HIMACHAL PRADESH TECHNICAL UNIVERSITY HAMIRPUR

Syllabus

for

BCA (Bachelor of Computer Applications) (Honours/Research)

As per National Education Policy (NEP-2020)

(w.e.f. the Academic Year 2023-2024)

Department of Computer Applications

School of Computer Science and Engineering

Approved by the Board of Studies

Dean - Academic
H.P. Technical University
Hamirpur - 177 001, HP

1. Preamble

BCA is named as Bachelor's of Computer Applications. Computer Applications has been evolving as an important branch of science and technology in the last two decade and it has carved out a space for itself just like computer science and engineering. Computer applications spans theory and more application and it require thinking both in abstract terms and in concrete terms. The ever-evolving discipline of computer application has strong connections to other disciplines. Many problems in Science, Engineering, Health Care, Business, and other areas can be solved effectively with computers and its applications, but finding a solution requires both computer science expertise and knowledge of the particular application domain.Computer science has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Mathematical and Statistical Analysis, Data Science, Computational Science, and Software Engineering.Universities and other HEIs have introduced programmes of computer application. Information Technology is growing rapidly. Increasing applications of computers in almost all areas of human endeavor has led to vibrant industries with concurrent rapid change in technology. Unlike other basic disciplines, developing core competency in this discipline that can be reasonably stable becomes a challenge.

BCA Degree (Honor's/Research) is aimed at undergraduate level training facilitating multiple career paths. Students so graduated, can take up postgraduate programmes in CS or MCA leading to research as well as R&D, can be employable at IT industries or can adopt a business management career.

BCA Degree (Honor's/Research) aim at laying a strong foundation of computer application at an early stage of the career. There are several employment opportunities and after successful completion of BCA, graduate students can fetch employment directly in companies as Programmer, Web Developer, Software Engineer, Network Administrator, Data Scientist, or AI/ML personnel.

2. Program Objectives (POs)

BCA comprises of the core subjects like Database System, Computer Architecture and System, networking, and data structures, core programming languages like C, C++, Java, web programming, Android, and Python. Students also get exposure to advanced topics like cyber security, mobile software, IoT, data science etc. Elective papers help students to have an exposure in IoT, image Processing Big Data and Information Security related subjects. Program has been designed not only to make students job ready but also dedicated to create an entrepreneurship skills and competency amongst them through the process of innovation. Apply the knowledge of mathematics and computing fundamentals to various real-life applications for any given requirement. Design and develop applications to analyse and solve all computer science related problems. This is accomplished through the following learning goalsand objectives:

- **Knowledge of mathematics and computing fundamentals.** Apply the knowledge of mathematics and computing fundamentals to various real-life applications for any given requirement.
- **Design and develop applications**. Design and develop applications to analyse and solve all computer science related problems.
- **Effective Communication.** Students will use various forms of business communication, supported by effective use of appropriate technology, logical reasoning, and articulation of ideas. Graduates are expected to develop effective oral and written communication especially in business applications, with the use of appropriate technology (business presentations, digital communication, social network platforms and so on).
- **Leadership and Teamwork.** Students will acquire skills to demonstrate leadership roles at various levels of the organization and leading teams. Graduates are expected to collaborate and lead teams across organizational boundaries and demonstrate leadership qualities, maximize the usage of diverse skills of team members in the related context.
- **Global Exposure and Cross-Cultural Understanding.** Graduate will be able to demonstrate a global outlook with the ability to identify aspects of the global business and Cross -Cultural Understanding.
- **Integrate and apply efficient tools.** Integrate and apply efficiently the contemporary IT tools to all computer applications.
- **Designing innovative methodologies**. Create and design innovative methodologies to solve complex problems

for the betterment of society.

- **Applying inherent skills**. Apply the inherent skills with absolute focus to function as a successful entrepreneur.
- **Social Responsiveness and Ethics**. Students will demonstrate responsiveness to contextual social issues/ problems and exploring solutions, understanding ethics, and resolving ethical dilemmas. Demonstrate awareness of ethical issues and can distinguish ethical and unethical behaviours.

3. Program Learning Outcomes (PLOs)

BCA Degree(3 Years): The present Curriculum Framework for BCA degrees is intended to facilitate the students to achieve the following objectives.

- To develop an understanding and knowledge of the basic theory of Computer Science and Information Technology with good foundation on theory, systems, and applications such as algorithms, data structures, datahandling, data communication and computation.
- To develop the ability to use this knowledge to analyses new problems in the application domain.
- To acquire necessary and state-of-the-art skills to take up industry challenges. The objectives and outcomes arecarefully designed to suit to the above-mentioned purpose.
- The ability to synthesize the acquired knowledge, understanding and experience for a better and improvedcomprehension of the real-life problems.
- To learn skills and tools like mathematics, statistics, and electronics to find the solution, interpret the results and make predictions for the future developments.
- To formulate, model, design solutions, procedure and use software tools that solve real world problems andevaluate.

BCA Degree(Honours/Research- 4 Years): The BCA Degree (Honours/Research) program enables students to attain following additional attributes besides the afore-mentioned attributes, by the time of graduation.

- Apply standard MATLAB / R Programming practices and strategies in real -time software /Research project development.
- Design and develop computer programs/computer -based systems / Research in the areas related to AI, Neural Networks, Machine Learning, Cloud Computing / IoT MOOC (Massive Online Open Course), Major & MinorProjects.
- Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems
- The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.
- The ability to work independently on a substantial software project and as an effective team member.

4. Curriculum Structure

BCA Degree (Honor's/Research) will have a curriculum with Syllabi consisting of following type of courses:

- **Core Course:** A course, which shoild compulsory be studied by a candidate as a core requirement is termed as a Core Course.
- **Discipline Specific Elective (DSE) Course:** Elective courses may be offered by the main discipline/subject of studyis referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).
- **Dissertation/Project:** An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.
- **Generic Elective (GE) Course:** An elective course choosen generally from an unrelated

discipline/subject, with an intentionto seek exposure is called a Generic Elective.

- **Ability Enhancement Courses (AEC):** Life Skills and Mentoring.
- **Mandatory Course (MC):** Energy and Environment, Holistic Health and Yoga.
- **Foundation Course (FC):** Communication Skills, Universal Human Values and Awareness About Himachal Pradesh.
- **Skill Enhancement Courses (SEC):** These courses may be chosen from a pool of courses designed to provide value-basedand/or skill-based knowledge.

5. Scheme of Examination

The pass percentage in each subject will be 40%.

- **Theory Examination**
  Irrespective of credits, each paper will be of 100 marks (60 marks for theory exam and 40 marks for internal assessment) and duration of paper will be 3 hours.
- **Practical Examination**
  Each paper will be of 100 marks (60 marks for external practical exam and 40 marks for internal assessment) and duration of paper will be 3 hours.
- **Project Report/Dissertation**
  The Project Report/Dissertation will be evaluated by the internal panel and external examiner from the panel approved by the university authority/evaluation branch, HPTU, Hamirpur. The Head of the Department willassign a guide/supervisor to each candidate for his/her project/Dissertation work. The candidate shall be required to maintain his/her project diary (logbook) of work in the organization or under the Guide. Each student will be required to give presentations on his/her project work/Dissertation work. Each student is required to submit three copies of his/her project reports to the Department after completion of the project work, which will be evaluated by external examiner. Most of the students are expected to work on a real-life project/Research, preferably in some industry/Research and Development Laboratories/Educational Institution/Software Company. The student can formulate a project problem/Research problem with the help of her/his Guide and submit the synopsis/Research proposal of the same in the college within 10 days at the starting of Major Project. Approval of the Synopsis /Research proposal is mandatory which will be evaluated by an internal examiner appointed by respective college Principal or Director or university. If approved, the student can commence working on it and complete it by using the latest versions of the software packages/Research Tools for the development of the project/Dissertation.

- **Instruction for paper setter**
  In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and the candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type questions with 6 to 8 parts, covering entire syllabus. In all, five questions are to be attempted. The question paper for the end semester examination may have any one of the following patterns:
  Section A(UNIT I) Two questions of long answer type of which one is to be attempted for 10 Marks.
  Section B(UNIT II) Two questions of long answer type of which one is to be attempted for 10 Marks.
  Section C(UNIT III) Two questions of long answer type of which one is to be attempted for 10 Marks.
  Section D(UNIT IV) Two questions of long answer type of which one is to be attempted for 10 Marks.
  Section E(Compulsory) 8 to 10 short answer type questions for 2.5 to 2 marks each and total for 20 Marks.
  Total marks (A + B + C + D+ E) 10+ 10 + 10 +10+20 = 60 marks

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End Semester Examination (ESE)

For the theory course, the question paper for the final examination will consist of five sections-A, B, C, D & E. Sections A, B, C, D will have two questions each from the corresponding units I, II, III & IV of the syllabus. Section E will be compulsory and will have short answer type questions covering the whole syllabus. Each question will be of 10 or 5,5 or 6,4 marks. The candidates will attempt five questions in all, i.e.one question each from sections A, B, C, D and the compulsory question from section E. The question paper is expected to contain problems with a minimum weightage of 25% of the total marks from each unit.

Template for End Semester Examination (4,3,2 credits)

Roll No:…. **Total Pages…….**

Month-Year (June-2023)

BCA Examination

Code

Title

Semester-X (NEP)

Time: 3 Hours **Max. Marks: 60**

The candidates shall limit their answers precisely within the answer book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note: Attempt five questions in all by selecting one question from each section A, B, C and D. Section-E is compulsory.

SECTION – A

(1x10 or 5,5 or 6,4)

1.

2.

SECTION – B

(1x10 or 5,5 or 6,4)

3.

4.

SECTION – C

(1x10 or 5,5 or 6,4)

5.

6.

SECTION – D

(1x10 or 5,5 or 6,4)

7.

8.

SECTION – E (Compulsory)

(10×2=20)

9 (a-f)

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Periodical Examination (PE)

During one semester, there will be two periodical examinations for theory and practical subjects. The question paper will consist of three sections A, B and C having a total of 20 marks. Section A will be compulsory and will have short answer type questions consisting of five parts, each with one mark covering the syllabus mentioned. Sections B and C will contain descriptive type questions of five and ten marks respectively. Sections B and C will have two questions and the candidates will attempt three questions in all, i.e., one question each from sections B and C. Section-A iscompulsory.

