DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY

UTTAR PRADESH, LUCKNOW

EVALUATION SCHEME & SYLLABUS
(*Second Year*)

for

Bachelor of Computer Applications
BCA

(Under Graduate Three-Year Course in Computer Application)

As per
National Education Policy 2020
(Effective from the Session: 2025-26)

BCA Second Year Evaluation Scheme, 2025-26

SEMESTER-III

S. No.	Subject Code	Subject Name	Periods			Sessional			ESE	Total	Credit
			L	T	P	CT	TA	Total			
1.	BBC301	Object Oriented Programming in C++	3	1	0	20	10	30	70	100	4
2.	BBC302	Web Technology	3	1	0	20	10	30	70	100	4
3.	BBC303	Business Communication	3	0	0	20	10	30	70	100	3
4.	BBC304	Computer Organization	3	1	0	20	10	30	70	100	4
5.	BVE301	Universal Human Values and Professional Ethics	2	1	0	20	10	30	70	100	3
6.	BBC351	Object Oriented Programming in C++ Lab	0	0	3	30	20	50	50	100	2
7.	BBC352	Web Technology Lab	0	0	3	30	20	50	50	100	2
		Total	14	4	6			250	450	700	22

CT: Class Test **TA**: Teacher Assessment   **L/T/P**: Lecture/ Tutorial/ Practical

SEMESTER-IV

S. No.	Subject Code	Subject Name	Periods			Sessional			ESE	Total	Credit
			L	T	P	CT	TA	Total			
1.	BBC401	Java Programming	3	1	0	20	10	30	70	100	4
2.	BBC402	DBMS	3	1	0	20	10	30	70	100	4
3.	BBC403	Operating Systems	3	1	0	20	10	30	70	100	4
4.	BBC404	Technical Communication	3	0	0	20	10	30	70	100	3
5.	BBC405	Indian Tradition, Culture And Society	3	0	0	20	10	30	70	100	3
6.	BBC451	Java Programming Lab	0	0	3	30	20	50	50	100	2
7.	BBC452	DBMS Lab	0	0	3	30	20	50	50	100	2
8.	BVA451	Sports and Yoga*	0	0	3		100	100			0
		Total	15	3	9					700	22

CT: Class Test **TA**: Teacher Assessment   **L/T/P**: Lecture/ Tutorial/ Practical

* Non-credit Course

Note: The Startup and Entrepreneurial Activity Assessment will be done in the VI semester, under which a student will have to undergo a startup/entrepreneurship activity of at least 60 hours till the V semester.

BCA

SECOND YEAR SYLLABUS

SEMESTER-III

BBC301: OBJECT ORIENTED PROGRAMMING IN C++	
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to	
CO 1 List the significance, key features and principles of object-oriented programming.	K2
CO 2 Analyze basic structural, behavioral and architectural models using object oriented software engineering approach.	K4
CO 3 Illustrate object-oriented modeling techniques for analysis.	K3
CO 4 Use the basic features of data abstraction and encapsulation, constructors, destructors in C++ programs.	K3
CO 5 Utilize templates and file handling mechanisms effectively.	K3

DETAILED SYLLABUS		3-1-0
Unit	**Topic**	**Proposed Lecture**
I	Introduction: Introducing Object – Oriented Approach, Relating to other paradigms (functional and data decomposition). Basic concepts: Class, Object, Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++, cin, cout, new, delete, operators.	08
II	Classes and Objects: Encapsulation, Information hiding, Abstract data types, Object & classes, Attributes, Methods, C++ class declaration, State identity and behavior of an object, Constructors and destructors, Instantiation of objects, Default parameter value, object types, C++ garbage collection, Dynamic memory allocation, Meta class / Abstract classes.	08
III	Inheritance and Polymorphism: Inheritance, Class hierarchy, Derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric Polymorphism.	08
IV	Generic Programming: Introduction to Generic Programming, Class Templates, Class templates with multiple parameters, Template function, Function template with multiple parameters, Overloading of Template functions, Standard Template Library.	08
V	**Streams, Files and Exception Handling:** Overview of Stream Class Hierarchy, Streams classes, Stream Errors, Disk File I/O with streams, file pointers, Exception handling mechanism, Error handling in file I/O with member function, Multiple catch statements.	08
Suggested Readings: 1. Venugopal A.R., Rajkumar, Ravishanker T., "Mastering C++", TMH. 2. Lippman S.B. and Lajoie J., "C++ Primer", Addison Wesley. 3. Lafore R., "Object Oriented Programming using C++", Galgotia Publications. 4. Balagurusamy E., "Object Oriented Programming with C++", TMH 5. Salaria R.S., "Mastering Object-Oriented Programming with C++", Khanna Publishing House		

6. Sehlidt H., "The Complete Reference C++", TMH.
7. Gottfried B. S., "Schaum's Outline of Programming with C++", TMH.
8. Stanley B. Lippman and Lajoie J., "C++ Primer", Pearson Education.
9. Stroustrup B., "The C++ Programming Language", Pearson Education.

BBC302: WEB TECHNOLOGY	
Course Outcome (CO)	**KL**
At the end of course, the student will be able to	
CO 1	Apply the knowledge of HTML and DHTML to develop web application.	K3
CO 2	Understand and apply the elements of Creating Style Sheet (CSS) , Bootstrap	K3
CO 3	Understand, analyze and apply the role of JavaScript in the workings of the web and web applications, Understand XML.	K3
CO 4	Apply and build dynamic web applications using servlet and JSP.	K3
CO 5	Develop Spring-based Java applications using Java configuration, annotation-based configuration, beans and their scopes, and properties, Develop web application using Spring Boot.	K3
DETAILED SYLLABUS	**3-1-0**

Unit	Topic	Lecture
I	**Web Page Designing:** Introduction and Web Development Strategies, History of Web and Internet, Protocols Governing Web, HTML-Introduction, HTML Tags, HTML-Grouping Using Div & Span, HTML-Lists, HTML-Images, HTML- Hyperlink, HTML Table, HTML- Iframe, HTML-Form, Dynamic HTML, Document Object Model, Features of DHTML, DHTML Events	**08**
II	**CSS:** Creating Style Sheet, CSS Properties , CSS Styling , Working with block elements and objects, Working with Lists and Tables , CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties), CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), Introduction to Bootstrap	**08**
III	**Java Script and XML:** Introduction to JavaScript, Creating Variables in JavaScript, Creating Functions in JavaScript, UI Events, Returning Data from Functions, Working with Conditions, looping in JavaScript, Block Scope Variables, Working with Objects, Creating Object using Object Literals, Manipulating DOM Elements with JavaScript , Introduction to XML, Defining XML tags	**08**
IV	**Web Application development using JSP & Servlets:** Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with Http Session. Java Server Pages (JSP) , Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries	**08**
V	**Spring & Spring Boot:** Spring Core Basics-Spring Dependency Injection concepts, Introduction to Design patterns, Factory Design Pattern, Strategy Design pattern, Spring Inversion of Control, AOP, Bean Scopes Singleton, Prototype, Request, Session, Application, Spring Boot Configuration, Spring Boot Annotations, Spring Boot Actuator, Spring Boot Build Systems, Spring Boot Code Structures	**08**

Suggested Readings:

1. Burdman J., "Collaborative Web Development – Strategies and Best practices for Web Teams", Addison-Wesley.

2. Xavier C, "Web Technology & Design", New Age International Publishers.

3. Bayross I., "Web Technologies", BPB Publications.

4. Schieldth H., "The Complete Reference – HTML & CSS", McGraw Hill.

5. Bergsten H., "Java Server Pages", SPD O' Reilly.

6. Walls C., "Spring Boot in Action", Manning Publications.

7. Bakliwal S., "Hands-on Application Development using Spring Boot", BPB Publications

BBC303: BUSINESS COMMUNICATION		
	Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to		
CO 1	Understand business communication strategies and principles for effective communication in domestic and international business situations.	**K2**
CO 2	Understand and appropriately apply modes of expression, i.e., descriptive, expositive, narrative, scientific, and self-expressive, in written, visual, and oral communication.	**K3**
CO 3	Develop the ability to research and write a documented paper and/or to give an oral presentation.	**K3**
CO 4	Develop the ability to communicate via electronic mail, Internet, and other technologies for presenting business messages.	**K3**
CO 5	Understand and apply basic principles of critical thinking, problem solving, and technical proficiency in the development of exposition and argument.	**K3**
DETAILED SYLLABUS		**3-0-0**
Unit	**Topic**	**Proposed Lecture**
I	**Basic Principles of Communication:** Introduction, Role of communication, defining and classifying communication, process of communication, importance of communication in management, communication in the workplace, barriers to communication.	**08**
II	**Oral Communication:** What is oral Communication, principles of successful oral communication, non – verbal communication, Written communication: –characteristics of verbal & non-verbal communication.	**08**
III	**Business Correspondence:** Business letter writing, reports, Parts of a report, Business Letter Layout-Full Block, Modified Block, Semi-Block Principles of Effective Letter Writing. Statement of purpose Job Application Letter and Resume, Paragraph writing.	**08**
IV	**Presentation Skill and Group Communication:** Principles of effective presentation; Making effective presentation; Listening skills; Group discussion, Interview preparation, conducting meeting, Drafting Notice, Agenda and resolution, Public Relations.	**08**
V	**Language and Writing Skills:** Letter of Complaints, Sales Letters, Adjustments letter, Consumer Grievance Letters. **Reports:** Layout, Types and parts of a report: Feasibility reports, Investigative reports,	**08**

Suggested Readings:
1. Chaturvedi P.D., "The Art and Science of Business Communication", Pearson.
2. Chhabra T. N., "Business Communication", Sun India Publications.
3. Bovee & Thill, "Business Communication Essentials A Skill–Based Approach to Vital Business", English Pearson.
4. Kumar K. & Salaria R.S., "Effective Communication Skills", Khanna Publishing House.
5. Bisen & Priya, "Business Communication", New Age International Publication.
6. Kalkar S. and Gupta S., "Business Communication" Orient Blackswan.
7. Bhatia V., "Business Communications", Khanna Publishing House.

BBC304: COMPUTER ORGANIZATION		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to		
CO 1	Describe functional units of digital system and explain how arithmetic and logical operations are performed by computers.	K$_2$
CO 2	Describe the operations of control unit and write sequence of instructions for carrying out simple operation.	K$_2$
CO 3	Describe various types of processor organization and addressing modes.	K$_2$
CO 4	Describe the various modes in which IO devices communicate with CPU and memory.	K$_2$
CO 5	Design various types of memory and its organization.	K$_3$
DETAILED SYLLABUS		**3-1-0**
Unit	**Topic**	**Proposed Lecture**
I	Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Arithmetic Logic, Shift Microoperation, Arithmetic Logic Shift Unit, Design of Fast adders, Arithmetic Algorithms (addition, subtraction, Booth Multiplication).	**08**
II	**Control Design:** Hardwired & Micro Programmed (Control UNIT)-Fundamental Concepts (Register Transfers, performing of arithmetic or logical operations, fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Hardwired Control, Micro programmed control(Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction).	**08**
III	**Processor Design:** Processor Organization- General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer.	**08**
IV	**Input-Output Organization:** I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Direct Memory access, Input-Output processor, Serial Communication.	**08**
V	**Memory Organization:** Memory Hierarchy, Main Memory (RAM and ROM Chips), Auxiliary memory, Cache memory, Virtual Memory, Memory management hardware.	**08**
Suggested Readings:		

Suggested Readings:
1. Mano M., "Computer System Architecture", Pearson.
2. Hamacher C., Vranesic Z. and Zaky S., "Computer Organization", Tata McGraw Hill.
3. Tanenbaum A. S., "Structured Computer Organization", Pearson Education.
4. Stallings W., "Computer Organization and Architecture", Pearson Education.
5. Hayes J. P., "Computer Architecture and Organization", McGraw Hill.

BVE301: UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS		
Objectives:		
1. To help students distinguish between values and skills, and understand the need, basic guidelines, content, and process of value education.		
2. To help students initiate a process of dialog within themselves to know what they really want to be in their life and profession		
3. To help students understand the meaning of happiness and prosperity for a human being.		
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.		
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life		
	Course Outcome (CO)	**Blooms Knowledge Level**
At the end of course, the student will be able to		
CO1	Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content, and process of value education, explore the meaning of happiness and prosperity, and do a correct appraisal of the current scenario in the society	K_2
CO2	Distinguish between the Self and the Body, and understand the meaning of Harmony in the Self and the Co-existence of Self and Body.	K_2
CO3	Understand the value of harmonious relationships based on trust, respect, and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society.	K_2
CO4	Understand the harmony in nature and existence, and workout their mutually fulfilling participation in nature.	K_2
CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.	K_2
DETAILED SYLLABUS		**2-1-0**
Unit	**Topic**	**Proposed Lecture**
I	**Introduction:** Understanding the need, basic guidelines, content, and process for Value Education, Self- Exploration–what is it? - its content and process; 'Natural Acceptance 'and Experiential Validation –as the mechanism for self-exploration, Continuous Happiness, and Prosperity-A look at basic Human Aspirations, Right understanding, Relationship, and Physical Facilities-the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels.	**08**
II	**Understanding Harmony in the Human Being:** Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha, Understanding the Body as an instrument of 'I' (I being the doer, seer, and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, the meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.	**08**

III	**Understanding Harmony in the Family and Society:** Harmony in Human-Human Relationship Understanding harmony in the Family-the basic unit of human interaction, Understanding values in the human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect(Samman) as the foundational values of relationship, Understanding the meaning of Vishwas; Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in a relationship, Understanding the harmony in the society (society being an extension of the family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society-Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) – from family to world family!.	**08**
IV	**Understanding Harmony in the Nature and Existence:** Whole existence as Co-existence Understanding the harmony in Nature, Inter connectedness, and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all- pervasive space, Holistic perception of harmony at all levels of existence.	**08**
V	**Implications of Holistic Understanding of Harmony on Professional Ethics:** Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies, and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for the transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b)At the level of society: as mutually enriching institutions and organizations.	**08**

Text Book

1. R. R Gaur, R. Asthana, G. P Bagaria, 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics. ISBN 978-93-87034-47-1, Excel Books, New Delhi.

References

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991 4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers.

8. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
9. E G Seebauer& Robert L. Berry, 2000, Fundamentals of Ethics for Scientists &Engineers, Oxford University Press
10. M Govindrajran, S Natrajan& V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

Mode of Evaluation:

Based on participation of student in classroom discussions/Self-assessment/Peer assessment/Assignments/ Seminar/Continuous Assessment Test/Semester End Exam Socially relevant project/Group Activities/Assignments may be given importance in this course

Guidelines and Content for Practice Sessions

After every two lectures, there will be a one/two-hour practice session. This is meant to provide an opportunity to the students for carrying out self-exploration on the salient propositions made during the lectures. It is to clarify the concepts being introduced and connect them to their everyday life. Further it will also be utilized to make them evaluate their propensities and preconditionings vis-à-vis their 'natural acceptance' using examples and issues relevant to them in their day-to-day life situations. Keeping this objective in mind, the following exercises are being proposed for the practice sessions. These are sequentially arranged according to the lecture material. With each of these exercises, the expected outcome is also indicated to facilitate the teacher.

In the text-book, a larger set of practice exercises for self-exploration are given after each chapter, particularly in part 2, of test your understanding. A list of such exercises and the experiences of some of the students and teachers who have done these exercises is also available on the web-site. The teacher may select exercises from this set as well as develop appropriate exercises on their own. Ultimately, it is the teacher who has to use his/ her own creativity to make the best use of these sessions to guide the students towards the expected outcome.

Practice Sessions for Module 1 – Introduction to Value Education

PS 1

Introduce yourself in detail:
- Share about yourself, your family and your friends.
- Share salient achievements and failures in your life.
- Share how do you presently differentiate between right and wrong.
- Share your aspirations from life. Share what a fulfilling life means for you. For this, you may list out the top five points that occur to you when you think of a fulfilling life. While making the list, please consider your entire life, not just the present stage of your life (youth, middle age, old age, etc.). How do you expect to fulfil these aspirations and live a life of fulfillment?
- What are your observations and conclusions from your life experiences so far?

Expected Outcome: The students start exploring themselves; get comfortable with each other and with the

teacher and start appreciating the need and relevance of the course.

PS 2

1. Watch the video "Story of Stuff". It is a documentary about the materials economy – its motivation, process and outcome. It has been produced by a set of concerned people at storyofstuff.org, USA
(Source: http://storyofstuff.org/movies/story-of-stuff/).
Discuss a. The activities and efforts made by the people shown in the video

a) The outcomes of these efforts
b) How their activities are motivated by their notion of happiness (physical facility = happiness. More shopping, physical facility = more happiness)? Is this and any other notions of happiness their own notions or they are programmed by advertisements, others? Does this notion seem to be true or is it getting the people into the loop of more and more physical facility only?
c) Do reflect on your own notion of happiness – is it your own notion or is it borrowed from others?

2. Make a list of your desires. Now for each item on the list, find out what would be necessary to fulfil it, i.e. will it require:

a) Right understanding?
b) Relationship (right feeling)?
c) Physical facility?

Desire Fulfilled by

	Right understanding	Fulfilment in relationship	Physical facility
Good health	?	?	Yes (food etc.)
Lots of friends	?	Yes	?
Other desires… (we have just put some examples above to start your list)			
Your priority	1, 2 or 3?	1, 2 or 3?	1, 2 or 3?

If it requires more than one of these, mark which one is the higher priority. Explain your conclusion from this exercise.

- Can all your aspirations be fulfilled just by physical facility?
- Is right understanding required for the fulfilment of none, some or all of your aspirations?
- Is relationship required for the fulfilment of none, some or all of your aspirations?
- Can one be substituted for the other (e.g. can right understanding be substituted by physical facility). If they are distinct things, what are their key characteristics (or what are the key differences between right understanding, relationship and physical facility)?
- What is the priority order of these three?
- In your education, should all three be included? To put it another way, should your education be only about skills or should it be about skills that are guided by human values?
- The problems that you see around you – are they more due to lack of physical facility or more due to lack of right understanding and right feeling?

Keep this list handy, because we intend to use the same list in future practice sessions as well.

Expected Outcome: The students start finding that right understanding is the basic need of human being; followed by relationship and physical facility. Understanding about all these three needs to be included in education. In fact, technical education without inculcation of human values can generate more problems than solutions. They appreciate the need to understand happiness and make a programme for it. They also start feeling that lack of understanding of human values is the root cause of all problems and the sustained solution could emerge only through understanding of human values and value-based living.

PS3

1. Observe that you have the faculty of 'Natural Acceptance', based on which you can verify what is right or what is not right for you. Of course, you may or may not be generally referring to your natural acceptance for making decisions. So, find out if you get a spontaneous answer when you ask yourself basic questions, like the ones mentioned below:

    a) You want to live in relationship (harmony) with others or You want to live in opposition with others?

    b) In relationship, you want to live with the feeling of respect or disrespect (for yourself and for others)?

    c) You want to nurture others or to exploit others?

Is your living in accordance with your natural acceptance or different from it? How do you feel when your living is in accordance with your natural acceptance; and when it is in contradiction to your natural acceptance?

2. Make a list of the problems in your family. For each problem, find out the most significant reason: is it related to lack of right understanding, lack of feelings in relationship or lack of physical facility? Also, find out how much time and effort you have devoted for each in the last one week.

Expected Outcome: The students are able to see that self-verification on the basis of their natural acceptance (and experiential validation through living) is an effective way to verify what is right and what is wrong for them. They are able to see that, in many cases, their actual living is not in accordance with their natural acceptance. They are able to see that they are uncomfortable when their living is in contradiction with their natural acceptance; they are comfortable when they are living in accordance with their natural acceptance.

The students are able to see that, in most of the cases, lack of feeling in relationship is the major cause of problems in their family and with friends rather than the lack of physical facility. However, most persons give higher priority to physical facility in their life, giving a lower priority to or even ignoring relationship. They are so far not aware that right understanding, and right feeling on the basis of right understanding, is the primary need of human being.

Practice Sessions for Module 2 – Harmony in the Human Being

PS 4

1. Take the list of desires you made in PS2. Update it if required. Now classify the desires as being related to the need of the Self or need of the Body. If a desire appears to be related to both (needs of the self and needs of the Body), look for the purpose, and split it into two or more sub-desires until you are able to see clearly whether the sub-desire is related to the need of the Self or the need of the Body.

From this exercise,

a) Find out at least two key distinguishing features between the needs of the Self and the needs of the Body.

b) Roughly, what percentage of your desires is related to the needs of the Self and what percentage is related to the needs of the Body?

2. Make a list of your activities from morning till night. Some of these are activities going on in you (the Self), some activities are going on in your Body and some activities involve both you (the Self) as well as your Body. Classify the list of activities in these three categories (see table, below).

Activity	In the Self	In the Body	Involving both the Self and the Body
Running	I made the decision to run.	The Body is running	
Eating	I made the decision to eat.	The Body is eating.	The Body is getting the nutrition and I am getting the taste
Thinking	I am thinking.	My body is not involved	

Feeling excited	I am feeling excited	There is some effect on my Body also	Both, me and my Body is involved
Heartbeat	This is happening in the Body		
Blood circulation	This is happening in the Body		
Other activities…			

Write down your observations regarding:
   a) The activities of the Self which do not involve the Body. Can you see that these activities are continuous?
   b) Activities of the Body. Can you see that they involve some internal organs of the Body (like the heart and blood vessels)? Can you see that these activities are discontinuous or cyclic?
   c) Activities that involve both, the Self as well as the Body (like climbing a staircase). In such activities, try to identify the role of the sense organs as well as the work organs.

Expected Outcome: The students are able to relate their desires to need of the Self and the Body distinctly. They are able to see that the Self and the Body are two distinct realities, and a large part of their desires are related to the need of the Self (and not the Body). They may also be able to conclude that while their efforts are mostly centered on physical facility, which can only fulfil the needs pertaining to the Body and not the Self. They may also see that they are going by the assumption that physical facility will fulfil the needs of the Self also.

The students are able to see that the Self and the Body are two distinct realities and there are three distinct types of activities going on – activities of the Self, activities of the Body and activities of the Body in which the decision of Self is involved. They are able to see that activities like understanding, desire, thought and selection are the activities of the Self; the activities like breathing, palpitation, blood circulation etc. are fully the activities of the Body, while the activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs etc. are such activities that require the participation of both the Self and the Body.

PS5

1. It was mentioned that when you are consuming any physical facility, the following sequence applies:
   Tasty-Necessary □ Tasty-Unnecessary □ Tasteless-Unnecessary □ Intolerable
   Observe this sequence for at least five types of physical facility, say a tasty food, TV programs, your favourite music, etc.
   In contrast, observe that any feeling in you is either naturally acceptable or not. If a feeling is naturally acceptable, you want it continuously; and if not naturally acceptable, you do not want it even for a moment. What are your conclusions from this exercise? Is continuous happiness possible through sensation by consuming physical facility? What are the other options for continuity of happiness?

2. Observe your imagination for about 15 minutes. List down the object of your imagination at least once every minute. From this list or from directly observing your imagination, make a sequence diagram (as shown below).
   Now write down your observations:
   a) Are you able to see your imagination all of the time or only some of the time?
   b) If you are able to see (be aware of) your imagination only some of the time, what do you think is the reason?

c) Are all your imaginations well connected (one imagination leads logically to another imagination) or are there sudden changes from one subject to another subject or there are gaps in between one imagination and another imagination? What is the reason for this state of imagination?

d) What are your observations from this exercise?

3. Take your list of desires. Revise it if you need to. For each desire, identify the primary source of motivation (sensation, preconditioning or natural acceptance). If there is any desire which has more than one source of motivation, split it into two or more desires. E.g. a desire for good clothes may be motivated by your natural acceptance (to protect the Body from excessive heat or cold) and also be motivated by the social preconditioning for the clothes of the latest fashion. In such a case, split the desire into two desires. Now, write down your observations:

a) What percentage (approximately) of your desires is motivated by your natural acceptance? This will give you an idea of the percentage that you are self-organised. Keep in mind that natural acceptance is about purpose and it does not change with time, place or person.

b) What percentage (approximately) of your desires is motivated by sensation or preconditioning? Now you can get an idea of the percentage that you are dependent or enslaved.

c) What effort is necessary to be completely self-organised (if that is your goal)?

Expected Outcome: The students are able to see that all physical facility they use is required for a limited time in a limited quantity. Sensation through physical facility cannot be the source of continuous happiness. They are able to see that in case of feelings; they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment.

The students become aware of the activities of the Self and start finding their focus of attention at different moments. Also, they are able to see that many of their desires are coming from outside (through preconditioning or sensations) and are not based on their natural acceptance. They are able to find out their level of self-organisation and enslavement.

PS6

1. In the last 3 years, recall the times that your body has been ill (in disharmony). What steps were taken to restore the harmony of the Body?

Date(s) Illness or disharmony Type (Accident, viral infection, bacterial infection, lifestyle related disorder, any other) Steps taken Root Cause

If you were to take full responsibility for your body (i.e. you had the feeling of self-regulation), what kind of daily schedule would you have? Approximately how much time would you allocate for keeping your body in good health through:

- Healthy intake (food, air, water, sunlight, etc.)
- Timings for upkeep of the Body (sleeping and waking up time, excretion, bathing, etc.)
- Labour (production of physical facility)
- Exercise
- Balancing internal and external organs of body
- Regulating breathing of body
- Medicine
- Treatment

(Of course, you need to keep adequate time for studying, understanding, learning, behaviour, work etc.)

Do you think this schedule will make you more productive or less productive? What conclusions do you draw from this exercise?

2. Calculate the quantity required for a specific physical facility, say clothes, in your family. Now find out the quantity available. Is the quantity available less, equal or more than the quantity required? In that sense, do you feel prosperous or deprived (at least regarding that particular physical facility)? Do the same for other needs. For that you can make an inventory of everything in your home (or at least your room). How much of the physical facility is being rightly utilised? Discuss this with your family and work out your conclusions regarding: a. Meaning of prosperity
b.   The role of understanding (human being, the role of physical facility and the feeling of self-regulation)
c.   Ability of your family to identify its needs, with the required quantity

Expected Outcome: The students are able to list down activities related to proper upkeep of the Body and practice them in their daily routine. They are also able to appreciate the plants growing in and around the campus which can be beneficial in maintaining their health and even curing common ailments.

The students begin to recognise that the need for physical facility for nurturing, protection and right utilization of their body is limited in quantity. In cases where they are able to see that they have more than enough physical facility, they develop a feeling of prosperity. In cases of lack in physical facility, they start thinking about how to produce more than required physical facility by way of a mutually-enriching cyclic process (rather than through exploitation).

Practice Sessions for Module 3 – Harmony in the Family and Society

PS 7
1. Make a list of your family members and friends. Take the eight questions regarding evaluation of trust and reflect on the answers for each person in your list, one person at a time. First reflect on the four questions about natural acceptance (intention):
1a. I want to make myself happy.
2a. I want to make the other happy.
3a. The other wants to make herself/himself happy.
4a. The other wants to make me happy.
Next, reflect on the four questions about competence – your competence and their competence:
1b. I am always able to make myself happy
2b. I am always able to make the other happy
3b. The other is always able to make herself/himself happy
4b. The other is always able to make me happy

From this reflection, how many people are there with whom you have a feeling of trust on intention? Is the feeling unconditional and continuous? The indicators of unconditional, continuous trust on intention are:
- You never get irritated or angry with them
- You never have a feeling of opposition for them
- You are always thinking and making effort for their development

Now in your class group, share your findings and discuss:
- What you have understood about intention and competence – do you evaluate them separately?

- How you evaluate yourself and how you evaluate others – do you evaluate yourself on the basis of your intention and evaluate others on the basis of their competence?
- What is the result of such evaluation?
- What would be the result if you evaluated the intention and competence separately? Will it lead to a feeling of trust for each other?
- Reflect on some instances where you got irritated or angry with someone. What was the result of it? Can you recollect that you had a doubt on their intention? Try to call them and share your reflections with one or more of them.

Write down your conclusions from this exercise.

2. Show the video "Right Here Right Now". It is a short film directed by Anand Gandhi about human behaviour and its propagation.
Source:
Part 1: https://www.youtube.com/watch?v=OVAokeqQuFM
Part 2: https://www.youtube.com/watch?v=gIYJePEnvUY).
Discuss:
   a) Specific interactions shown in the video – are these interactions showing reaction or response?
   b) Reflect on your own interactions – what percentage of your interactions are reactions and what percentage are response?
   c) Is it desirable to have 100% response (and no reaction)? What effort is required for it?

Expected Outcome: The students are able to see that the natural acceptance (intention) of
everyone is to be happy and make others happy! It is the competence that is lacking – it is
lacking in themselves and it is lacking in others also. Whenever they evaluate themselves on the basis of their
intention and others on the basis of their competence, whenever they doubt the intention of the other, there is
a feeling of opposition, irritation or anger. They conclude that I am a good person and other is a bad person!
This is a major problem in their relationship with their family and friends.
As soon as they are able to see their own natural acceptance (intention), they are able to see that
the other also has the same natural acceptance (intention), they have a feeling of being related
and they start thinking in terms of mutual development. This is relieving for them and also
relieving for the other.
They are able to distinguish between reaction and response; appreciate the need for 100%
response in human-human interaction and make effort towards it.

PS 8
1. List out ten or more of your interactions with other people in your family and friends in
the last one week. Now analyse these interactions:
a. From your side, was it over-evaluation, under/ otherwise evaluation or right evaluation of
the other? In each interaction, were you comfortable within, uncomfortable within or unaware of
your state?
b. Did they evaluate you rightly or they over evaluated or under/ otherwise evaluated you?
In each interaction, were you comfortable within, uncomfortable within or unaware of your
state?
2. Study the chart regarding differentiation (discrimination) and regarding respect (on the
basis of the Self). Where has most of your effort been? Where would you like to put in your
effort now? What effort, if any, is required from your side now?
Expected Outcome: The students are able to see that respect is the right evaluation (of intention

and competence). Only right evaluation leads to fulfillment in relationship. Over evaluation leads to ego and under/ otherwise evaluation leads to depression.

They are able to see that many present-day problems in the family and society are side-effects of the lack of correct understanding of respect. This results into differentiation (discrimination) such as gender bias, generation gap, caste conflicts, class struggle, domination through power, communal violence, clash of interests, and so on.

Once they can see beyond the superficial differences at the level of body, physical facility, beliefs etc., they are able to see that the other is like me (at the level of the Self):

• The other has the same natural acceptance as me.
• The other has the same potential as me.
• The other has the same programme for happiness as me.

PS 9

1. What are your personal goals or values that you would like to make effort for? Discuss with your family and find out the goals of other members. Is there a common family goal? What are the goals being pursued by your workplace or educational institution? How much of these three sets of goals are aligned to each other? What is your role in the fulfilment of these three sets of goals?

2. Assuming that you would like to see your hostel/ educational institution/ workplace/ neighborhood as a model of human society, write down:

a. Its goal(s) – relate it to the four human goals and elaborate on what each goal means. Also develop some key indicators or measures which will show that the goals are realised

b. The system to achieve these goals – Make a comprehensive plan for the fulfilment of each goal. Relate it to the dimensions of human order.

3. Working on the dimension of Education-Sanskar and Sanyam-Health, suggest what programs can be taken up to ensure right nutrition of the child along with the right sanskar.

Expected Outcome: The students are able to see that as a family, a society, the comprehensive human goal is naturally acceptable:

• Right understanding and right feeling in every human being
• Prosperity in every family
• Fearlessness (trust) in society
• Co-existence (mutual fulfilment) in nature/existence

They are able to see that the systems required for their fulfilment include:

Education-Sanskar, Health-Self regulation, Production-Work, Justice-Preservation and Exchange-Storage.

Meaningful participation by every individual, every family, every family cluster… every village, town, city… country and the whole world is required in these systems for the human goals to be fulfilled.

They are also able to see that presently they do not have definite goals and their family goals are unknown or not clearly defined. The goals of their educational institution or workplace are articulated as vision-mission-goals-objectives-values etc. These various goals need to be aligned for them to appreciate, commit and fully participate in their fulfilment. Presently there is neither clarity nor alignment, so there is limited focused effort. They start to refine their goals and think about how to discuss them in their family, in their hostel, institution etc. and make more focused effort.

Practice Sessions for Module 4 – Harmony in the Nature (Existence)

PS 10

1. Watch the video "An Inconvenient Truth". It is a 2006 documentary about global climate

change presented by Former US Vice President Al Gore. He raises the question "What were you doing when you had the time to do something?" (Source: http://an-inconvenient-truth.com/).
Discuss:
a. State of the planet
b. Root cause of the problems
c. Take any one environmental issue in your neighbourhood/ village/ country and try to find out the root cause of it. [for instance, water scarcity, air pollution, food adulteration, etc.]. What exactly can you contribute as an individual, class or institution to the solution?
2. Observe the activity, innateness, natural characteristic and inheritance of at least two units in each of the four orders. Are you able to see that these orders are in a relationship of mutual fulfilment?
Expected Outcome: The students are able to appreciate the interconnectedness, interdependence and the relationship of mutual fulfilment existing in nature. They are able to see that they have a natural acceptance to participate in a mutually fulfilling manner in nature. By understanding the activity, innateness, natural characteristic and inheritance of the four orders in nature, they are able to identify the role of human being in the entire nature. They are able to see that the present-day environmental issues are related to lack of understanding; and these issues can be resolved only with the development of right understanding on the part of human being.
PS 11
1. Observe your Self.
Are you in space?
Are you getting energy from the body? Is your energy dependent on the body? When your body is sick, does your energy to think diminish? Are you energised in space?
Are you being dictated by the body? Are you self-organised in space?
Innately, you have a natural acceptance for co-existence, harmony and relationship. To understand and live in co-existence, harmony and relationship is the scope of your full potential, your full possibility as a human being. Find out if that is the case for you.
2. Make a chart for the whole existence. List down different courses of studies and relate them to different realities in the existence (such as plants, human mind, animals etc.).
Expected Outcome: The students are able to obtain a holistic vision about the existence. It is in the form of co-existence, rather than a chaos. Every unit is energized, self-organised and is participating with other units in an orderly manner for mutual-fulfilment. It is only the human being without right understanding that is violating this underlying co-existence. They are able to appreciate the need to understand the co-existence in existence.
In the light of this understanding, they are able to place various educational inputs appropriately and see that education is, after all, to understand the underlying harmony and live in harmony at every level – at the level of individual human being, at the level of family, at the level of society and at the level of nature/existence.
Practice Sessions for Module 5 – Implications of the Holistic Understanding – a Look at Professional Ethics
PS 12
1. Watch the video "Hiware Bazaar". It is a documentary about a progressive village in Maharashtra, India about how good governance, along with the people of the village have madesignificant change in their society (Source: https://www.youtube.com/watch?v=cb0Qvh9BJ0s).
Discuss:
a. The goal of this village and the systems that they have to fulfil these goals
b. The outcomes – achievements and areas of improvement
You can additionally pick current social problems in the campus or neighboring community and

discuss how they can be solved with the involvement of the students and teachers.

2. Recollect any situation in your life when you had to face a strong ethical dilemma.

Explain how, with the help of proper self-exploration and understanding, the dilemma could be resolved.

Expected Outcome: The students are able to clearly visualise the co-relation between lack of Human Values and the prevailing problems. They are also able to visualise tangible steps and a roadmap for moving in the cherished direction – for a humane society.

PS 13

1. By careful analysis, identify some important features which, when incorporated, will make our education more humanistic. What are the right expectations in terms of the outcome from humanistic education?

2. Some people feel that talking about holistic development is like trying to turn the wheel of time backwards. It will greatly hamper our progress. What is your view in this regard? Explain with justification.

Expected Outcome: The students are able to detail out various social systems essential for their own fulfilment, as well as the fulfilment of future generations. In particular, they are able to visualize the education system required for individual, and then societal transformation.

They are also able to appreciate those many efforts made in the tradition that were in line with desirable human goals. Thus, they are able to learn from tradition and develop a deep sense of gratitude for the effort, for the people, for the tradition, culture etc.

PS 14

1. Suggest ways in which you can use your knowledge of Technology/Engineering/ Management/Medicine etc. for universal human order, from your family order to the world family order.

2. The course is going to be over now. Evaluate your state before and after the course in terms of

a. Thought b. Behaviour c. Work d. Realization

3. Do you have any plan to participate in the transition for the humane society after graduating from the institute? Write a brief note on it.

Expected Outcome: The students are able to visualise an appropriate utilization of the knowledge in their respective streams to ensure mutually enriching and sustainable systems.

They are able to sincerely evaluate the course and the transformation achieved in this process.

They are also able to make use of this understanding for moving towards a happy and prosperous life, including an ethical conduct of their profession.

Socially Relevant Projects

Projects may be chosen to develop all the three aspects, in order of priority:

• Right understanding

• Relationship (right feeling and right thought)

• Skills for living in harmony

For illustration, let us take a project of tree plantation. It should help the teacher and students to:

1. Experience and understand mutual fulfillment in nature.

2. Understand human participation in enrichment, protection and right utilization of rest of the nature as well as to get a feel for prosperity within. i.e. get an idea of

a. Right utilization of the products from the tree (like fruit, vegetables, wood etc.)

b. Protection and nurturing of the trees planted; at least to be aware not to damage existing trees while planting the new ones.

3. Planning and Physical plantation of the tree.

The tree plantation project can be helpful in developing the three aspects mentioned. Of course, if they are doing tree plantation primarily as a task to be done or a means to get attention and some press coverage, then the project with the same physical tasks will not be as productive for this course.

Projects should take into consideration local requirements – it should be socially relevant. For instance, a gasifier power generation project in a city can use the waste wood, leaves, cardboard and paper etc. and contribute the clean power in the neighborhood power grid using a net-meter.

Projects can be of three types:
1. Study – Observing/Recognizing/Survey/Proposing a solution. e.g. finding out the change in water table in the local area and potential sustainable solutions
2. Modelling / Prototyping – Analysing, doing on a small scale and for a short term. e.g. developing a prototype of a pedal driven generator
3. Implementation – on some scale and for the long term. e.g. establishing an evening school in the local community, solar based lighting and pumping in the village community

Some topics:
1. Find out the quantity of food-grain (rice, wheat, corn, jowar etc.) that your family consumes annually. Taking this as the base, find out the total requirement of food-grain for your country. Find out the total production of food-grain in your country. Is the production sufficient? Articulate your conclusions
2. What do we consider important as a family -understanding, relationship and/ or physical facility? Is our time and effort applied for what we consider important? What do we evaluate at the end of every month? Discuss this at home and articulate your conclusions
3. Does my family have sufficient physical facility for my physical needs? Is my family prosperous? What do we need for feeling prosperous? Discuss this at home and articulate your conclusions
4. For the proper development of a child, there is a need to ensure a proper system in the society and make an appraisal of the current state. As a project work, find out the following in the society regarding the nutrition of children:
a. The demographic divide
b. Present social determinant of Health
c. Current child Health Policies
d. Involvement of Society and steps to be taken in this direction

Suggest policies which would ensure a better state of the society in terms of the above.
5. Find out how much water is available (rain, rivers, canals), how much water is needed
6. Find out how much water is available annually, and how much is used to generate electricity
7. Find out about power generation from low-head flowing-water, i.e. without making any dams. Can this system be cyclic and mutually-enriching?
8. Find out the change in water table in the local area and suggest possible sustainable solutions
9. List Socially Relevant Work in your state, nearby states, whole country, nearby countries, whole world
10. What is one valuable lesson from your tradition? Study its impact on Trust in your family
11. Document your understanding of the meaning of Health of your Body and the Programme for Health

12. Study the needs of families around your campus that are selling liquor. Suggest ways that they can meet their needs in a mutually fulfilling manner, rather than taking to means that are harmful for the society

13. Study the 'Sulabh-Shauchalaya' organisation and systems. Write a case study report on it with sections on its eco-friendly sustainable technology and human-friendly entrepreneurial system.

BBC351: OBJECT ORIENTED PROGRAMMING IN C++ LAB	
Course Outcome (CO)	**KL**
At the end of course, the student will be able to	
CO 1 Use the Concept of Data Abstraction and Encapsulation in C++ programs.	K3
CO 2 Interpret C++ program using the concept such as polymorphism, virtual function, exception handling and template.	K3
CO 3 Apply object- o r i e n t e d techniques to analyze, design and develop a complete solution for a given problem.	K3

1. Write a program using functions.
2. Write a program using functions with default arguments.
3. Write a program to implement call by value, call by address, and call by reference.
4. Write a program to understand objects, member functions, and constructors.
5. Write a program using classes with primitive data members.
6. Write a program using classes with arrays as data members.
7. Write a program using classes with pointers as data members.
8. Write a program using classes with constant data members.
9. Write a program using classes with static member functions.
10. Write a program to demonstrate compile-time polymorphism.
11. Write a program to demonstrate operator overloading.
12. Write a program to demonstrate function overloading.
13. Write a program to demonstrate run-time polymorphism.
14. Write a program to implement inheritance.
15. Write a program to demonstrate virtual functions.
16. Write a program using virtual base classes.
17. Write a program using templates.
18. Write a program for file handling.
19. Write a program to perform sequential file access.
20. Write a program to perform random file access.

Note: The instructor may add/delete/modify experiments, wherever he/she feels in a justified manner.

BBC352: WEB TECHNOLOGY LAB		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to		
CO 1	Design web pages using HTML, DHTML.	K5
CO 2	Design web pages using Cascading Styles sheets.	K5
CO 3	Develop dynamic web pages using JavaScript.	K5
CO 4	Develop an interactive web applications using JSP.	K5
CO 5	Create web applications using Spring & Spring Boot.	K5
DETAILED SYLLABUS		

1. Create a simple webpage using HTML
2. Create a HTML page, which has properly aligned paragraphs with image along with it.
3. Write a program to display list of items in different styles.
4. Use frames to Include Images and Videos.
5. Design a website with different methods of embedding CSS in a web page.
6. Add a Cascading Style sheet for designing the web page.
7. Write programs using Java script for Web Page to display browsers information.
8. Design a dynamic web page with validation using JavaScript.
9. Write a program using JavaScript to demonstrate the concept of built-in array methods.
10. Write a program using JavaScript to demonstrate the concept of nested functions.
11. Write programs using JavaScript for Web Page to display browsers information.
12. Write a program using JavaScript to merge property of two objects.
13. Write a program using JavaScript to include a JS file into another JS file.
14. Develop a Servlet to validate user name and password stored in database. Display authorized user is she/he is Authorized else display unauthorized user.
15. Write JSP & Servlet program to store student details sent from registration form in to database table.
16. Write appropriate JSP pages to insert, update and delete data in student table in a single application with proper Linking of JSP pages and session management.
17. Write a java program/servlet application to connect to a database and extract data from the table containing Employee's information and display them.
18. Write program to demonstrate the concept of spring and spring boot.

Note: The instructor may add/delete/modify experiments, wherever he/she feels in a justified manner.

BCA

SECOND YEAR SYLLABUS

SEMESTER-IV

BBC401: JAVA PROGRAMMING		
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**	
At the end of course, the student will be able to		
CO1	List the significance, key features, and principles of Object-Oriented Programming in Java.	K_1
CO2	Analyze basic structural, behavioral, and architectural models using object-oriented software engineering in Java.	K_4
CO3	Illustrate object-oriented modeling techniques and build GUI/web-based applications using Java APIs.	K_3
CO4	Use the core Java features like abstraction, encapsulation, constructors, and garbage collection in Java programs.	K_3
CO5	Utilize Java generics and file handling mechanisms effectively for modular programming.	K_3
DETAILED SYLLABUS		**3-1-0**
Unit	**Topic**	**Proposed Lecture**
I	**Introduction:** History of Java, Characteristics of Java, The Java Environment, Java Source File Structure and Compilation. Fundamental Programming Structures in Java: Data type, Variables, Comments, Operators, Methods & Classes, Constructors, Arrays, Control Statements, Access specifies.	**08**
II	**Inheritance, Interfaces, and Packages:** OOP in Java, Inheritance and its types, super and this keyword, final and static keyword, method overloading and overriding, abstract classes and methods. Defining an interface, implement interfaces, accessing implementations through interface references, extending interface. **Packages**- Defining, creating and accessing a package, importing packages.	**08**
III	**Exception handling & File I/O:** Define Exception, advantages of exception handling, Exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception. Introduction to file I/O(Input/Output).	**08**
IV	Java Awt & Swing: Differences Swing and AWT, Creating a Swing Applet and Application, Programming using Panes, Labels, Text fields, Buttons, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layouts, Windows, Dialog Boxes, Inner frame. JDBC: Introduction to JDBC, Java.sql package, Introduction to MySQL Database, Server and connectivity to remote database.	**08**
V	**Java Servlets:** Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).	**08**

Suggested Readings:

1. Radha Krishna P., "Object Oriented Programming through Java", Universities Press.
2. Eckel B., "Thinking in Java", Prentice Hall.
3. Malhotra S. and Choudhary S., "Programming in Java", Oxford University Press.
4. Schildt H., "Java: The Complete Reference", McGraw Hill.
5. Horstmann C.S., "Core Java Volume I – Fundamentals", Pearson Education.
6. Basham B., Sierra K. and Bates B., "Head First Servlets and JSP", O'Reilly Media.
7. Balagurusamy E., "Programming with Java: A Primer", McGraw-Hill Education.

BBC402: DATABASE MANAGEMENT SYSTEMS		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to understand:		
CO 1	The features of a database system and its representation through data models.	K_1
CO 2	Understanding of ER Model and basis of database constraints.	K_5
CO 3	Formulate solution to a query problem using SQL Commands, relational algebra, tuple calculus and domain calculus.	K_5, K_6
CO 4	Understanding of normalization, a given relation to the desired normal form.	K_2, K_3
CO 5	Understanding of transaction processing and concurrency control process.	K_2
DETAILED SYLLABUS		**3-1-0**
Unit	**Topic**	**Proposed Lecture**
I	**Introduction:** Overview, Database System vs File System, Database System Concept and Architecture, Data Model Schema and Instances, Data Independence and Database Language and Interfaces, Data Definitions Language, DML, Overall Database Structure. Data Modeling Using the Entity Relationship Model: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.	**08**
II	**Relational data Model and Language:** Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple and Domain Calculus. Introduction to SQL: Characteristics of SQL, Advantage of SQL. SQL Data Type and Literals. Types of SQL Commands. SQL Operators and their Procedure. Tables, Views and Indexes. Queries and Sub Queries. Aggregate Functions. Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL	**08**
III	**Data Base Design & Normalization:** Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.	**08**
IV	**Transaction Processing Concept:** Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. Distributed Database: Distributed Data Storage, Concurrency Control, Directory System	**08**
V	**Concurrency Control Techniques:** Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction, Case Study of Oracle.	**08**

Suggested Readings:

1. Silbertschatz A., Korth H. and Sudarshan S., "Database Concepts", McGraw Hill.
2. Date C. J., "An Introduction to Database Systems", Addision Wesley.
3. Elmasri R. and Navathe S., "Fundamentals of Database Systems", Pearson Education.
4. O'Neil P., "Databases", Elsevier Publications.
5. Ramakrishnan R. and Gehrke J., "Database Management Systems", McGraw Hill.
6. Leon A. and Leon M., "Database Management Systems", Vikas Publishing House.
7. Desai B.C., "An Introduction to Database Systems", Galgotia Publications.
8. Majumdar A. K. and Bhattacharya P., "Database Management System", Tata McGraw Hill.

BBC403: OPERATING SYSTEMS	
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to	

	Course Outcome	KL
CO 1	Explain main components, services, types and structure of operating systems.	K_2
CO 2	Apply the various algorithms and techniques to handle the various concurrency control issues.	K_3
CO 3	Compare and apply various CPU scheduling algorithms for process execution.	K_2
CO 4	Identify occurrence of deadlock and describe ways to handle it.	K_3
CO 5	Explain and apply various memory, I/O and disk management techniques.	K_5
DETAILED SYLLABUS		**3-1-0**

Unit	Topic	Proposed Lecture
I	**Introduction**: Operating System Structure- Layered structure, System Components, Operating system functions, Classification of Operating systems- Batch, Interactive, Time-sharing, Real-Time System, Multiprocessor Systems, Multiuser Systems, Multi process Systems, Multithreaded Systems, Operating System services, Reentrant Kernels, Monolithic and Microkernel Systems.	08
II	**Concurrent Processes**: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation, Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem, Inter Process Communication models and Schemes, Process generation.	08
III	**CPU Scheduling:** Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.	08
IV	**Memory Management:** Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.	08
V	**I/O Management and Disk Scheduling**: I/O devices, and I/O subsystems, I/O buffering, Disks to rage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File System protection and security.	08

Suggested Readings:

1. Silberschatz A., Galvin P.B. and Gagne G., "Operating Systems Concepts", Wiley Publication
2. Halder S. and Arvind A. A "Operating Systems", Pearson Education.
3. Dietel H.M, "An Introduction to Operating System", Pearson Education.

4. Stallings W., "Operating Systems: Internals and Design Principles", Pearson Education.
5. Harris J.A., "Operating Systems (Schaum's Outlines)", McGraw Hill Education.

BBC404: TECHNICAL COMMUNICATION		
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**	
At the end of course, the student will be able to		
CO 1	Understand the nature and remember the objectives of Technical Communication relevant for the work place as a software Engineers.	K_1, K_2
CO 2	Analyze and understand the key concepts of writing, designing and speaking.	K_2, K_4
CO 3	Utilize the technical writing skills for the purposes of Technical Communication and its exposure in various dimensions.	K_3
CO 4	Buildup interpersonal communication traits that will make the transition from institution to workplace smoother and help them to excel in their jobs.	K_4, K_6
CO 5	Evaluate and apply technical communication to build their personal brand and handle crisis communication.	K_3, K_5
DETAILED SYLLABUS		**3-0-0**
Unit	**Topic**	**Proposed Lecture**
I	**Fundamentals of Communication and Voice Dynamics:** Role and Purpose of Technical Communication, Types & Flow of Communication, Barriers to Effective Communication, 7 C's of Communication, Code and Content; Stimulus & Response, Vowel Sounds, Consonant Sounds, Tone: Rising and Falling Tone.	**08**
II	**Communication Skills for Career Building:** CV and Résumé Writing, Interview Skills, Group Discussion, Effective Profiling, Communication and Networking: Building relationships, Writing the Statement of Purpose (SOP) for admission in Higher Studies, Seminar & Conference Paper Writing, Expert Technical Lecture: Writing and Presenting.	**08**
III	**Communication Skills for Presentation: Writing, Designing, and Speaking:** Thesis and Project Report Writing, Technical Proposal Writing, How to Pitch an Idea: Process, Preparation and Structure, Elements of Speech Delivery: Passion, Poise & Illustrations.	**08**
IV	**Communication and Leadership Development:** Leadership Communication, Communication and Social competence: context, feelings, intentions, behaviors, Providing and Receiving feedback, Difference between Tact and Intelligence, Emotional Intelligence: Trust through Communication, Thinking Skills: Meaning and Types.	**08**
V	**Digital Communication and Personality Making:** Content Creation for Social Media: Emails, Webinars, podcasts, Blogs. Effective and Ethical use of Social Media by Text and Technique, Speech and Personality, Personality Analysis: Types of Personality; Concept of Personality: Maslow, Freud, Vivekananda, Jung Typology &Personality Assessment.	**08**
Suggested Readings: 1. Raman M. & Sharma S., "Technical Communication – Principles and Practices", Oxford Univ. Press. 2. Mitra B. K., "Personality Development and Soft Skills", Oxford Univ. Press. 3. Pfeiffer, "Technical Communication", Pearson. 4. Pillai S. and Fernandez A., "Soft Skills & Employability", Cambridge University Press.		

