unions - User defined data types - Passing structures to functions - Self-referential structures - Unions - Bit wise operations.


The C Preprocessor: # define to Implement Constants, # define to Create Functional Macros, Reading from Other Files using # include, Conditional Selection of Code using #ifdef, Using #ifndef for different computer types.

Using #ifdef to temporarily remove program statements, Other Preprocessor Commands, Predefined Names Defined by Preprocessor, Macros Vs Functions.

Files: File Handling in C Using File Pointers, Open a file using the function fopen(), Close a file using the function fclose(), Input and Output using file pointers, Character Input and Output in Files, String Input/Output Functions, Formatted Input/Output Functions, Block Input/Output Functions, Sequential Vs Random Access Files, Positioning the File Pointer.

Text Book:
4. Reema Thareja - Programming in C
5. Byron Gottfried – C Programming; Oxford University Press
BCA-205 OPERATING SYSTEM & UNIX

Introduction: Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures, system calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/O devices organization, I/O devices organization, I/O devices organization, I/O buffering.


Memory Management: Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system.

Introduction to Open Source technology, Files System hierarchy, Logging in, Simple commands like ls, cp, mv, wc, sort, tsort, cat, cut, grep, dd, head, tail, uniq, diff, echo, touch, which, whereis, whatis, type, who, whoami, finger, w (option and variations included), tty, uname, printf, ps, pwd, history, exec, kill, pkill, clear, Ipstate, cancel, compress, uncompress, exit. Directory commands like: Brief introduction to file system, mkdir, dir, cd, df, dfspace, du, ll, dirname, rmdir, dir access permission, changing access permission for files and directories like: chmod, chgrp, chown, hard & soft links. Environments and path setting. I/O redirection & piping commands

vi editor: General startup of vi editor and it modes, Creating and editing files, features of vi, screen movement, cursor movement, insertion, deletion, searching, submitting operations, yank, put, delete commands, reading & writing files, exrc file for setting parameters, advance editing techniques, vim (improved vi).

Shell: meaning and purpose of shell, introduction to types of shell. The command line, standard input and standard output, redirection, pipes, filters special characters for searching files and pathnames. Built-ins, functions, history, aliases, job control, file substitution, source code management - RCS and CVS. awk utility.

Features of Linux: Drawbacks of Linux, Components of Linux, Memory Management Subsystems, Linux Process and Thread Management, File Management System, Device Drivers.


Linux Utilities and Editor: Some Useful Commands, Permission Modes and Standard Files, Pipes, Filters and Redirection, Shell Scripts, Graphical User Interface, Editor.

UNIX System Administration: System Administration, Installing Linux, Choosing an Installation
Method, Choosing an Installation Class, Pre-installation checks, Installation, Booting the System, Maintaining User Accounts, File Systems and Special Files, Backups and Restoration.

**TEXT BOOK:**

4. Sumitabh Das : Your UNIX The Ultimate Guide; TMH

**REFERENCE BOOKS:**

4. S.E. Mandnick & J.J. Donovan : Operating System; TMH
BCA-206 Lab: (204)
Arrays; Structures; Linked Lists; Stacks; Queues; Trees; Advanced Trees; Graphs; Searching; Sorting.

BCA-207 Lab: (205)
Year 2: Semester III

BCA-301 OBJECT ORIENTED PROGRAMMING USING C++

Introduction to programming paradigms: Concept of object, class, objects as variables of class data type, difference in structures and class in terms of access to members, private and public members of a class, data & function members. Characteristics of OOP - Data hiding, Encapsulation, data security.

Basics of C++: Structure of C++ programs, introduction to defining member functions within and outside a class, keyword using, declaring class, creating objects, constructors & destructor functions, Initializing member values with and without use of constructors, simple programs to access & manipulate data members, cin and cout functions. Dangers of returning reference to a private data member, constant objects and members function, composition of classes, friend functions and classes, using this pointer, creating and destroying objects dynamically using new and delete operators. Static class members, container classes and iterators, proxy classes.

Operator overloading: Fundamentals, Restrictions, operator functions as class members v/s as friend functions. Overloading stream function, binary operators and unary operators. Converting between types.

