Fundamentals of Object Oriented Programming

CSN- 103

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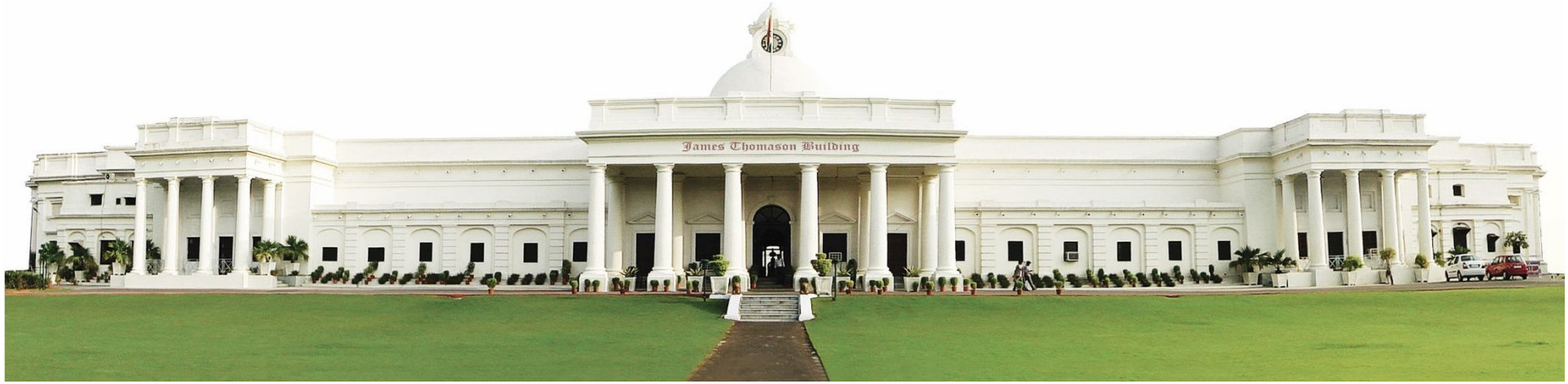

Time Table

Time Table (Dr R Balasubramanian)

Tuesday	Wednesday	Thursday	Friday
	P[CSN-103] B.Tech I ECE O5 - O6 Alternate Weeks Computer Lab 1	P[CSN-103] B.Tech I CSE (O1 - O2 CSE)/(O3:CSE - O4:ECE) Alternate Weeks Computer Lab 1	
LUNCH			
	L[CSN-103] B.Tech I LHC-005		L[CSN-103] B.Tech I LHC-005
L[CSN-103] B.Tech I LHC-005	P[CSN-261] B.Tech II Computer Lab 2		

Syllabus

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE: **Computer Science and Engineering**

1. Subject Code: **CS – 103** Course Title: **Fundamentals of Object Oriented Programming**

2. Contact Hours: **L: 3** **T: 0** **P: 2/2**

3. Examination Duration (Hrs.): **Theory** 0 3 **Practical** 0 0

4. Relative Weight: **CWS** 15 **PRS** 15 **MTE** 30 **ETE** 40 **PRE** 00

5. Credits: 0 4 6. Semester √ **Autumn** ☐ **Spring** ☐ **Both**

7. Pre-requisite: **NIL**

8. Subject Area: **DCC**

9. Objective: To introduce the concepts of Object Oriented Programming through Java.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	**Intoroduction:** Introduction to computer systems, computer as a programmed machine; machine language, assembly language, high level languages; concept of flow chart and algorithms, algorithms to programs, object oriented programming concept, difference in approach from procedural programming,	3
2.	**Introduction to Linux and Java Programming Environment:** Java compiler and virtual machine, Structure of a Java program, stand-alone programs and applets; concepts of portability.	3
3.	**Programming Elements in Java:** Data types, variables and array operators, assignment and selection statements, iterative structures, nested loops, string handling in Java, I/O mechanism, command line arguments.	6
4.	**Classes in Java:** General form of a class, creating objects, access control in classes; Constructors, methods, parameters, method overloading, recursive methods, returning objects, static members, finalization, final qualifier, nested and inner classes.	10
5	**Dynamic Memory:** Pointers, references and dynamic memory handling in C++, Objects as references in Java, dynamic memory allocation and garbage collection in Java	5

