REF: VTU/BGM/BOS/PG Scheme 2022/2024-25/1009

REGISTRAR

Date: – 4 JUN 2024

Dear Sir/ Madam,

**Subject** : Instead BBM403 Java Programming in 4th semester Control Engineering Syllabus uploaded

**Reference** : Chairperson recommendation vide email dated: 04.06.2024

: The Hon'ble Vice-Chancellor's approval dated: 04.06.2024

This is a reference to the subject cited above. In the B.E. Biomedical Engineering program for the 4th semester, the course code BBM403 corresponds to Java Programming. However, the syllabus section erroneously contains the syllabus for Control Systems.

This issue was communicated to the Chairperson of the Board of Studies in EI/BM/ML at VTU Belagavi for clarification. The chairperson confirmed that the subject with the code BBM403 is indeed Java Programming (IPCC).

Currently, the Biomedical Engineering program is offered by two colleges: 1) Rajeev Gandhi Institute of Technology, Bengaluru, and 2) ACS College of Engineering, Bengaluru. Upon confirmation, it was found that both colleges are following the BBM403 Java Programming syllabus.

**Corrigendum is mentioned as below;**

| In Scheme | | In Syllabus | | Remark |
|---|---|---|---|---|
| BBM403 | Java Programming | BBM403 | Control System | To be read as (in syllabus) **BBM403- Java Programming** |

**BBM403 –Java Programming** Syllabus is attached with this circular for stakeholders' convenience and use.

All the principals of Engineering Colleges under the ambit of the university are informed to bring the content of the circular and syllabus to the notice of all concerned

REGISTRAR

To,

**All the Principals of Engineering Colleges under the ambit of University**

**Copy to**

- The Hon'ble Vice-Chancellor through the secretary to VC for information
- The Registrar (Evaluation) VTU Belagavi for information and needful
- The Special Officer, QPDS for information and while setting of question papers and scrutinizing, to consider BBM403 - as - Java Programming subject/Course.
- The Director, ITI,SMU,VTU Belagavi for information and needful (for Subject mapping)
- Office copy

**REGISTRAR**

| JAVA PROGRAMMING | | Semester | 4 |
|---|---|---|---|
| Course Code | **BBM403** | CIE Marks | 50 |
| Teaching Hours/Week (L:T:P: S) | 3:0:2:0 | SEE Marks | 50 |
| Total Hours of Pedagogy | 40 hours Theory + 8-10 Lab slots | Total Marks | 100 |
| Credits | 04 | Exam Hours | 3 |
| Examination nature (SEE) | Theory | | |

**Course objectives:**
- To understand object oriented programming concepts, and apply them in solving problems.
- To Understand Set up Java JDK environment to create, debug and run simple Java programs.
- To Understand Introduce the concepts of exception handling and multithreading.
- To Understand Introduce the design of Graphical User Interface using applets and swing controls.

**Teaching-Learning Process (General Instructions)**

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop student's theoretical and programming skills.

2. State the need for learning Programming with real-life examples.

3. Support and guide the students for self–study.

4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.

5. Encourage the students for group learning to improve their creative and analytical skills.

6. Show short related video lectures in the following ways:

• As an introduction to new topics (pre-lecture activity).

• As a revision of topics (post-lecture activity).

• As additional examples (post-lecture activity).

• As an additional material of challenging topics (pre-and post-lecture activity).

• As a model solution of some exercises (post-lecture activity).

| MODULE-1 |
|---|
| **Object Oriented Programming and JAVA:** Object Oriented Paradigm, basic concepts, benefits and applications of OOPs. JAVA history and features, How java differs from C and C++, JAVA and Internet, JAVA and World Wide Web, Web browsers, JAVA support systems, JAVA environment. JAVA program structure, Tokens, Statements, JAVA Virtual Machine.<br><br> **Overview of JAVA Language:** Simple Java Program, Math functions, An application with two classes, Java program structure, Java Tokens, Java Statement, Implementing a Java Program, Java Virtual Machines, Command and Line Arguments, Programming Style. |

| Teaching-Learning Process | Chalk and Talk, PowerPoint Presentation RBT Level: L1, L2, L3 |
|---|---|

| MODULE-2 |
|---|

| Constants, Variables, Data Types: Declaration and scope of Variables, Symbolic constants, Type Casting, Standard Default values. Operators and Expression: Arithmetic, Relational, Logical, Assignment, Increment, Decrement, Conditional, Bitwise, Special Operators, Arithmetic Expressions, Evaluation, Procedure of Operators, Type Conversion in Expressions, Mathematical functions. Decision Making, Branching and Looping: If Statement, If....Else statement, Nesting of statements, Switch Statement, Operator, While Statement, Do statement, For statement, Jump in Loops. | |
|---|---|
| **Teaching-Learning Process** | Chalk and Talk, PowerPoint Presentation RBT Level: L1, L2, L3 |

| MODULE-3 | |
|---|---|
| **Classes, Objects and Methods:** Class definition and declaration, Creating Object, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting Methods, Inheritance, Overriding Methods, Final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control. <br> **Arrays, Strings and Vectors:** One and two dimensional arrays, Strings, Vectors, Wrapper Classes | |
| **Teaching-Learning Process** | Chalk and Talk, PowerPoint Presentation RBT Level: L1, L2, L3 |

| MODULE-4 | |
|---|---|
| **Interfaces:** Definition, Extending and Implementing Interfaces, Accessing Interface variables. **Packages:** JAVA API Packages, Using System packages, Naming conventions, Creating, Accessing and Using a package, Adding a class to a Package, Hiding Classes. <br> **Multithreaded Programming :** Creating and Extending Thread Class, Stopping, Blocking and Life Cycle of Thread, Using Thread Methods, Thread Exceptions and Priority, Synchronization, Implementing runnable Interface. | |
| **Teaching-Learning Process** | Chalk and Talk, PowerPoint Presentation RBT Level: L1, L2, L3 |

| MODULE-5 | |
|---|---|
| **Applet Programming:** Introduction, How Applets Differ from Applications, Preparing to write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet , Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, More about HTML Tags, Displaying Numerical Values, Getting Input from the User, Event Handling. | |
| **Teaching-Learning Process** | Chalk and Talk, PowerPoint Presentation RBT Level: L1, L2, L3 |

**PRACTICAL COMPONENT OF IPCC***(May cover all / major modules)*

| Sl.NO | Experiments |
|---|---|
| 1 | a. Write a java Program to illustrate the creation of variables of basic types and effect of type conversions. <br><br> b. Write a java Program that display the roots of a quadratic equation $ax2+bx=0$. Calculate the discriminate D and based on value of D, describe the nature of root. |
| 2 | a. Write a java program to demonstrate creation and accessing of objects and methods. <br><br> b. Write a java program to illustrate use of constructor overloading and method overloading. |
| 3 | a. Write a java Program to demonstrate the concept of single Inheritance. <br><br> b. Write a java program to implement multi level Inheritance. |
| 4 | Write a simple Program on Java to illustrate the implementation of the concept of multiple inheritance using interfaces |
| 5 | a. Write a java program to demonstrate String Methods used for manipulating strings like accessing, inserting, modifying and appending. <br><br> b. Write a java program to illustrate use of most commonly used wrapper class methods. |
| 6 | Write a Java program to implement the concept of importing classes from user defined package and creating packages. |
| 7 | Write a Java program using Synchronized Threads, which demonstrates Producer Consumer concept. |
| 8 | a. Write a Java program for creation of Java Built-in Exceptions. <br><br> b. Write a Java program for creation of User Defined Exceptions. |
| 9 | **Can be Demo experiments for CIE** <br> Complete the following: <br> i.      Create a package named shape. <br> ii.    ii. Create some classes in the package representing some common shapes like Square, Triangle, and Circle. <br> iii.   iii. Import and compile these classes in other program |
| 10 | **Can be Demo experiments for CIE** <br> a. Write a Java program to copy bytes from one file to another using File Input Stream and File Output Stream. <br><br> b. Write a Java program to illustrate the process of file concatenation and buffering. |
| 11 | **Can be Demo experiments for CIE** <br> Write a Java applet program, which handles keyboard event. |
| 12 | **Can be Demo experiments for CIE** <br> Write an Applet that displays —Hello Worldl (Background color-black, text color-blue and your name in the status window.) |

**Course outcomes (Course Skill Set):**
At the end of the course, the student will be able to:
1. To Understand OOPs concepts and basics of Java programming.
2. To Create Java programs using inheritance and polymorphism.
3. To Implement error-handling techniques using exception handling and multithreading.
4. To Develop GUI using Applets and Swing components.
5. Analyze, design and develop solutions to real-world problems applying OOPs concepts through JAVA.

**Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

The IPCC means the practical portion integrated with the theory of the course. CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.

**CIE for the theory component of the IPCC**

- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

**CIE for the practical component of the IPCC**

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test **(duration 02/03 hours)** after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks**.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

**SEE for IPCC**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course **(duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

**The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.**

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- The minimum marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum marks-25) in the theory component and 10 (40% of maximum marks -25) in the practical component. The laboratory component of the IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 04/05 sub-questions are to be set from the practical component of IPCC, the total marks of all questions should not be more than 20 marks.

- SEE will be conducted for 100 marks and students shall secure 35% of the maximum marks to qualify for the SEE. Marks secured will be scaled down to 50.

- The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Suggested Learning Resources:**
**Books**
1. E.Balaguruswamy – Programming with JAVA – A Primer – 5th Edition, McGraw Hill
2. Herbert Schildt, Java the Complete Reference, 7th Edition, Tata McGraw Hill, 2007.
3. Object oriented programming in TURBO C++ - Robert Lafore, Galgotia Publications, 2002.
4. Mahesh Bhave and Sunil Patekar, "Programming with Java", First Edition, Pearson Education, 2008.

**Web links and Video Lectures (e-Resources):**
- VTU e-Shikshana Program
- VTU EDUSAT Program
- https://www.w3schools.com/java/
- https://www.youtube.com/watch?v=CFD9EFcNZTQ
  https://www.youtube.com/watch?v=grEKMHGYyns

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**
- Programming skills to solve real world problems.
- Quizzes
- Assignments
- Seminars