Inheritance: Base classes and derived classes, protected members, relationship between base class and derived classes, constructors and destructors in derived classes, public, private and protected inheritance, relationship among objects in an inheritance hierarchy, abstract classes, virtual functions and dynamic binding, virtual destructors.

Advanced Topics: Multiple inheritance, virtual base classes, pointers to classes and class members, multiple class members. Templates, exception handling, File handling

Text Books:
1. E. Balagurusamy: Object oriented programming with C++; TMH Publication.
2. Deitel and Deitel: C++ How To Program (currently in its 4th edition); PHI.

Reference Books:
1. Robert Lefore: Object oriented programming in Turbo C++; Galgotia Publication
BCA-302 INTERNET & WEB DESIGNING


Introduction to HTML: HTML, HTML Tags, Commonly Used HTML Commands, Title and Footers, Text Formatting, Text Style, Lists, Adding Graphics to HTML Documents, Tables, Linking Documents, Frames.


Text Books:
2. Michel Morrison - HTML and XML for Beginners, PHI, New Delhi- 200

Reference Book:
1. Java Server Side Programming -WROX Publication


Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class, Overriding Methods, final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.


Managing Input/Output Files in Java: Introduction, Concepts of Streams Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, using the File Class, Input/Output Exceptions, Creation of Files.

Text Book:

Reference Books:
BCA-305 LAB (301 & 303)

BCA-306 LAB (302 & 304)
Year 2: Semester IV

BCA-401 RELATIONAL DATA BASE MANAGEMENT SYSTEM

INTRODUCTION TO DATABASE SYSTEMS: Overview and History of DBMS. File System vs DBMS. Advantage of DBMS Describing and Storing Data in a DBMS. Queries in DBMS. Transaction management and Structure of a DBMS. Components of DBMS; The 3 level architecture of DBMS – Hierarchical, Network, and Relational Model; Distributed Database; KB-DBMS; OODBMS (Basic Concepts).


SQL QUERIES PROGRAMMING AND TRIGGERS: The Forms of a Basic SQL Query, Union, Intersection and Exception, Nested Queries, Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values and Embedded SQL, Dynamic SQL, ODBC and JDBC, Triggers and Active Databases.

SCHEMA REFINEMENT AND NORMAL FORMS: Introductions to Schema Refinement, Functional Dependencies, Boyce-Codd Normal Forms, Third Normal Form, Normalization-Decomposition into BCNF Decomposition into 3-NF.

TEXT BOOKS:

REFERENCES BOOKS:
1. An Introduction to Database Systems- C.J.Date, Addison Wesley, Pearson Education Press.
5. Aron M. Tenenbaum & Others – Data Structure using C & C++; Pearsons Publications
BCA-402 DIGITAL ELECTRONICS, COMPUTER SYSTEM ARCHITECTURE, AND ORGANISATION


The Data Representation: Data Representation, Number Systems, Decimal Representation in Computers, Alphanumeric Representation, Data Representation for Computation, Error Detection and Correction Codes.

Principles of Logic Circuits I: Logic Gates, Logic Circuits, Combinational Circuits, Canonical and Standard Forms, Minimization of Gates, Design of Combinational Circuits, Examples of Logic Combinational Circuits, Adders, Decoders, Multiplexer, Encoder, Programmable Logic Array, Read Only Memory ROM.


The Central Processing Unit: Instruction Set Architecture; Instruction Set Characteristics, Instruction Set Design Considerations, Operand Data Types, Types of Instructions, Number of Addresses in an Instruction, Addressing Schemes, Types of Addressing Schemes, Immediate Addressing, Direct Addressing, Indirect Addressing, Register Addressing, Register Indirect Addressing, Indexed Addressing Scheme, Base Register Addressing, Relative Addressing Scheme, Stack Addressing, Instruction Set and Format Design Issues, Instruction Length, Allocation of Bits Among Opcode and Operand, Variable Length of Instructions, Example of Instruction Format.