Syllabus

5.	**Inheritance:** Basics, super classes and subclasses, the keyword extends, multilevel hierarchy, method overriding; run time polymorphism, abstract classes, final in inheritance, the object class.	5
6.	**Packages and Interfaces:** Defining package, access protection, importing classes and packages, defining and implementing interfaces, nested interfaces, use of interfaces, variables in interfaces.	3
7.	**Exception Handling:** Fundamentals, types of exceptions, catching exceptions, multiple catching, nested try statements, uncaught exceptions, throw and throws, finally mechanism, built-in exceptions, creating exception subclasses, using exceptions.	4
8.	**Applets:** Applet fundamentals, native methods, static import, the applet class, applet display method, requesting repainting, a banner applet, passing parameters to applets, uses of applets.	3
	Total	**42**

11. Suggested Books:

Sl. No.	Name of Books / Authors	Year of Publication
1.	Dietel and Associates, "Java How to Program", 7th Ed., Prentice-Hall.	2006
2.	David Flanagan, "Java in a Nutshell", 5th Ed., O'Reilly Media, Inc.	2005
3.	Bruce Eckel, "Thinking in Java", Prentice-Hall.	1998
4.	James Gosling, Bill Joy, Guy Steele and Gilad Bracha, "The Java Language Specification", 2nd Ed., Prentice-Hall.	2000

Components

- Surprise Quizzes (Total 3, best 2 out of 3 will be considered)
  - 10% weightage
- 5% for Class participation
- Practical with Assignments will carry 15% weightage
- Course Website
  - https://sites.google.com/site/balaiitr/csn103-2018-19
  - Channeli (https://channeli.in/)
- Facebook group?

Programming Contest Sites

- http://icpc.baylor.edu (ACM ICPC)
  - IIT Roorkee "Triangulation" team has got 68th rank in 2018
  - IIT Roorkee "11coders" team has got 72nd rank in 2016
  - IIT Roorkee "3spades" team has got 64th rank in 2015
  - IIT Roorkee "The 65th bit" team has got 60th rank in 2013
- http://www.codechef.com (Online Contest)
- http://www.topcoder.com
- http://www.spoj.com
- http://www.interviewstreet.com

Introduction to Computer Systems

- A computer is a complex system consisting of both *hardware* and *software* components.

- The word *hardware* is used for physical devices such as TV sets, DVD players and computers. The word *software* is used for the information used with such devices: movies, music, novels, web pages, computer programs, and data.
- When talking about computer systems, *hardware* means the physical parts of the computer. *Software* means the programs and data used with the physical computer.

Introduction to Computer Systems

- The major hardware components of a computer system are:
  - Processor
  - Main memory
  - Secondary memory
  - Input devices
  - Output devices

System

Rating:	4.1 Windows Experience Index
Processor:	Intel(R) Core(TM) i5-2500S CPU @ 2.70GHz 2.70 GHz
Installed memory (RAM):	4.00 GB (2.23 GB usable)
System type:	32-bit Operating System
Pen and Touch:	No Pen or Touch Input is available for this Display

Lecture Outline

In this lecture, we will go through the following topics:

- Introduction to Programming Languages
- Algorithms
- Pseudo code
- Flowcharts

- Algorithm:
  - A set of **explicit, unambiguous finite steps**, which when carried out for a given set of **initial condition** to produce the corresponding **output** and terminate in **finite time**.
- Program:
  - An implementation of an algorithm in some programming languages
- Data Structure:
  - **Organization** of data needed to solve the problem

Programming Languages

- **Programming Language** is an agreed upon format of symbols that allow a programmer to instruct a computer to perform certain predefined tasks.

- Provide features to support the data processing activities, which include declaring variables, evaluating numeric expressions, assigning values to variables, reading and writing data to devices, looping and making decisions.