Template for Periodical Examination (4,3,2 credits)

Roll No:……. **Total Pages…..……**

Month-Year (June-2023)

BCA Examination

Code

Title

Semester-X (NEP)

Time: 1.5 Hours **Max. Marks: 20**

Note: Attempt three questions in all by selecting one question from each section B and C. Section-A is compulsory.

SECTION – A (Compulsory)

(8x1=8)

1. (a-e)

SECTION – B

(6)

2.
3.

SECTION – C

(6)

4.
5.

6. Purposed Subject Code System

Each subject code is denoted by alpha-numerals, alphabets before hyphen indicates course name and four numerals after hyphen indicates level, semester, and subject number respectively.

- For Example: BCA-6209
- First three alphabets “BCA” is degree indicator.
- First number “6” defines the Level. 6 for level 6 subject and 7 for level 7.
- Second number “2” defines the semester.
- Third and fourth number are for subject number.

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7. Assessment & Evaluation

- **IA-Internal Assessment (Theory)**

  Periodical Examination (PE) -I and Periodical Examination (PE) -II = Weightage of **20** Marks (Average of PE-I and PE-II)

  Teacher's Assessment (Assignment Discussion/ Presentation /Overall behaviour) = 15 Marks

  Attendance = 05 Marks

Sr. No.	Percentage of Lecture Attended	Marks Awarded
1	From 75% to 80%	01
2	Above 80% to 85%	02
3	Above 85% to 90%	03
4	Above 90% to 95%	04
5	Above 95%	05

Total (IA) = 10 + 10+ 15+ 5 = 40 for all courses

- **IA-Internal Assessment (Practical)**
  Periodical Examination (PE) (Written/Presentation & Viva-Voce) = **20**
  Teacher's Assessment (Lab performance /Work Performance + Report/File Work) = **15**
  Attendance = **05**

- **EA-External Assessment (Theory)**
  ESE-End-Semester Examination = 60 for all courses

Total marks for theory evaluation = (20 + 15 + 05 + 60 =100) for all courses.

- **External Assessment (Practical)**
  ESE-End-Semester Examination (written script, performance, External viva-voce etc.) = **60**
  Total marks for practical evaluation = 20+20+60 =100

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Template for- IA-Internal Assessment (Theory)

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Bachelor of Computer Applications , School of Computer Science & Engineering

AWARD SHEET THEORY (INTERNAL ASSESSMENT)

Name of the Institution:			**Distribution of Marks**				
Programme:			**Periodical Examinations**		**Teacher Assessment** Assignment discussion/ presentation/ behaviour Quizzes/Overall	**Attendance**	**Total Marks**
Subject:		**Sub. Code:**					
Branch:		**Semester:**	1st Periodical Examination	2nd Periodical Examination			
MAX. MARKS:		**MIN. MARKS:**					
Sr. No.	**University Roll No.**	**Name of Student**	**10**	**10**	**15**	**05**	**40**

Name of Internal Examiner	Head of Dept	Head of the Institution
Signature……..……	Signature…….....	Signature…….....
Date……..	Date……..	Date……

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Template for-IA-Internal Assessment (Practical/Project/Seminar/Viva-Voce)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

Bachelor of Computer Applications , School of Computer Science & Engineering

AWARD SHEET PRACTICAL (INTERNAL ASSESSMENT)

(Practical/Project/Seminar/Viva-Voce)

Name of the Institution:			**Distribution of Marks**				
Programme:			**Periodical Examination**		**Teacher's Assessment** Lab /work performance Report/File work	**Attendance**	**Total Marks**
Subject:		**Sub. Code:**					
Branch:		**Semester:**	Written/Presentation	Viva-voce			
MAX. MARKS:		**MIN. MARKS:**					
Sr. No.	**University Roll No.**	**Name of Student**	**10**	**10**	**15**	**05**	**40**

Name of Internal Examiner	Head of Deptt.	Head of the Institution
Signature……..……	Signature…….....	Signature…….....
Date……..……..…....	Date……..	Date……

Note: The distribution of marks for Institutional training, Internship, Survey, SWAYAM, MOOCs, NPTEL courses (if any) would be same as above.

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Template for-External Examination
(Practical/Project/Seminar/Viva-Voce)
HIMACHAL PRADESH TECHNICAL UNIVERSITY
Bachelor of Computer Applications, School of Computer Science & Engineering
(Practical/Project/Seminar/Viva-Voce)

Name of the Institute: …….

Programme: ……

Subject Name……... …… Subject Code:…….

Branch: …… Semester ……

Max Marks …….. Min. Marks:……

Sr. No.	University Roll No.	Name of Student	Marks in Figure	Marks in Words

Name of Internal Examiner:…… ExternalExaminer…….

Signature……...…… Signature……..……..
Date……..……. Date……..…….

Note: The distribution of marks would be on the basis of Work done/Task performance (20 marks), Performance (written/presentation) (20 marks) and viva-voce (20 marks), total=60 marks.

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8.Overall General Instructions

- Each paper will be of 100 marks (60 marks for external and 40 marks for internal) and the duration of paper will be 3 hours. The candidate shall be declared to have passed the examination if the candidate secures not less than 24 marks in the End Semester Examinations of each paper and secures not less than 16 marks in the Internal Assessment (IA) and overall aggregated marks is 40 in both the external and internal taken together.
- Each theory lecture per hour will be considered as one credit and two practical hours as one credit. For each theory course of 04 credits, there will be 4 lecture hours of teaching per week and for each theory course of 02 credits, there will be 2 lecture hours of teaching per week. For each practical course of 02 credits, there will be 04 lecture hours of teaching per week and for practical course of 04 credits, there will be 08 lecture hours of teaching per week. For the other course categories, the lecture hours per credit would be same as those of having theory subjects.
- In each semester, the students are required to perform at least ten experiments out of the listed experiments.
- For Seminar, Industrial Training, Research Project, Summer Internship, Survey, SWAYAM, MOOC, NPTEL; the internal and external assessment shall be same as that of theory/practical courses i.e., 100 (60 % ESE & 40 % IA) marks.
- The distribution of internal & external assessment for Project work, Seminar and other course categories will be same as that of Core Compulsory course/Discipline Specific Courses and also as per the format mentioned above. (Read all the instructions mentioned in each course content semester-wise)
- Teaching hours per semester for each 04-credit theory course will be minimum 60 hours and of 02 credit theory course will be minimum 30 hours.
- For Research project, Seminar/SWAYAM/MOOC/NPTEL/Industrial Internship/Survey, the time frame for the duration of classes, examination, format for writing the report and evaluation system will be as per the format given as well as may be decided by the Department/University itself or organizing/host/collaborative institutions time to time after the approval from BoS.
- On the basis of the interest/availability of the students from other departments, any other relevant course for the Inter-Departments Course (ID) may be offered at the spot after the approval from Authority/Department.
- Students having the attendance below 75% in each course will not be allowed to appear in the final examination. The students having attendance lying between 70-75% may be allowed to submit the examination form and finally to appear in the examinations only after the approval from the Dean/concerned authority. Similarly, the students having attendance lying between 65-70% may be allowed to submit the examination form and finally to appear in the examinations only after the approval from the Vice-Chancellor only on the request basis.
- For Theory examinations (Internals), two examinations; Periodical Examination-I and Periodical Examination-II will be conducted and for the practicals and other course categories, only one periodical examination will be conducted-as the internal examination along with other parameters as mentioned in the instructions (mentioned above).
- Both the periodical examinations are mandatory. If, in any case, the student is not able to appear in any of the above examinations, then the option of Make-up Examination will be given to the student. For that, he/she has to report before that examination to the concerned teacher/head of the department. Within 3 days, he/she has to submit the documents related to the cause and finally get permission from the concerned Authority. After getting the permission, the student has to appear in the examination within 10 days with the weightage of 80% only. For example, if the student scoring 15 marks with the weightage of 100%, then he/she will be given 12 marks (80% weightage).
- Keeping in view the guidelines of NEP-2020, BCA is made inter- departmental in nature. It has been made mandatory by the university for the students at the UG level to opt at least one course of minimum 2 credits in first year.

- Duration: One year divided into two semesters.
- Medium of instruction: English and Passing Standard: As mentioned in the Ordinance.
- In regard to maintain the record of the answer-sheets, after the completion of one year, all the used answer-sheets of internal examinations, project reports, practical note-books etc. would be allowed to disposed off.
- In regard to maintain the lab equipments, if any of the equipments not working properly may be allowed to send to the concerned companies (within and out-side the state) for repairing and may be allowed to disposed off/write off the damaged/old/not-in-use items like books, equipments, furniture and other appliances after the approval from the concerned authorities.

Scheme of Teaching and Examination

Bachelor of Computer Applications(BCA)

Semester-I

Subject Code	Course Type	Subject Title/Subject Name	Periods			Credits	Evaluation Scheme					Total
			L	T	P		ESE	Internal Assessment				
								PE	TA	A	Total	
BCA-5101	DSC	Computers Fundamentals & Information Technology	4	0	0	4	60	20	15	05	40	100
BCA-5102	DSC	Office Automation Tools	4	0	0	4	60	20	15	05	40	100
BCA-5103	DSC	Desktop Publishing and Designing	4	0	0	4	60	20	15	05	40	100
BCA-5104	GE	Basic Electronics	4	0	0	4	60	20	15	05	40	100
BCA-5105	SEC	Digital Marketing	2	0	0	2	60	20	15	05	40	100
EVS-111	MC	Energy and Environment	2	1	0	3	60	20	15	05	40	100
HS-111	FC	Communication Skills	3	0	0	3	60	20	15	05	40	100
Labs												
BCA-5106P	DSC LAB	Lab -I : Office Automation Tools Lab	0	0	2	1	60	20	15	05	40	100
BCA-5107P	DSC LAB	Lab-II :Desktop Publishing and Designing Lab	0	0	2	1	60	20	15	05	40	100
HS-111P	FC	Lab-III: Communication Lab	0	0	2	1	60	20	15	05	40	100
Total			**23**	**1**	**6**	**27**	**600**	**200**	**150**	**50**	**400**	**1000**

Legend:	**DSC-** Discipline Specific Core	**GE** – Generic Elective
	AEC- Ability Enhancement Compulsory	**SEC** - Skill Enhancement Course
	VAC – Value Addition Course	**T**-Tutorial
	L-Lecture	**PE**-Periodical Examination
	P-Practical	**TA**-Teacher's Assessment
	ESE-End Semester Examination	**A** - Attendance
	DSE- Discipline Specific Electives	**C**- Compulsory
	MC-Mandatory Course	**FC**- Foudation Course

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Scheme of Teaching and Examination
Bachelor of Computer Applications(BCA)
Semester-II

Subject Code	Course Type	Subject Title/ Subject Name	Periods			Credits	Evaluation Scheme					Total
			L	T	P		ESE	Internal Assessment				
								PE	TA	A	Total	
BCA-5201	DSC	Computer Architecture	4	0	0	4	60	20	15	05	40	100
BCA-5202	DSC	Database Management System	4	0	0	4	60	20	15	05	40	100
BCA-5203	DSC	Programming in C	4	0	0	4	60	20	15	05	40	100
BCA-5204	GE	Fundamentals of Accounting	3	1	0	4	60	20	15	05	40	100
BCA-5205	VAC	Digital Empowerment	2	0	0	2	60	20	15	05	40	100
BCA-5206	SEC	Advance Spreadsheet Tools	2	0	0	2	60	20	15	05	40	100
HS-112	MC	Universal Human Values and Awareness about Himachal - Pradesh	3	0	0	3	60	20	15	05	40	100
Labs:												
BCA-5207P	DSC LAB	Lab- IV: DBMS Lab	0	0	2	1	60	20	15	05	40	100
BCA-5208P	DSC LAB	Lab- V: Programming in C Lab	0	0	2	1	60	20	15	05	40	100
HS-122P	MC	Lab-VI:Holistic Health and Yoga	0	0	2	1	60	20	15	05	40	100
Total			**21**	**1**	**6**	**26**	**600**	**200**	**150**	**50**	**400**	**1000**

Undergraduate Certificate will be awarded after completing first two semesters with minimum of 53 Credits provided all electives passed and successful completion of 10 Credit bridge course of two-month duration.

Bridge Course

Subject Code	Course Type	Subject Title/ Subject Name	Credits	Total Marks
BCA-5209	C	Training/ Internship Report and Viva-Voce	6	100
BCA-5210	C	MOOC /NPTEL/ Swayam Certification/ Online Certification	4	100
Total			**10**	**200**

Note: The bridge course Training / Internship will be based on MOOC /NPTEL/ Swayam Certification. After completion of Level 5 the candidate will have core knowledge of Computer basics.

MOOC /NPTEL/ Swayam Certification/ Online Certification

Subject Code	Course Type	Subject Title/ Subject Name
BCA-5210(A)	C	Basic of IT
BCA-5210(B)	C	Essential of Python
BCA-5210(C)	C	PC Hardware & Networking

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Scheme of Teaching and Examination

Bachelor of Computer Applications(BCA)

Semester-III

Subject Code	Course Type	Subject Title/ SubjectName	Periods			Credits	Evaluation Scheme					Total
			L	T	P		ESE	Internal Assessment				
								PE	TA	A	Total	
BCA-6301	DSC	Operating System	4	0	0	4	60	20	15	05	40	100
BCA-6302	DSC	Data Structure Using C	4	0	0	4	60	20	15	05	40	100
BCA-6303	DSC	Python Programming	4	0	0	4	60	20	15	05	40	100
BCA-6304	GE	Mathematics for Computing	3	1	0	4	60	20	15	05	40	100
BCA-6305	SEC	Introduction to Blockchain	2	0	0	2	60	20	15	05	40	100
BCA-6306	VAC	Ethics and Culture	2	0	0	2	60	20	15	05	40	100
Labs:												
BCA-6307P	DSC LAB	Lab -VII :Data Structure Using C Lab	0	0	2	1	60	20	15	05	40	100
BCA-6308P	DSC LAB	Lab- VIII : Python Programming Lab	0	0	2	1	60	20	15	05	40	100
Total			**19**	**1**	**4**	**22**	**480**	**160**	**120**	**40**	**320**	**800**

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Scheme of Teaching and Examination

Bachelor of Computer Applications(BCA)

Semester-IV

Subject Code	Course Type	Subject Title/ SubjectName	Periods			Credits	Evaluation Scheme					Total
			L	T	P		ESE	Internal Assessment				
								PE	TA	A	Total	
BCA-6401	DSC	Software Engineering	4	0	0	4	60	**20**	**15**	**05**	**40**	**100**
BCA-6402	DSC	Web Technology	4	0	0	4	60	20	15	05	40	100
BCA-6403	DSC	Java Programming	4	0	0	4	60	20	15	05	40	100
BCA-6404	GE	Numerical Methods	3	1	0	4	60	20	15	05	40	100
BCA-6405	AEC	Life Skills and Mentoring	2	0	0	2	60	20	15	05	40	100
BCA-6406	SEC	Graphics Design & Animation	2	0	0	2	60	20	15	05	40	100
IKT-111	MC	Indian Knowledge Tradition	2	0	0	2	60	20	15	05	40	100
Labs:												
BCA-6407P	DSC LAB	Lab -VII :Java Programming Lab	0	0	2	1	60	20	15	05	40	100
BCA-6408P	DSC LAB	Lab -VIII : Web Technology Lab	0	0	2	1	60	20	15	05	40	100
Total			**21**	**1**	**4**	**24**	**540**	**180**	**135**	**45**	**360**	**900**

Undergraduate Diploma will be awarded after completing four semesters with minimum of 99 Credits provided all electives passed and successful completion of 10 Credit bridge course of two-month duration.

Bridge Course

Subject Code	Course Type	Subject Title/ Subject Name	Credits	Total Marks
BCA-6409	C	Training/ Internship Report and Viva-Voce	6	100
BCA-6410	C	MOOC /NPTEL/ Swayam Certification/ Online Certification	4	100
Total			**10**	**200**

Note: The bridge course Training / Internship will be based on MOOC /NPTEL/ Swayam Certification. After completion of Level 6 the candidate will have core knowledge of Computer Programming with its specialization.

MOOC /NPTEL/ Swayam Certification/ Online Certification

Subject Code	Course Type	Subject Title/ Subject Name
BCA-6410(A)	C	Communication in Professorial
BCA-6410(B)	C	Graphics Design and Animation
BCA-6410(C)	C	Big Data Analytics

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Scheme of Teaching and Examination
Bachelor of Computer Applications(BCA)
Semester-V

Subject Code	Course Type	Subject Title/ Subject Name	Periods			Credits		Evaluation Scheme				Total
			L	T	P		ESE	Internal Assessment				
								PE	TA	A	Total	
BCA-7501	DSC	Computer Networks	4	0	0	4	60	20	15	5	40	100
BCA-7502	DSC	Programming in PHP	4	0	0	4	60	20	15	5	40	100
BCA-7503	DSC	Advance Java (Servlet & JSP)	4	0	0	4	60	20	15	5	40	100
BCA-7504	GE	Fundamentals of Management	3	0	0	3	60	20	15	5	40	100
BCA-7505	SEC	Introduction of Cloud Computing	2	0	0	2	60	20	15	5	40	100
BCA-7506	DSE	DSE - I	4	0	0	4	60	20	15	5	40	100
Labs:												
BCA-7507P	DSC LAB	Lab- IX: Programming in PHP Lab	0	0	2	1	60	20	15	5	40	100
BCA-7508P	DSC LAB	Lab- X: Advance Java (Servlet & JSP) Lab	0	0	2	1	60	20	15	5	40	100
Total			**21**	**0**	**4**	**23**	**480**	**160**	**120**	**40**	**320**	**800**

Departmental Electives University Wide Courses

Discipline Specific Electives- I

Sr. No.	Course Type	Course Code	Course Title
1.	DSE	BCA- 7506(A)	Search Engine Optimization
2.	DSE	BCA- 7506(B)	Software Quality Assurance
3.	DSE	BCA- 7506(C)	Open-Source Software
4.	DSE	BCA-7506(D)	Network Security

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Scheme of Teaching and Examination
Bachelor of Computer Applications(BCA)

Semester-VI

Subject Code	Course Type	Subject Title/ Subject Name	Periods			Credits	ESE	Evaluation Scheme				Total
			L	T	P			Internal Assessment				
								PE	TA	A	Total	
BCA-7601	DSC	Analysis and Design of Algorithms	4	0	0	4	60	20	15	5	40	100
BCA-7602	DSC	Artificial Intelligence	4	0	0	4	60	20	15	5	40	100
BCA-7603	DSC	Android Programming (Web /IOS)	4	0	0	4	60	20	15	5	40	100
BCA-7604	GE	Management Information System	3	0	0	3	60	20	15	5	40	100
BCA-7605	SEC	Data Analytics Computing withPython	2	0	0	2	60	20	15	5	40	100
BCA-7606	DSE	DSE - II	4	0	0	4	60	20	15	5	40	100
Labs:												
BCA-7607P	DSC LAB	Lab- XI : Artificial Intelligence Lab	0	0	2	1	60	20	15	5	40	100
BCA-7608P	DSC LAB	Lab- XI: Android Programming Lab	0	0	2	1	60	20	15	5	40	100
Total			**21**	**0**	**4**	**23**	**480**	**160**	**120**	**40**	**320**	**800**

Departmental Electives University Wide Courses

Discipline Specific Electives- II

Sr. No.	Course Type	Course Code	Course Title
1.	DSE	BCA- 7606(A)	Unix OS & Shell Programming
2.	DSE	BCA- 7606(B)	Advance Mobile Communications (5G)
3.	DSE	BCA- 7606(C)	Cyber Law
4.	DSE	BCA- 7606(D)	Ethical Hacking

Bachelor's Degree (BCA) will be awarded after completing six semesters with minimum of 145 Credits provided and successful completion of 10 Credit bridge course of two-month duration.

Bridge Course

Subject Code	Course Type	Subject Title/ Subject Name	Credits	Total Marks
BCA-7609	C	Training/ Internship Report and Viva-Voce	6	100
BCA-7610	C	MOOC /NPTEL/ Swayam Certification/ Online Certification	4	100
Total			**10**	**200**

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Note: The bridge course Training / Internship will be based on MOOC /NPTEL/ Swayam Certification. After completion of Level 7 the candidate will have core knowledge of Computer applications with its specialization.

MOOC /NPTEL/ Swayam Certification/ Online Certification		
Subject Code	**Course Type**	**Subject Title/ Subject Name**
BCA-7610 (A)	C	Machine Learning
BCA-7610 (B)	C	Computer vision basics
BCA-7610 (C)	C	Introduction to R for Data Science

Scheme of Teaching and Examination
Bachelor of Computer Applications(BCA)
Semester-VII

Subject Code	Course Type	Subject Title/ Subject Name	Periods			Credits		Evaluation Scheme				Total
			L	T	P		ESE	Internal Assessment				
								PE	TA	A	Total	
BCA-8701	DSC	Internet of Things (IoT)	4	0	0	4	60	20	15	5	40	100
BCA-8702	DSC	Data Analytics using R-Tool	4	0	0	4	60	20	15	5	40	100
BCA-8703	DSE	DSE - III	4	0	0	4	60	20	15	5	40	100
BCA-8704	DSE	DSE - IV	4	0	0	4	60	20	15	5	40	100
Labs:												
BCA-8705P	DSC LAB	Lab- XIII: Data Analysis usingR-Tool Lab	0	0	2	2	60	20	15	5	40	100
BCA-8706P	DSC LAB	Lab- XIV : Minor Project	0	0	6	6	60	20	15	5	40	100
Total			**16**	**0**	**8**	**24**	**360**	**120**	**90**	**30**	**240**	**600**

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Departmental Electives University Wide Courses

Discipline Specific Electives-III

Sr. No.	Course Type	Course Code	Course Title
1.	DSE	BCA- 8703(A)	Compiler Design
2.	DSE	BCA- 8703(B)	Computer Graphics
3.	DSE	BCA- 8703(C)	Cyber Security Awareness
4.	DSE	BCA- 8703(D)	Data Mining

Discipline Specific Electives- IV

Sr. No.	Course Type	Course Code	Course Title
1.	DSE	BCA- 8704(A)	Theory of Computation
2.	DSE	BCA- 8704(B)	Computer Graphics
3.	DSE	BCA- 8704(C)	Mobile Security
4.	DSE	BCA- 8704(D)	Machine Learning

Scheme of Teaching and Examination

Bachelor of Computer Applications(BCA)

Semester-VIII

Course Code	Course Type	Subject Title/ Subject Name	Credits	Total Marks
BCA-8801 (A)	DSC	**Project Design & Implementation (Industrial / In-House)**	**20**	
		(A). Synopsis		50
		(B). Mid Project Report		50
		(C). Project Seminars		50
		(D). Major Project Progress Report		50
		(E). Major Project Report		100
		(F). Major Project Viva-Voce		100
Total				**400**
or				
BCA-8801 (B)	DSC	**Research (Industrial / In-House)**	**20**	
		(A). Synopsis		50
		(B).Mid Research Report		50
		(C).Research Work Seminars (02)		50
		(D).Research Work Report		50
		(E). Research Work Report		100
		(F). Research Work Viva-Voce		100
Total				**400**

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BCA-5101 Computer Fundamentals & Information Technology							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to provide conceptual knowledge about fundamentals of Computers, I/O devices, storage devices, memory, computer Software and type of programming Languages.

Unit I	**15 Lectures**
Fundamentals of Computers: Characteristics, Evolution, Capabilities and Limitations Generations of Computers. **Types of Computers:** Micro, Mini, Main Frame, Supercomputers, Block Diagram of Computer, Instruction Set, Registers, Processor Speed, Type of Processors.	
Unit II	**15 Lectures**
I/O Devices: Introduction & Types of I/O devices, Input Devices: Keyboard, Mouse, Touch Screens, Joystick, Electronic Pen, and Trackball. **Scanning Devices:** Optical Scanners, OCR, OMR, Bar Code Readers, MICR, Digitizer, Electronic card reader, Image Capturing Devices-Digital Cameras. **Output Devices:** Monitors CRT, LCD/TFT, Printers- Dot matrix, Inkjet, Laser, Plotters- Drum, Flatbed, Screen image projector.	
Unit III	**15 Lectures**
Memory: Main Memory, RAMS, ROM, EPROM, PROM, Cache Memory. **Secondary Storage Devices:** Magnetic Tape, Magnetic Disks Internal & External Hard Drives, Floppy Disks, Optical Disks-CD, VCD, CD-R, CD-RW, DVD, Flash Memory, USB Drives.	
Unit IV	**15 Lectures**
Computer Software: Software and its Need, Types of software System Software, Application Software, System software, Utility Program. Programming Languages: Types of Computer Languages, their Merits and Demerits Assemblers, Compilers and Interpreter, computer virus and its types, antivirus.	

Course Learning Outcomes (CLOs)

- Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.
- Understand the concept of input and output devices of Computers.
- Understand an operating system and its working, and solve common problems related to operating systems.
- Learn basic word processing, Spreadsheet and Presentation Graphics Software skills.

Suggested Readings

- Fundamentals of Computer, JB Dixit, Luxmi Publications.
- S.K. Gandhi, Pawan Thakur "Basic Computer Engineering", Satya Prakashan, New Delhi.

Further References

- Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication
- Fundamentals of Computer, JB Dixit, Luxmi Publications.

BCA-5102 Office Automation Tools							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to provide conceptual as well as practical knowledge of apply Word Processing Tools including Document Formatting, Using Graphics, Working with Macro and Mail Merge, Apply Spread Sheet Tools including Worksheet formatting, Using Functions, Graphics and Charts, Create effective Presentation Using Animation and Transition.

Unit I	15 Lectures
DOS & Windows: History and Version of DOS, Internal Command: DIR, DATE, TIME, CLS, CD, RD, MD, PATH, TYPE, DEL, ECHO, COPY, REN, PROMPT, VOL, VER etc. External Command: ATTRIB, CHKDSK, DISKCOPY, DISKCOMP, XCOPY, TREE, DELTREE,DOSKEY, FORMAT, FIND, SORT, FDISK, MORE, SYS etc. Concept of Files & Directories, Wild card characters. **Windows:** Definition, Benefits, Features & Uses of Windows, Control Panel, Accessories, Task Bar, My Computer, Recycle bin.	
Unit II	**15 Lectures**
MS Office: Elements, Introduction to Office & Features, MS-Word: Definition, Benefits, Features & uses of Word, Menus, Toolbars, Cursor, Short Cut & Hot keys, Editing Text, Opening, Creating, saving, Printing, Editing Files, Formatting text, Find and replace, Tables and Columns, Spell check, Thesaurus, File protection, Mail Merge, Macros.	
Unit III	**15 Lectures**
MS Excel: Definition, Benefits, Features & Uses of MS Excel, Worksheets, Formatting Worksheets and Restricting Data, Calculating with Formulas and Functions, Ranges, Auto fill, Data (Sort, Filter, Validation, Subtotal), Viewing and Manipulating Data with Charts and PivotTables, Print, Goal seek, Scenario, Macros, Creating Excel Databases.	
Unit IV	**15 Lectures**
MS – Power Point: Definition, Benefits, Features & Uses of Power Point, Menus, Toolbars, Creating and Editing Slides, adding graphics, Multimedia, and Special Effects to Slides, Insert (Picture, Slide & Text), Master Slide, Views, Animation, Action Buttons.	

Course Learning Outcomes (CLOs)

- The students will be able to perform documentation, accounting operations and presentation skills.

Suggested Readings

- PC Software – R.K Taxali
- S.K. Gandhi, Pawan Thakur "Basic Computer Engineering", Satya Prakashan, New Delhi.

Further References

- Microsoft Office - The Complete Reference .
- Microsoft Office - Fundamentals By Laura Story, Dawna Walls.

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BCA-5103 Desktop Publishing and Designing							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to creation of electronic forms of information such as documents, presentations, brochures, books, or even website content using computer programs. It allows an amalgamation of various tasks that are generally performed independently at printing presses such as layouts, typesetting, graphic design etc.

Unit I	15 Lectures
D.T.P For Publications: Introductions to Printing, Types of Printing, Offset Printing, Working of offset Printing, Transparent Printout, Negative & Positives for Plate were making, Use of DTP, Importance, Advantage of D.T.P, Mixing of graphics & Image in a single page production, Laser printers - Use, Types, Advantage of lager printer in publication.	
Unit II	**15 Lectures**
Page Layout: Different page format / Layouts, News paper page format, Page orientations, Columns & Gutters, Printing in reduced sizes**. Introductions To Page Maker:** Page Maker Icon and help, Tool Box, Styles, Menus etc., Different screen Views, Importing text/Pictures, Auto Flow, Columns.	
Unit III	**15 Lectures**
Advance features: Master Pages and Stories, Story Editor, Menu Commands and short-cut commands, Spell check, Find & Replace, Import Export etc., Fonts, Points Sizes, Spacing etc., Installing Printers, Scaling (Percentages), Printer setup Use of D.T.P. in Advertisements, Books & Magazines, News Paper, Table Editor.	
Unit IV	**15 Lectures**
Adobe Photoshop: Introduction to Adobe Photoshop & Documents, Various Graphic Files and Extensions, Vector Image and Raster Images, Various Colour Modes and Models, Introduction to Screen and Work Area, Photoshop Tools & Palettes ,Use of Layers & Filters, Working with Images.	

Course Learning Outcomes (CLOs)

- The students would be to learn the basics of printing,page layouts and different page orientations .
- Learn the advance features of DTP in Books, magazines and the proficient working in Adobe Photoshop.

Suggested Readings

- Page Maker 4.0 & 5.0 By B.P.O. Publications.
- Prakhar Complete Course For DTP (Coreldraw, Pagemaker, Photoshop).

Further References

- Vishnu Priya Singh, Meenakshi Singh, "DTP Course Book", Computech Publications Ltd., New Delhi.
- Satish Jain, DTP (Desktop Publishing) Training Guide, BPB Publication.

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BCA-5104 Basic Electronics							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to understand Data Representation for Digital Logic, Basic Blocks of Digital Logic Understand the Fundamental Organization of a Digital Computer, Design Simple Combination, Sequential Circuits and Examine the Basics of General Programming.

Unit I	**15 Lectures**
Data Representation: Data Types and Number Systems Binary Number System Octal & Hexa- Decimal Number System Fixed Point Representation 1's & 2's Complement. **Binary Fixed:** Point Representation Arithmetic Operation On Binary Numbers Overflow & Underflow Floating Point Representation Codes ASCII EBCDIC Codes Gray Code Excess-3 & BCD Error Detection & Correcting Codes Binary Storage and Registers.	
Unit II	**15 Lectures**
Boolean Algebra and Digital Logic Circuits: Logic Gates and OR NOT Gates and Their Truth Tables NOR, NAND & XOR Gates Boolean Algebra Basic Definition and Properties Basic Boolean Law's Demorgan's Theorem Map Simplification Minimization Techniques. **K Map:** Two Three andMore Variables Maps Sum of Product & Product of Sums.	
Unit III	**15 Lectures**
Combination Circuits: Half Adder & Full Adder, Full Subtractor, and Decimal Adder Code Conversion Multilevel NAND and NOR Circuits Multiplexers and Demultiplexers, RAM and ROMWorking & Circuit.	
Unit IV	**15 Lectures**
Sequential logic: Flip-Flops – RS, D, JK & T Flip-Flop and Triggering in flip flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, flip flop excitation tables, Design procedure and design of counters. Design with equations.	

Course Learning Outcomes (CLOs)

- The students will be able to study basics of semiconductor & devices and their applications in different areas.
- Analyze output in different operating modes of different semiconductor devices.

Suggested Readings

- M. Morris Mano-Computer System Architecture Revised 3rd Edition Pearson Publication.
- Digital Electronics by Anil Kumar Maini publisher :Wiley and Sons.

Further References

- Morris Mano-Digital Logic and Computer Design.
- Modern Digital Electronics by R. P. Jain publisher Tata Mcgraw-Hill education.

BCA-5105 Digital Marketing							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
2	0	0	2	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to apply and analyse digital marketing activities in achieving business objectives, to develop skills relevant to marketing campaigns for enhancing business reach, to examine marketing metrics and collect consumer data using digital media and to improve the brand identity and develop the customer base using real- world techniques.

Unit I	**08 Lectures**
Introduction to Digital Marketing: Digital vs. Traditional Marketing, Digital Marketing Channels, ROI between Digital and traditional marketing, Creating an initial digital marketing plan and Content Management. **Search Engine Basics:** Search Engines and Websites, Difference between Blog, Portal and Website, Static and Dynamic Websites.	
Unit II	**08 Lectures**
Keyword Research: Keyword Research, Types of Keywords, Business Analysis & Categorization, Google Keyword Planner, Market Research and Analysis, New Keyword Ideas and Finalizing the Keywords List. **Optimization Techniques:** Website Speed, the Domain name in SEO, URL Optimization, Title and Meta Tag Optimization, Sitemaps Generation, Using Robot.txt in Site URL, Redirecting Techniques.	
Unit III	**08 Lectures**
Search Engine Optimization: Local SEO, Importance of Local SEO, Local SEO Ranking Signals, Local SEO Negative Signals, Citations and Local Submissions, Website Position Analysis and Website Monthly Reports. **Paid Marketing Techniques:** Google Account setup, Account Structure, Campaigns settings, Ad Group setup, Keyword Match Types, Keyword Research Tools and Understanding Ad Auction.	
Unit IV	**08 Lectures**
Display Advertising: Benefits of Display Advertising, creating a Display Campaign, Bidding Strategies, Targeting Option in Display Network, Examples of Good and Bad Ads, Display Ad Builder and Conversion Tracking. **Social Media Marketing:** Introduction to SMM, Facebook Marketing, Facebook Advertising and Email Marketing..	

Course Learning Outcomes (CLOs)

- The students will be able to learn about digital marketing including topics like SEO, Social media marketing etc.

Suggested Readings

- Ryan, D. Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Kogan Page Limited.

Further References

- The Beginner's Guide to Digital Marketing. Digital Marketer. Pulizzi, J. Epic Content Marketing, Mcgraw Hill Education.

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EVS-111 Energy and Environment							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
2	1	0	3	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to provide knowledge about the components of environment and their inter-relatedness. It provides understanding of all the resources available, their origin, the ways to conserve them for sustainable future, understand various measures undertaken by Government and laws related to protection of environment.

Unit I	**09 Lectures**
Ecosystem: Structure and function of an ecosystem–ecological succession–primary and secondary succession - ecological pyramids – pyramid of number, pyramid of energy and pyramid of biomass. **Convention on Climate Change:** Origin of Conference of Parties (COPs), United Nations Framework Convention on Climate Change (UNFCCC) and Intergovernmental Panel on Climate Change (IPCC); Kyoto Protocol, Montreal Action Plan; Paris Agreement and post-Paris scenario.**Environmental issues:**Global Environmental crisis, Current global environment issues, Global Warming, Greenhouse Effect, role of Carbon Dioxide and Methane, Ozone Problem, CFC's and Alternatives, Causes of Climate change, Carbon footprint.	
Unit II	**09 Lectures**
Air Pollution: Origin, sources, adverse effects and preventive measures related to air pollution. Case study for air pollution (London smog, Photochemical smog, Bhopal gas tragedy).**Water Pollution:** Origin, sources, adverse effects and preventive measures related to water pollution. Case study for air pollution (Minmata tragedy, Arsenic pollution at Punjab/UP, The Ganga river pollution). **Noise Pollution:**Origin, sources, adverse effects and preventive measures related to noise pollution. **Nuclear Pollution:**Origin, sources, adverse effects and preventive measures related to radioactive pollution, Case study. **Environmental protection acts:**Important environmental protection acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act.	
Unit III	**09 Lectures**
Renewable and non-renewable resources: Coal, Petroleum, Solar energy, wind energy, hydrothermal energy, nuclear energy, Tidal energy, Bioenergy etc. Role of individual in conservation of natural resources for sustainable life styles. Use and over exploitation of Forest resources, Deforestation, Timber extraction, Mining, Dams and their effects on forest and tribal people. Use and over exploitation of surface and ground water resources, Floods, Drought, Conflicts over water, Dams- benefits and problems. National green hydrogen mission. FAME India Scheme.	
Unit IV	**09 Lectures**
Environment and disaster: Introduction: Principles of Disaster Management. Natural Disasters such as Earthquake, Floods, Fire, Landslides, Tornado, Cyclones, Tsunamis, Nuclear and Chemical Terrorism. Hazards, Risks and Vulnerabilities,Vulnerability of a location and vulnerable groups, National policy on disaster Management.	

Course Learning Outcomes (CLOs)

- The students will be able to discover knowledge in ecological perspective and value of environment.
- Understand the significance of various natural resources and their management.
- Demonstrate a comprehensive understanding of the world's biodiversity and the importance of its conservation.
- Understand environmental laws and sustainable development.

Suggested Readings

- Moaveni,S., Energy, Environment and Sustainability, Cengage(2018)
- Down to Earth, Environment Reader for Universities,CSE Publication(2018)
- Chapman, J.L. and Reiss, M.J., Ecology Principles and Application, Cambridge University Press (LPE) (1999).
- Eastop,T.P. and Croft, D.R., Energy Efficiency for Engineers and Technologists, Longman and Harow (2006).

Further References

- O'Callagan, P.W., Energy Management, Mc Graw Hill Book Co.Ltd.(1993).

HS-111Communication Skills							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
3	0	0	3	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

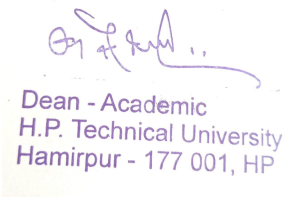
Course Objectives (COs)

The main objective of this course is to identify deviant use of English both in written and spoken forms and understand the importance of writing in academic life. It reorganizes and correct the errors of usage to write simple sentences without committing errors of spelling and grammar and to understand and appreciate English spoken by people from different regions.

Unit I	**09 Lectures**
Essentials of communication: The meaning, types &process of communication, Barriers to communication and removal of these barriers, Shannon & weaver model of communication, Berlos' model of communication, The Seven Cs of Effective Communication - Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness, Types of information- order, advise, suggestion, motivation, persuasion, warning and education. Mass Communication –function of mass communication – Media of mass communication, Advantages and disadvantages of social media.	
Unit II	**09 Lectures**
Essentials of Grammar: Types of sentences: Declarative Sentence, Imperative Sentence, Interrogative Sentence,Exclamatory Sentence, simple, compound & complex sentences, conversion of one type of sentence into other, Parts of speech, Tenses, articles and prepositions, Model Auxiliaries Types of diction, ways to improve diction, Paragraphwriting.	
Unit III	**09 Lectures**
Technical Communication: Report writing: Characteristics of a good report, parts & types of reports, drafting of reports. Business letters: planning a business letter, parts of a letter, classification of business letters – inviting and sending quotations, letter placing orders, letter of complaint, letter of adjustment, and letter of Job, letter negotiating a job offer and Resume writing, Drafting memorandum, notices, agenda and minutes of meeting, preparing effective e-mail messages and power-point presentations.	
Unit IV	**09 Lectures**
Soft skills & personality development: Soft skills: Classification of soft skills, Delivering effective presentations, Capturing audience, Impromptu speech, speech initiators, telephone etiquette - Good practice when making and receiving a call; Becoming a good leader and team-player, Personal SWOT analysis., body language, Types of interviews, preparing for a job interview, Strategies for managing emotions & controlling stress.	

Course Learning Outcomes (CLOs)

- The students will be able to develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others.
- Understand and practice different techniques of communication.
- Practice and adhere to the 7Cs of Communication.
- Familarized with different types of communication. Understand and practice interview etiquettes.



Suggested Readings

- Communication Skills, Sanjay Kumar and Pushp Lata, Oxford University Press.
- Effective Communication and soft Skills, Nitin Bhatnagar and Mamta Bhatnagar, Pearson Publication.
- Communicative English for Engineers and professionals, Nitin Bhatnagar and Mamta Bhatnagar, Pearson Publication.

Further References

- Business Communication: Theory and Application by R.W. Lesikar and John.D. Pettit , All India Traveller Bookseller.

BCA-5106P Lab - I: Office Automation Tools Lab							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
0	0	2	1	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

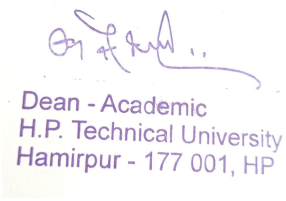
Course Objectives (COs)

The main objective of this course is to cover practical implementation part of **BCA-5102.**

Total Lab Hours: 40(Max)

List of suggested practical:

1. Create, save, print a document file and create header and footer in MS- Word.
2. Create the Timetable of BCA department.
3. Create and remove a Macro in MS-Word.
4. Design a birthday invitation to your friends using mail merge in MS- Word.
5. Create an Advertisement, Prepare a Mark Sheet of your class subjects and prepare a Salary Slip of an employee.
6. Prepare a bar chart, pie chart for analysis of Election Results and prepare a generic Bill of a Super Market.
7. Prepare an Attendance sheet of 10 students for any 6 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student & average of attendance.
8. Create a worksheet on Students list of any 4 faculties and perform following database functions on it. (i). Sort data by Name (ii). Filter data by Class (iii). Subtotal of no. of students by Class.
9. Design a presentation learnshow to save it in different format, copying and opening an existing presentation.
10. Design a presentation learns insertion of movie, animation and sound.
11. Design a presentation to demonstrate verbal (sounds, language, and tone of voice).
12. Design a presentation learnsnon-verbal (facial expressions, body language, and posture) .
13. Design a presentation to demonstrate written (journals, emails, blogs, and text messages) .
14. Design a presentation illustrating aural visual (signs, symbols, and pictures**)**



BCA-5107P Lab -II: Desktop Publishing and Designing Lab							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
0	0	2	1	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Course Objectives (COs)

The main objective of this course is to cover practical implementation part of **BCA-5103.**

Total Lab Hours: 40

List of suggested practical:

1. Creating templates/master page for the given layout (setting grid, margin and columns)
2. Importing, linking and saving files for text and graphics.
3. Creating Title page
4. Creating style sheets and Table of Content.
5. Designing Letter head.
6. Designing Leaflet/Pamphlet.
7. Designing Envelop
8. Designing Invitation card / greeting card
9. Designing Bills / Vouchers
10. Designing an Advertisement

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HS-111P Communication Lab							
Teaching Scheme			**Credit**	**Marks Distribution**			**Duration of End Semester Examination**
L	**T**	**P**	**C**	**Internal Assessment**	**End Semester Examination**	**Total**	
0	**0**	**2**	**1**	**Maximum Marks: 40**	**Maximum Marks: 60**	**100**	**3 Hours**
				Minimum Marks: 16	**Minimum Marks: 24**	**40**	

Course Objectives (COs)

The main objective of this course is to cover practical implementation part of **HS-111.**

Unit I
Learning correct pronunciation: Organs of speech, IPA symbols (consonant & vowel sounds), classification of consonants as per place & manner of articulation. finding out the correct pronunciation of words with the help of a dictionary, phonetic transcription of words presented orally, conversion of words presented through IPA symbols into normal orthography, syllable division and stress marking (in words presented in IPA form).Intonation (rising & falling tone).
Unit II
Listening Skills: Listening with a focus on pronunciation (ear-training), stress and intonation; the students will be exposed, to the following varieties of English during listening practice: Standard Indian, British and American. Learning the differences between British & American pronunciation, Listening practice of the dialogues and speeches in British & American English.
Unit III
Speaking Skills: Delivering impromptu speeches, reading aloud of dialogues, poems, excerpts from plays, Situational conversations: Introducing oneself, describing a person, place, situation and event, giving instructions, making inquiries – at a bank, post-office, air-port, hospital, reservation counter etc. Mock interviews and group discussions.
Unit IV
Writing Skills: Identifying common mistakes made by students in written communication and improving them, writing emails: sending and responding to emails, preparing and delivering power -point presentations, answering comprehension, translation practice (Hindi to English & vice-versa).

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BCA-5201 Computer Architecture							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs):The main objective of this course is to provide conceptual as well as practical knowledge about computer system architecture, instruction format and actual data processing inside CPU. After completing the course the student should be able to understand all the components of computer system, as well as the organization of these components inside computersystem, various data processing mechanism used inside CPU.

Unit I	**15 Lectures**
Basic Computer Organization and Design: Instruction Code, Operation Code, Stored Program Concept, Registers and memory of Basic Computer, Common Bus System for Basic Computer, Instruction Format, Control Unit of Basic Computer, Control Timing Signals, Determining Type of Instruction. **Microprogrammed Control:** Control Word, Microprogram, Control Memory,Control Address Register, Sequencer, Address Sequencing, Conditional Branch, Mapping of Instructions	
Unit II	**15 Lectures**
Central Processing Unit: Major Components of CPU, CPU Organization, Instruction Formats, Addressing Modes, Data Transfer and manipulation, Program Control, Subroutine Call and Return, Types of Interrupt, RISC vs CISC, Pros and Cons of RISC and CISC.	
Unit III	**15 Lectures**
Pipelining : Concept and Demonstration with Example, Speedup Equation, Floating Point addition and Subtraction with Pipelining, Instruction Level Pipelining: Instruction Cycle, Three & Four- Segment Instruction Pipeline, Pipeline Conflicts and Solutions. Input-Output Interface: I/O Bus and Interface Modules, I/O vs. Memory Bus, Isolated vs. Memory-Mapped I/O.	
Unit IV	**15 Lectures**
Memory Organization: Memory Hierarchy, Main Memory, RAM and ROM Chips, Memory address Map, Auxiliary Memory. **Associative Memory:** Hardware Organization, Match Logic, Read Operation, Write Operation. **Cache Memory:** Locality of Reference, Hit & Miss Ratio, Mapping.	

Course Learning Outcomes (CLOs)

- The students will be able to learn about digital marketing including topics like SEO, Social media marketing etc.

Suggested Readings

- M. Morris Mano, "Computer System Architecture", Prentice-Hall of India, Pvt. Ltd.Further References.

Further References

- William Stallings, "Computer Organization and Architecture", Prentice-Hall of India.
- Vincent P. Heuring and Harry F. Jordan, "Computer System Design and Architecture", Prentice-Hall of India, Pvt. Ltd.

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BCA-5202 Database Management System							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to provide conceptual as well as practical knowledge of Database, various methodologies and applications software used for data base management. After completing the course the student should be competent in data base handling, able to design and manage database for real life problems and the student should by proficientin query handling.

Unit I	**15 Lectures**
Introduction To Database System : Data - Database Applications - Evolution of DB & DBMS - Need for data management, Introduction and applications of DBMS, File systems versus Database systems, Data Models, DBMS Architecture, Data Independence, Data Modeling using Entity- Relationship Model, Enhanced ER Modeling.	
Unit II	**15 Lectures**
Relational Database Concept: Introduction to relational database, Structure of Relational Database, Relational model terminology domains, Attributes, Tuples, Relations, relational DB schema. **Relational algebra:** Basic operations selection and projection, Set Theoretic operations Union, Intersection, set difference and division. **Types of Database languages:** DDL, DML, DCL, TCL, Oracle: Oracle product details, Structured query language (SQL), Using Oracle.	
Unit III	**15 Lectures**
Relational Database design: Functional Dependency, definition, trivial and nontrivial FD. **Normalization**: 1Nf, 2NF, 3NF, Decomposition using FD dependency preservation, BCNF, Multi valued dependency, 4NF, Join dependency and 5NF.	
Unit IV	**15 Lectures**
Concurrency Control: Definition of concurrency, lost update, dirty read and incorrect summary problems due to concurrency. Concurrency Control Techniques: Overview of Locking, 2PL, Timestamp ordering, Recovery concepts, Shadow paging, system failure, Backup and Recovery Techniques.	

Course Learning Outcomes (CLOs)

- The students will be able to understand the core terms, concepts, and tools of relational database management systems.

Suggested Readings

- Desai, B., "An Introduction to Database Concepts", Galgotia Publications, New Delhi.
- Elimsari and Navathe, "Fundamentals of Database Systems", Addison Wesley, New York.

Further References

- Date C.J., "An Introduction to Database Systems", Narosa Publishing House, New Delhi.
- Ullman, J.D, "Principals of Database Systems", Galgotia Publications, New Delhi.

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BCA-5203 Programming in C							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to provide Understanding of C programming language and trace the execution of programs written in C language. Writing the C code for a given problem and Performing input / output operations using programs in C.

Unit I	**15 Lectures**
Introduction to C Programming: Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C. **C Programming Basic Concepts:** C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants**. Input and output with C**: Formatted I/O functions and Unformatted I/O functions .	
Unit II	**15 Lectures**
C Operators & Expressions: Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively Evaluation of arithmetic expressions; Type conversion.**Control Structures:** Decision making Statements - Simple if, if_else nested if_else, else_if ladder Switch Case, goto, break & continue statements; Looping 12 19 Statements - Entry controlled and exit controlled statements, while, do-while, for loops, Nested loops.	
Unit III	**15 Lectures**
Derived data types in C: Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation Strings: Declaring & Initializing string variables.	
Unit IV	**15 Lectures**
Pointers in C: Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers.**User defined data types** Structures and Unions.	

Course Learning Outcomes (CLOs)

- The students will be able to analyze problems efficiently and develop comprehensive logic to solve it.
- To develop good algorithms and flowcharts to solve problems.

Suggested Readings

- C: The Complete Reference, By Herbert Schildt.
- C Programming Language, By Brain W. Kernighan.
- Kernighan & Ritchie: The C Programming Language (PHI).

Further References

- P. K. Sinha & Priti Sinha: Computer Fundamentals (BPB).
- E. Balaguruswamy: Programming in ANSI C (TMH).
- Kamthane: Programming with ANSI and TURBO C (Pearson Education).

BCA-5204 Fundamentals of Accounting							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
3	1	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The basic objective of the course is to equip the students with the understanding of accounting rules and double entry system. The course is designed so that the students can understand the scientific and preparation of transaction with relevant interpretation. The course also provides students with knowledge on preparation of cash, flow statements and company accounts.

Unit I	**15 Lectures**
Introduction to Accounting: Understanding the meaning, nature, functions and usefulness of accounting, branches of accounting, accounting equation, accounting concepts and Generally Accepted Accounting Principles. An overview of Indian and US GAAP. Introduction to IFRS.	
Unit II	**15 Lectures**
Recording of Transactions: Concept of double entry. Understanding the Accounting cycle. Preparation of voucher, journal, ledger and trial balance and numerical on the same. Subsidiary Books Preparation of subsidiary books including purchase book, sales book, purchase returns book and sales return books and numerical on the same. Cash book, types of cash book and balancing of cashbook. Numerical on single column cashbook, double column cashbook, triple column cashbook and petty cash book.	
Unit III	**15 Lectures**
Financial Statements: Preparation of trading account, manufacturing account, profit and loss account and balance sheet along with adjustments and numerical on the same.	
Unit IV	**15 Lectures**
Company Accounts: Introduction to shares, characteristics and types of shares no numerical on the same. Accounting for debentures: Classification of Debentures. Differentiate Debentures from shares. Numerical on issue of debentures for cash and for consideration other than cash.	

Course Learning Outcomes (CLOs)

- The students will be able to acquire conceptual knowledge of basics of accounting.
- Identify events that need to be recorded in the accounting records.

Suggested Readings

- J.R. Monga, Financial Accounting.
- Jain & Narang, Advanced Accountancy.

Further References

- R.L Gupta & M. Radhaswamy, Advanced Accountancy.
- Sultan Chand & Sons S.N. Maheshwari, Advanced Accountancy.

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BCA-5205 Digital Empowerment							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
2	0	0	2	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

This course is designed to uunderstands the digital world and need for digital empowerment. It provides awareness about Digital India. It explores, communicate, and collaborate in cyberspace and imparting awareness on cyber safety and security.

Unit I	**08 Lectures**
Digital inclusion and Digital Empowerment: Needs and challenges, Vision of Digital India: DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services), e-Health Campaigns, Public utility portals of Govt. of India such as RTI, Health, Finance, Income Tax filing,Education.	
Unit II	**08 Lectures**
Communication and Collaboration in the Cyberspace: Electronic Communication, electronic mail, blogs, social media, Collaborative Digital platforms, Tools/platforms for online learning, Collaboration using file sharing, messaging, video conferencing.	
Unit III	**08 Lectures**
Towards Safe and Secure Cyberspace: Online security and privacy, Threats in the digital world: Data breach and Cyber Attacks, Blockchain Technology, Security Initiatives by the Govt of India.	
Unit IV	**08 Lectures**
Ethical Issues in Digital World: Netiquettes, Ethics in digital communication, Ethics inCyberspace.	

Course Learning Outcomes (CLOs)

- The students will be able to use ICT and digital services in daily life.
- Develop skills to communicate and collaborate in cyberspace using social platforms, teaching/learning tools.

Suggested Readings

- K. S. Vijaya Sekhar, G. P. Sahu, Prabhu Gollamudi, Digital Empowerment A Cornerstone For eGovernance, BS Publication.
- Arpan Kumar Kar, Shuchi Sinha, M. P. Gupta, Digital India: Reflections and Practice, Springer Publication.

Further References

- Dr. S. Saileela and Dr. S. Kalaivani, Education on Digital Cultural and Social Media.

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BCA-5206 Advance Spreadsheet Tools							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
2	0	0	2	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

This course is designed to develop students IT skills that are a pre-requisite today's work environment. The Objective of this course is to Make meaningful representations of data in the form of charts and pivot tables. It provides understanding Draw analysis on data using spreadsheets and use interpretation to make decisions and manage data for generating queries, forms and reports in a database.

Unit I	08 Lectures
Spreadsheet Calculations: Introduction to the range, absolute and relative references, formulas and functions, calculation across sheets. **Data Analysis:** find and replace functions, text functions, filtering, sorting conditional formatting. **Spreadsheet Printing:** introduction, print preview and adjustments, orientation, margins and scale, headers and footers	
Unit II	**08 Lectures**
Charts and Graphs: basic chart types, move and resize charts, change chart styles and types, Modification chart elements. **Elementary Modelling:** IF statement analysis, nested if, COUNTIF and COUNTIFS, SUMIF and SUMIFS, AVERAGEIF and AVERAGEIFS. **Lookup Functions:** Vlookup, Hlookup, Index and match function.	
Unit III	**08 Lectures**
Pivot Table and its Applications: introduction to pivot table, filter data using slicers in multiple pivot table, visualize aggregate data using pivot table. **VBA Macros programming:** create and record a macro in a spreadsheet, Msgbox, declaring variables, writing a subroutine and function in VBA. IF Then statement, Case statement, For loop, While loop and Do until, worksheet and range object.	
Unit IV	**08 Lectures**
Sensitivity Analysis: goal seek, data table, scenario Analysis. Simulation and Optimization: Monte Carlo simulations, introduction to solver, linear programming for optimization, Intrinsic value calculation models.	

Course Learning Outcomes (CLOs)

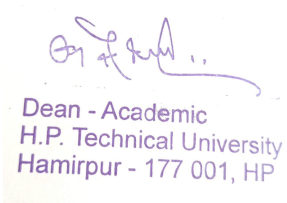
- The students will be able to make meaningful representations of data in the form of charts and pivot tables.
- Draw analysis on data using spreadsheets and use interpretation to make decisions.
- Generate word documents with appropriate formatting, layout, proofing.
- Manage data for generating queries, forms, and reports in a database.

Suggested Readings

- Microsoft Excel 2016 Data Analysis and Business Modeling Wayne L.Winston,PHI.
- Microsoft Excel 2016 Bible, John Walkenbach, Wile.

Further References

- Microsoft Office 2013 Digital Classroom by Walter Holland and the AGI Creative Team, Wiley.
- Access 2010 Bible, Michael R. Groh, Wiley India Edition.



HS-112 Universal Human Values and Awareness about Himachal Pradesh							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
3	0	0	3	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is, to aware the students about human values and professional ethics and also aware them about their various social and professional responsibilities. After completing the course the student should be aware about their social and professional responsibilities towards, self, society and nature.

Unit I	**09 Lectures**
Introduction to Value Education: Difference between moral and human values. Five core human values: Truth, Righteous conduct, Peace, Love and Non-violence. Classification of moral values, Value crisis in contemporary Indian society at different levels: Individual, family, Society, and culture. Values in Indian constitution: Justice, liberty, equality and fraternity, Fundamental Rights under Indian constitution: Fundamental duties of Indian citizens.	
Unit II	**09 Lectures**
Harmony with the self, family & society: Understanding Human being as the Coexistence of the Self and the Body, Program to ensure the health of the body Distinguishing between the Needs of the Self and the Body, living in harmony with the self, family & society, steps to achieve self-discipline. Noble Eightfold Path: Right Understanding, Thought, Speech, Action, Livelihood, Effort,Mindfulness, and Concentration.	
Unit III	**09 Lectures**
Understanding Mental health & emotional well-being: Characteristics of a mentally healthy person, causes of mental-health issues in contemporary society, possible solutions to improve mental health. Emotional intelligence: elements of emotional intelligence, Advantages of higher emotional intelligence & improving emotional intelligence, Maslow's hierarchy of needs & self-actualization.	
Unit IV	**09 Lectures**
Awareness about Himachal Pradesh: General knowledge including the knowledge of different places of historic, national and cultural importance & tourist attraction, hydro power projects, industries, highways, educational and other institutions of the state, knowledge about the famous personalities from the state, currents affairs of Himachal Pradesh, history of Himachal- from medieval to present time, Geographyincluding the weather, borders, rivers, mountain-ranges , passes, peaks , knowledge of customs and culture of HP : including the costumes, customs, fairs and festivals etc.	

Course Learning Outcomes (CLOs)

- Understand the significance of value inputs in a classroom and start applying them in their life and profession.
- Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual etc..

Suggested Readings

- The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
- Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.

Further References

- M. Govindarajan, S. Senthikumar, M.S. Natarajany, "Professional Ethics and Human Values", PHI.

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BCA-5207P Lab -IV: DBMS Lab							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
0	0	2	1	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Course Objectives(COs): The main objective of this course is to cover practical implementation part of **BCA-5202.**

Total Lab Hours: 40(Max)

Suggested List of Practical Topics:

1. Data Definition Language

(a). Create *(b).* Alter *(c).* Drop

2. Data Manipulation Language

(a). Insert (b). Select (c). Delete (d). Update

3. Clauses

(a). Where *(b).* Having *(c).* Order By *(d).* Group By *(e).* Exists *(f).* In (*g).* Not *in (h).* Any

4. Arithmetic and Aggregate Operators

5. Sub queries

6. Data Control Language

7. Transaction Control Language

8. Views & Triggers

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BCA-5208P Lab -IV: Programming in C Lab							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
0	0	2	1	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Course Objectives(COs): The main objective of this course is to cover practical implementation part of **BCA-5203**.

Total Lab Hours: 40 (Max)

Suggested List of Practical Topics:

1. Data Types, Input/output Functions
2. Formatted input/ Output function
3. Unformatted Input/Output functions
4. C Operators
5. C Expressions
6. Control structures
7. Arrays
8. Strings
9. Pointers
10. Structure and Union

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HS-122P Holistic Health and Yoga							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
0	0	2	1	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Course Objectives(COs):

Total Lab Hours: 40 (Max)

Suggested List Of Practical Topics:

1. Introduction of Yoga, Different Definitions of Yoga. General Guidelines for Yogic Practices
2. Traditional Schools of Yoga: Bhakti yoga, karma yoga, Gyana yoga, Hatha yoga, Mantra yoga, Laya yoga, Raja yoga) Ashtanga Yoga of Sage Patanjali.
3. Concept of Shatkriyas: Dhauti, Basti, Neti, Nauli, Trataka and Kapalbhati. Shatkriyas (Cleansing Process): Jala neti, Sutra neti. Kunjala, Vastra Dhauti, Danda Dhauti, kapalbhati, Surya namaskar.
4. Concept of Surya namaskar: Introduction, Technique, benefit, precaution.
5. Concept of Asanas Introduction, Types, Technique, benefit, precaution, Asanas: Standing Poses: Tadasana, Kati chakrasana, tiryak tadasana, vrikshasana, veer bhadrasana, garudasana, trikonsana, Sitting Poses: Padmasana, Swastikasana, Vajrasana, Bhadrasana, Gomukhasana, Mandukasana, Singhasana.
6. Concept of Pranayama: Introduction, Types, Technique, benefit, precaution.
7. Meditation: Concept, technique, benefit, and precaution. Dhyana: Sthoola Dhyana, Jyoti Dhyana, Sukshama Dhyana, (According to Gheranda Samhita). Mantra Chanting- Omkar (Pranav Jaap), Gayatri Mantra, Maha Mrityunjaya Mantra, Shanti Mantr.
8. Lying Down Poses: Spine Position: uttanpadasana, Pawan muktasana, Naukasana, markatasana, halasana, sarvangasana, matsyasana, setubandhasana, chakarasana and shavasana. Prone Position: Bhujangasana, Shalabhasana, Dhanurasana, Vipreet naukasana.

Suggested Readings

- BKS Iyengar (2012), Light on Yoga
- Basvaraddi & S.P.Pathak (2016), Yogic Suksham Vyayam Evem Sthula
- Vyayam Swami Satyananda Saraswati (2012), Asana Pranayama Mudra
- Modern Trends and Physical Education by Prof. Ajmer Singh.

BCA-5209 Training/Internship Report and Viva							
Teaching Scheme			Credits	Marks			Duration of End Semester Examination
L	T	P	C	Sessional	End Semester Exam	Total	
0	0	2 Months	6	40	60	100	3 Hours

Instructions: For External Examiner: 60% marks (60 marks) will be awarded based on practical implementation and Internship Report in final practical examination and remaining 40% marks (40 marks) will be awarded based on viva-voce and written script.

BCA-5210 MOOC/NPTEL/Swayam Certification/Online Certification							
Teaching Scheme			Credits	Marks			Duration of End Semester Examination
L	T	P	C	Sessional	End Semester Exam	Total	
0	0	2 Months	4	40	60	100	3 Hours

Instructions: For External Examiner: 60% marks (60 marks) will be awarded based on practical implementation and Internship Report in final practical examination and remaining 40% marks (40 marks) will be awarded based on viva-voce and written script.

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BCA-5210(A) Basic of IT							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to introduce the components of computers. To introduce basic concepts of software. To introduce the general structure of the CPU. To introduce the elementary concepts of word processing, Excel and Power Point Presentation.

Unit I	15 Lectures
Introduction to Computer: Computer Characteristics, Concept of Hardware, Software , Evolution of computer and Generations, Type of Computer – Analog and Digital computers, HybridComputers, General Purpose and Special Purpose Computer, Limitations of Computer Application of Computer in Various Fields.**Structure and Working of Computer:** Functional Block Diagram o f Computer. CPU, ALU,Memory Unit, Bus Structure of Digital Computer – Address, Data and Control Bus.	
Unit II	**15 Lectures**
Input/Output Devices: Input Device – Keyboard, Mouse, Scanner, MICR, OMR. Output Devices– VDU, Printers – Dot Matrix, Daisy-wheel, Inkjet, Laser, Line Printers and Plotters.**Computer Memory**: Memory Concept, Memory Cell, Memory Organization, Semiconducto Memory – RAM, ROM, PROM, EPROM, Secondary Storage Devices – Magnetic Tape, Magnetic Disk (Floppy Disk and Hard Disk.), Compact Disk.	
Unit III	**15 Lectures**
Computer Language and Software: Algorithm, Flowcharts, Machine Language, Assembly Language, High Level Language Assembler, Compiler, Interpreter. Characteristics of Good Language. Software- System and Application Software.**Operating System** Operating System, Evolution of Operating System. Functions of Operating System. Types of Operating Systems. Detailed Study of Windows Operating System. Introduction and Features of LINUX OS.	
Unit IV	**15 Lectures**
Networking: Concept, Basic Elements of a Communication System, Data Transmission Media, Topologies, LAN, MAN, WAN Internet **MS Office:** Introduction to MS Office, Components and Features.**MS Word:** Creating Letter, Table, Fonts, Page Layou Document,Formatting, Spell Check, Print Preview, Template, Color, Mail Merge, Auto Text, Inserting Picture, Word Art. **MS Excel** Introduction to Excel, Sorting, Queries, Graphs, Scientific Functions.**PowerPoint:** Introduction to PowerPoint, Creation of Slides Inserting Pictures, Preparing Slide Show with Animation.**MS Access:** Creation and Manipulation of Files.	

Course Learning Outcomes (CLOs)

- The students will be able to learn about the fundamentals of computers. Explain the working of the CPU and other components of the motherboard.

Suggested Readings

- Computer fundamentals by P. K. Sinha, BPB Publication.
- MS –Office, Dr. S. S. Srivastava, Publised by Laxmi Publication.

Further References

- Computer fundamentals and Programming in C,Reema Thareja,OXFORD University Press.
- Office 2019: In Easy Step, Michal Price, BPB Publication.

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BCA-5210(B) Essential of Python							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to provide conceptual as well as practical knowledge of Python. After completing the course, the student can develop web solution software for real life problems.

Unit I	**15 Lectures**
Python Concepts: Origin, Comparions, Comments, Variables and Assignment. Identifier, Operators, Built-in- functions, Number and Strings. Sequence: Strings, String –operator and functions, Special features of strings, Memory management, Program and examples.**Conditional and Loops**: If Statement, else Statement, else –if Statement, while Statement, for Statement, break Statement, continue Statement, pass Statement, else Statement.	
Unit II	**15 Lectures**
Object and Classes: Classes in Python, Principles of object orientation, Creating classes, Instance Methods, Class Variables, Inheritance, Polymorphism, Type identification, Python Libraries.	
Unit III	**15 Lectures**
Lists and Sets: Built-in-functions, list type built-in-methods, Tuples, Tuple operators, special features of Tuples. **Set**: Introduction, accessing, built-in-methods (add,update,clear,copy,discard,remove)**,** Operations(Union,Intersection,Difference)**. Dictionaries:** Introduction, built-in functions, built-in methods, Dictionary keys,sorting and looping, nested dictionaries.	
Unit IV	**15 Lectures**
Files: Fileobjects, File built-in function, File built-in methods, File built-in attributes. Standard files, command line arguments, file system, file execution, persistent storage module.**Exceptions:** Exceptions in python, detecting & handling, Exception as a string, raising an Exceptions, assertions, standard Exceptions.**Database Interaction:** SQL database connection using python, creating & searching tables, reading & sorting Config. information on database. Programming using database connection.	

Course Learning Outcomes (CLOs)

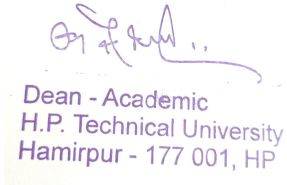
- The students will be able toCreate your first program in Python IDLE
- Implement OOPs concepts in your programming.
- Use Arrays, and Data structures. Create an application with the support of graphics in Python.

Suggested Readings

- James Payne, "Beginning Python Using python 2.6 and Python 3.1 ", Wiley Publication
- "Learning Python", 5th edition, O'Reilly Publication.

Further References

- Paul Berry,2011, "Headfirst Python". O'REILLY Media, Inc
- Jeeva Jose and P. Sojan Lal, "Introduction to Computing and Problem Solving with Python".



BCA--5210(C) PC Hardware & Networking							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P	C	Internal Assessment	End Semester Examination	Total	
4	0	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A,B,C and D will have 2 questions of 10 marks each and Section E has short answer type questions consisting of ten parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A,B,C,D and the complusory question from section E. In the question paper, the questions avialable in sections A.B,C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus.

Course Objectives (COs)

The main objective of this course is to understand about introduction of computer and Basic Networking concepts. Introduction to various networking devices. Network basic and configuration. Introduction to servers and network security.

Unit I	15 Lectures
Introduction about Computer. Basics of computer. Organization of computer. Software and hardware. Input/output devices**. Basic networking concepts** Network topologies: LAN, WAN, MAN, PAN, CAN. Networking Model. The OSI model, TCP/ IP Model, Network adapters**. Introducing protocols**. Cabling and troubleshooting.	
Unit II	**15 Lectures**
Introduction to various networking devices: Routers, Switches, Modems, Hubs etc. Wired and Wireless technology. Inside the PC: Opening the PC and identification. Study of different blocks, Assembling and disassembling.	
Unit III	**15 Lectures**
Network basic and configuration: Setting IP addresses, Sharing files and folders. Network troubleshooting. PING test, ipconfig. **Introduction to servers and network** security, Types **of servers**: Files servers, Email Servers, Proxy servers.	
Unit IV	**15 Lectures**
Basics of Internet and Intranet: Types of Internet connections, Dialup, Broadband, Leased Line, Wi-Fi, Wi-Max, 2G, 3G, 4G, WWW, E-mails, Search Engines, Social Networking. Cloud application. Audio-video Conferencing. Voice over Internet Protocol (VOIP). Recovery and backup. Essential security measures.	

Course Learning Outcomes (CLOs)

- The student will be able to know the Basic of Computer assembling and trouble shooting.
- Have brief knowledge of Computer networking and trouble shooting.

Suggested Readings

- Windows XP Complete Reference. BPB Publications.
- MS Office XP Complete BPB Publication.
- MS Windows XP Home Edition Complete, BPB publication.

Further References

- I.T .Tools and Applications, by A. Mansoor, Pragya Publications, Matura.

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Model Question Papers

[Total No. of Questions = 9] **[Total No. Pages =1]**

BCA 2nd Semester Examination

Computer Architecture

BCA- 5201

Time: 3 Hours **Max.Marks:60**

The candidates shall limit their answer precisely within the answer book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note: Attempt 5 questions in all. Question no.9 in section E is compulsory. Rest attempt oneeach from section A, B, C and D.

SECTION-A

Q1. (a) Why NAND and NOR gates are called universal gates?
(b) Distinguish between 1's and 2's complements. **(5x2=10)**

or

Q2. (a) What is multiplexer? Explain 4-to-1 multiplexer.
(b) What is Error-Detecting codes? **(5x2=10)**

SECTION-B

Q3. Write short note on:
(a)Memory Reference Instructions.
(b)Instruction Cycle. **(5x2=10)**

or

Q4. (a) What is a bus? Explain various types of buses.
(b) Differentiate between hardwired control and microprogrammed control. **(5x2=10)**

SECTION-C

Q5. What is Instruction Pipeline? Explain in detail. **(10)**

or

Q6. Explain the following:
a) Addressing modes.
b) Parallel Processing **(5x2=10)**

SECTION-D

Q7. (a) What is handshaking mode of data transfer?
(b) What is Associative Memory? Explain in detail. **(5x2=10)**

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or

Q8. (a) Differentiate between Cache Memory and Virtual Memory.
(b) What is DMA? **(5x2=10)**

SECTION-E

Q9. Explain the following:

(a) What do you mean by flip-flop?
(b) Define the truth table.
(c) Assembler
(d) CISC
(e) Associative mapping
(f) Priority interrupt
(g) Memory Bus
(h) Cache Memory
(i) Locality of Reference
(j) Hit and Miss Ratio **(10x2=20)**