Text Books:
2. Rajaraman V.: Fundamental of Computers, PHI
3. Willam Stallng: Computer Organization & Architecture- Desigining for Performance; PHI

Reference Books:
1. M. Morris Mano: Computer System Architecture; PHI.
BCA-403 File & Data Structure

Introduction to Data Structure and Application of Data Structure


Arrays, Stacks and Queues: Array Operations, Number of Elements in an Array, Representation of Arrays in Memory, Applications of Array, Stack-Introduction, Stack Operations, Applications of Stack, Queues-Introduction, Operations on Queues, Circular Queues, Other Types of Queues, Applications of Queues, Polynomials & Sparse matrix.


Sorting: Understanding Internal and External Sorting.

Internal Sorting: Insertion Sort, Bubble Sort, shell sort, Quick Sort, 2-way Merge Sort, Heap Sort, Sorting on Several Keys.


Text Book:


Reference Books:

BCA-404 INTRODUCTION TO STATISTICS

UNIT-I
COMBINATORICS: Permutation and Combination, Repetition and Constrained Repetition, Binomial Coefficients, Binomial Theorem.

UNIT-II
Frequency distributions, Histograms and frequency polygons, Measures of central tendency: Mean, Mode, Median, Dispersion, Mean deviation and standard deviation. Moments, Skewness, kurtosis.

UNIT-III
Elementary probability theory: Definition, conditional probability, Probability distribution, mathematical expectation.

Theoretical distribution: Binomial, poisson and Normal distribution, Relation between the binomial, poisoned Normal distribution.

UNIT-IV
Correlation and Regression: Linear Correlation, Measure of Correlation, Least Square Regression lines.

Curve fitting: Method of least square, least square line, least squares Parabola. chi-square test: definition of chi-square; signification test: contingency test, coefficient of contingency.

UNIT-V
Basic of sampling theory: Sample mean and variance, students t-test, test of Hypotheses and significance, degree of freedom, Z-test, small and large sampling, Introduction to Monte Carlo method.

TEXT BOOKS:

BCA-405 Lab: (401)

BCA-406 Lab: (403)
Year 3: Semester V

BCA-501 Windows Programming using VB .Net

Introduction to .Net Technology

The Visual Basic.Net Language
VB.Net Data types, Operators, Decision Statements- If..then, If..then..else, Select.. Case, Loop Statements- While, Do .. Loop, For .. Next, For Each ..Next, Arrays.

OOP using VB.Net

Windows Form

Data access with ADO.Net
Overview of Microsoft Database Access Technology, ADO.Net, Creating a Database, ADO.Net Architecture, ADO.Net Class Libraries, Databound Controls, Creating a Data Set, Using XML Data.
BCA-502 GRAPHICS & MULTIMEDIA

Computer Graphics: Picture analysis, Overview of programmer’s model of interactive graphics, Fundamental problems in geometry. Scan Conversion: point, line, circle, ellipse polygon, Aliasing, and introduction to Anti Aliasing (No antialiasing algorithm).

2D & 3D Co-ordinate system: Homogeneous Co-ordinates, Translation, Rotation, Scaling, Reflection, Inverse transformation, Composite transformation. Polygon Representation, Flood Filling, Boundary filling. Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Polygon Clipping algorithms.

Hidden Lines & Surfaces: Image and Object space, Depth Buffer Methods, Hidden Facets removal, Scan line algorithm, Area based algorithms. Curves and Splines & Rendering: Parametric and Non parametric Representations, Bezier curve, BSpline, Basic illumination model, diffuse reflection, specular reflection, shading, Ground shading, ray tracing, color models like RGB, YIQ, CMY, HSV


Animation: Introduction, Rules, problems and Animation techniques.

Text/References:
4. Multimedia Information Networking, N.K.Sharda, PHI.
BCA-503 COMPUTER NETWORK, DATA COMMUNICATION, AND CLIENT SERVER TECHNOLOGY


Data Line Devices: Modems, DSL, ADSL, Multiplexer and Different Multiplexing Techniques: (FDM, TDM).


Data Link Layer: Need for Data Link Control, Frame Design Consideration, Flow Control & Error Control (Flow control mechanism, Error Detection and Correction techniques) Data Link Layer Protocol, HDLC.

Network Layer: Routing, Congestion control, Internetworking principles, Internet Protocols (IPv4 packet format, Hierarchal addressing sub netting, ARP, PPP), Bridges, Routers.

Transport Layer; Session Layer; Presentation Layer; Application Layer.