5. Pandey L. U. B., "Practical Communication: Process and Practice", A.I.T.B.S. Publications India Ltd.

6. M. Ashraf Rizvi, "Effective Technical Communication", McGraw Hill Education India Pvt. Ltd.

	BBC405: INDIAN TRADITION, CULTURE AND SOCIETY	
	Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
	At the end of course, the student will be able to understand	
CO 1	Students will be able explain society, state and polity in India in traditional and modern context.	K_2, K_3
CO 2	Students will be acquaint with essence of Indian Literature, Culture, Tradition and Practices.	K_2
CO 3	Students will be able to visualize the root of Indian Religion, Philosophy and Practices.	K_3, K_4
CO 4	Students will be able to understand Science, Management and Indian Knowledge System.	K_1, K_2
CO 5	Students will connect up and explain Cultural Heritage of India and root of Performing Arts.	K_2, K_3
	DETAILED SYLLABUS	**3-0-0**
Unit	**Topic**	**Proposed Lecture**
I	**Module 1- Society State and Polity in India** State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women. Four-class Classification, Slavery.	**08**
II	**Module 2- Indian Literature, Culture, Tradition, and Practices** Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali, Prakrit And Sanskrit, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature, Malayalam Literature, Sangama Literature Northern Indian Languages & Literature, Persian and Urdu , Hindi Literature.	**08**
III	**Module 3- Indian Religion, Philosophy, and Practices** Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines, Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices.	**08**
IV	**Module 4- Science, Management and Indian Knowledge System** Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India, Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India, Writing Technology in India, Pyrotechnics in India Trade in Ancient India/, India's Dominance up to Pre-colonial Times.	**08**

V	**Module 5- Cultural Heritage and Performing Arts Indian Architect** Engineering and Architecture in Ancient India, Sculptures, Seals, coins, Pottery, Puppetry, Dance, Music, Theatre, drama, Painting, Martial Arts Traditions, Fairs and Festivals, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema.	**08**

Suggested Readings:

1. Sivaramakrishna V., "Cultural Heritage of India-Course Material", Bharatiya Vidya Bhavan, Mumbai.
2. Baliyan S., "Indian Art and Culture", Oxford University Press, India.
3. Jitatmanand S., "Modern Physics and Vedant", Bharatiya Vidya Bhavan.
4. Thapar R., "Readings In Early Indian History", Oxford University Press, India.
5. Fritz of Capra, Tao of Physics.
6. Fritz of Capra, The wave of Life.
7. Jha V. N., "Tarkasangraha of Annam Bhatta", International Chinmay Foundation, Velliarnad, Amakuam (English Translation).
8. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta.
9. Jha G. N. and Jha R. N., "Yoga-darshanam with Vyasa Bhashya", Vidyanidhi Prakasham.
10. Jha R. N., "Science of Consciousness Psychotherapy and Yoga Practices", Vidyanidhi Prakasham, Delhi.
11. Sharma P. R., Shodashang Hridayam (English Translation).
12. Basham A. L., "The Wonder that was India", Rupa & Co., New Delhi.
13. Sharma R. S., "Aspects of Political Ideas and Institutions in Ancient India", Motilal Banarsidass.

BBC451: JAVA PROGRAMMING LAB	
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to	
CO 1 Understand basic syntax and core Java concepts like input/output, strings, and command-line arguments.	K_2
CO 2 Apply Object-Oriented Programming concepts like inheritance, encapsulation, file handling.	K_3, K_4
CO 3 Illustrate GUI applications and use Java APIs like AWT/Swing with JDBC.	K_3

LIST OF PROGRAMS:

1. Write a program to find the number of arguments provided at runtime.
2. Write a program to calculate the simple interest by entering input by the user.
3. Write a program to create a simple class to find out the area and perimeter of rectangle and box using super and this keyword.
4. Write a program to design a class account using the inheritance and static that show all function of bank (withdrawal, deposit).
5. Write a program to design a string class that performs String method (equal, reverse the string, change case).
6. Write a program that import the user define package and access the member variable of classes that contained by package.
7. Write a program to create a class component that shows controls and event handling on controls (Math calc)
8. Write a program to draw a line, rectangle, oval using the graphics method.
9. Write a program to create a Menu using the frame.
10. Write a program to implement the Grid Layout and Card Layout.
11. Write a program to create Frame to display the student information.
12. Write a program to process student information and marks sheet using method overloading.
13. Write a program to create an employee class and calculate the Gross salary of employee using inheritance.
14. Write a program to illustrate the inheritance and use of the Super key word.
15. Write a program to create a new txt file in the disk.
16. Write a program to read string data from the File.
17. Write a program to read data from the File.
18. Write a program to create a Notepad using Swing.
19. Write a program to create a calculator.
20. Write a program to maintain student database using JDBC.

Note: The instructor may add/delete/modify experiments, wherever he/she feels in a justified manner.

BBC452: DATABASE MANAGEMENT SYSTEMS LAB	
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course, the student will be able to	
CO 1 Write SQL commands for DDL, DML and DCL.	K_5
CO 2 Write SQL commands to query a database.	K_3
CO3 Write PL/SQL programs for implementing stored procedures, stored functions, cursors, trigger and packages.	K_4

LIST OF PRACTICALS
1. Install oracle/ MYSQL.
2. Create Entity-Relationship Diagram using case tools.
3. Write SQL statements Using ORACLE /MYSQL:
    a) Write basic SQL SELECT statements.
    b) Restrict and sort data.
    c) Display data from multiple tables.
    d) Aggregate data using group function.
    e) Manipulate data.
    f) Create and manage tables.
4. Create cursor.
5. Create procedure and functions.
6. Create packages and triggers.
7. Design and implement any one:
    a) Payroll Processing System.
    b) Library Information System.
    c) Student Information System.

Note: The instructor may add/delete/modify experiments, wherever he/she feels in a justified manner.

BVA451: Sports and Yoga-II
Objective of the Course:
- To maintain their mental and physical wellness upright and develop ability in them to cope up with the stress arising in the life.   - To create space in the curriculum to nurture the potential of the students in sports/games/yoga etc.   - To take forward the previous course on the topic to next advance level in terms of practice and specialization.

Syllabus/ Guidelines

Part A: Sports/Games

Some form of Athletics would be compulsory for all students, unless restricted due to medical / physical reasons.

In addition to this, a student has to opt for **at least one Sport/Game** out of the remaining mentioned below. The chosen game may be same which was taken up by the students in previous year of study or may change the option.

A fair theoretical knowledge and a reasonable amount of field / site practice of the chosen games will be essential.

1. Athletics   **Compulsory**
2. Volleyball
3. Basketball
4. Handball
5. Football
6. Badminton
7. Kabaddi
8. Kho-kho
9. Table tennis
10. Cricket

Part B: Yoga

- **Yogic postures**: Prone and Balancing
- **Pranayama:** Breath awareness, Sectional breathing, Nadishuddhi, Bhastrika, Ujjai, Cooling pranayama (Shitali, Shitkari), Bhramari, Udgit Pranayama (with Antar & Bahya Kumbhaka)
- **Practices leading to Meditation:** Pranav and SohamJapa, Yoga Nidra (1,2,3), Antarmauna, AjapaDharana (Stage 1,2,3), Practices leading to Breath Meditation, Practices leading to Om Meditation, Practices leading to Vipassana Meditation, Transcedental Meditation

General Guidelines

1. Institutes must assign minimum of three periods in the Time Table for the activities of Sports/Yoga.

2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.

3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

4. Student must be made familiar with the terminologies, rules/regulations, dimension/ marking of the play field/area and general knowledge of national/ international level facts/figures related to the chosen game.

Assessment:

The Institute must assign coordinator/ subject teacher for the subject for every batch/group of the students who would be responsible for coordinating the required activities and keep watch on the level of student's participation in the chosen game.

Coordinator/mentor would be responsible for award of the sessional marks based upon following components.

1. Level of understanding and general awareness   (20 %)
2. Involvements in the Practice Sessions   (50 %)
3. Regularity, Sincerity and Discipline   (20 %)
4. Participation in University level / District level   / State level / National Level events   (10 %)