Basic Applications: Telnet, FTP, NFS, SMTP, SNMP and HTTP.


Text Book:

2. Behrouz Forouzan – Introduction to Data Communication & Networking; T. M. H.
BCA-504 Business Accounting & ERP (Enterprise Resource Planning)

**Accounting Fundamentals:** Basic Concepts of Accounting, The Accounting Process; Cash Book and Bank Reconciliation; Other Subsidiary Books Bills of Exchange; Final Accounts.

**Concepts Relating to Final Accounts:** Final Accounts – I; Final Accounts – II; Errors and their Rectification.

**Consignment and Joint Ventures:** Consignments Accounts – I; Consignments Accounts – II; Consignments Accounts – III; Joint Venture Accounts.

**Accounts from Incomplete Records:** Self Balancing System; Accounting from Incomplete Records – I; Accounting from Incomplete Records – II; Accounting from Incomplete Records – III.

**Accounts of Non-trading Concerns, Depreciation, Provisions and Reserves:** Accounts of Non-trading Concerns – I; Accounts of Non-trading Concerns – II; Depreciation – I, Depreciation – II, Provisions and Reserves.
BCA-505 Lab: (501)

BCA-506 Lab: (502)
Year 3: Semester VI

BCA-601: Web Technology (Elective 1)

Web2.0 and XHTML

Introduction to XML
XML Basics, XML Document Structure, XML Name-spaces, Document Type Definitions, XML Schema, Displaying XML Documents, XSL and CSS.

Programming with Java Script – DOM and Events
The Document Object Model, Element Access in Java Script, Traversing and Modifying a DOM Tree, DOM Collections and Styles, Events, Examples of Event Handling from Body, Button, Text Box and Password Elements, Dynamic Documents using JavaScript – element moving, visibility, positioning etc., Example program (s), Introduction and example of AJAX.

The Server Side Scripting
Server side scripting and its need, Two-Tier, Three-Tier, N-Tier and Enterprise Architecture, Various Languages / Technologies for server scripting, HTTP Methods (such as GET, POST, HEAD, and so on), Purpose, Technical characteristics, Method selection, Use of request and response primitives, Web container – Tomcat.

JSP – Basics
Basic JSP Life-cycle, JSP Directives and Elements, Script-lets, Expressions, Action Elements, Standard Actions, Comments and Template Data, JSP variables, The out Object, Request, response, sessions and application objects.

JSP Applications
Exceptions and exception handling using JSP, Cookies and sessions, Managing Email using JSP.

JSP Application Development
Example applications using JSP, What is JDBC? Need for JDBC, Database Drivers, Connection using JDBC API, Application development and deployment.

Text Books:
1. Ivan Bay Ross- Web Enable Commercial Application Using HTML, DHTML, BPB Publication
2. Michel Morrison -HTML and XML for Beginners, PHI, New Delhi- 2001

Reference Book:
1. Java Server Side Programming -WROX Publication
BCA-602 : CONCEPT OF DATA MINING AND DATA WAREHOUSING (Elective 2)

Introduction: Data Mining – Motivation, Importance of DM Functionalities, Basic Data Mining Tasks, DM Applications, and Social Implications

Data Warehousing: Differences between Operational Database and Data Warehouse – Multi-dimensional Data Model - From Tables to Data Cubes. Schemas, Measures, DW Implementation – Efficient Computation of Data Cubes.

Data Reprocessing, Data Mining Primitives, Languages: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and concept of Hierarchy Generation, Task relevant Data, Background Knowledge, Presentation and Visualization of Discovered Patterns.

Data Mining Algorithms: Association Rule Mining, Classification and Prediction – Decision Tree, Baysian Classification Back Propagation, Cluster Analysis, Outlier Analysis.


Reference Books:


BCA-603 E-COMMERCE

Introduction to E-commerce: E-commerce: The revolution is just beginning, The visions and forces behind E-commerce, Understanding E-commerce.


E-commerce infrastructure: The Internet, Technology background, The internet today, The world wide web. Building an E-commerce web site: A systematic approach, choosing server software, choosing the hardware for an E-commerce site, other E-commerce site tools.


Text Book:


Reference Books: