LABORATORY GUIDELINES

[Advanced Java Programming]

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY AMITY UNIVERSITY UTTAR PRADESH

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1. Introduction

Laboratory session is an integral part of the subject taught in the classes. By attending lab session, students will have an opportunity to conduct experiments and to be exposed to the practical aspects of the subject. Experiments allow students to apply and test the theory learned in the class, which will help strengthen the understanding of the subject. It is therefore an important part of learning activities that all students must participate in. This guideline serves as a policy, rules and regulations that all students must follow when they use the lab and when attending lab sessions.

2. Important Instructions

- Participation in the lab session is compulsory to all students who have registered for the subject.
- Attendance will be taken during the experiment. Only students who have attended the lab session are allowed to submit Lab file and will be marked accordingly.
- Lab file must be checked and evaluated in next lab session.
- Lab File is an individual work. Fabricating result and copying report of others are strictly prohibited.
- Students are also required to maintain a log book. The purpose of the Log Book is to record daily progress of experimental and other pertinent information related to the experiment.
- Lab instructor may conduct briefing to the students at the start of the experiment. This briefing includes the procedure, software/hardware requirement and safety aspect of the experiment.

- Experiment must be completed within the stipulated time.
- Each lab session is of 2 hours

3. Attendance

- It is a mandatory requirement for the students to attend all lab sessions.
- Students who are late by more than 5 minutes are not allowed to do the experiment
- Student must sign in and sign out in the register maintained in the lab.
- No student will be allowed to appear for the final exams if attendance is less than 75%.
 His/her status will be shown as debarred.

4. Lab Regulation

4.1 GENERAL RULES

- Students are not allowed to work without supervision from the lab staff/instructor.
- Foods, drinks and smoking are NOT allowed.
- All bags must be kept at the indicated place.
- Respect the laboratory and its other users. Noise must be kept to a minimum.
- Workspace must be kept clean and tidy after experiment is completed.
- Handle all apparatus with care. Observe safety measures at all time.
- All students are liable for any damage to equipment due to their own negligence.
- Students are strictly PROHIBITED from taking out any items from the laboratory without permission from the Lab Supervisor or Lab Staff in charge.

4.2 SAFETY RULES

- For safety purposes, it is essential that an orderly and tidy working environment is maintained. All persons working in the laboratories are individually responsible for ensuring that their working areas are so maintained.
- Read the safety rules on the notice board of the laboratory.
- Study the procedures for using the equipment before actually using it.

4.3 LAB PERFORMANCE RULES

- The laboratory will consist of ten mandatory experiments.
- It is compulsory for the student to perform all the mandatory experiments individually.
- Total marks given to mandatory experiments are 10.
- The laboratory will also consist of design based experiments.
- It is compulsory for a student to do one design based experiment which will be performed in a group of 5-6 students.
- The open ended design based assignment/experiment will be allotted to the student at the beginning of the semester.
- Total marks given to design based experiment is 10.
- Separate records have to be maintained for mandatory lab assignments and open ended design based assignments.
- 5 marks will be given for the performance of students in viva

5. EXPERIMENT LISTS 5.1 INSTRUCTIONS

- Students/learners are advised to perform each experiments listed in the Table.
- All the experiments are compulsory to include in the lab records.
- Learners are advised to prepare a write-up according to the template given to you.

- You are advised to copy others work, if found zero marks will be given to you.
- For any difficulty you can come for help and discussion.
- You are advised to understand the instruction given by instructor/faculty during the lab session which will help you to achieve the goal.
- Your suggestions are always welcome.
- Marks will be awarded based on the content written in your words and your performance in oral session. You are advised to include references as appropriate.
- If any student fails to fulfill the requirements then he/she will be given second opportunity (2 days) to submit the revised version of the write-up. But, if student fail to submit within the time line given then zero marks will be awarded.

5.2 EXPERIMENT LIST

	Experiment Details		Learning Outcome
W	Vrite a program to demonstrate the working of multi	At	the end learners will be able
th	reading.	to:	
•	Task 1: Use Threads class to enable thread.	•	To describe the working of
•	Task 2: Write a program to create threads using		threads theoretically and
	runnable interface. you need to explain		experimentally.
	understanding and comparative study b/w thread	•	Creating threads in Java
	class implementation and runnable interface for the		programming language.
	programs you have created	•	Setting the priority for
•	Task 3: WAP to set priorities (min, max & norm)		threads.
	for the threads. Execute the program explain your		
	understanding by looking the output.		
	•	 Experiment Details Write a program to demonstrate the working of multi threading. Task 1: Use Threads class to enable thread. Task 2: Write a program to create threads using runnable interface. you need to explain understanding and comparative study b/w thread class implementation and runnable interface for the programs you have created Task 3: WAP to set priorities (min, max & norm) for the threads. Execute the program explain your understanding by looking the output. 	Experiment DetailsWrite a program to demonstrate the working of multi threading.At to:• Task 1: Use Threads class to enable thread.•• Task 2: Write a program to create threads using runnable interface. you need to explain understanding and comparative study b/w thread class implementation and runnable interface for the programs you have created•• Task 3: WAP to set priorities (min, max & norm) for the threads. Execute the program explain your understanding by looking the output.•

2.	Create a RMI service to demonstrate the working	At the end learners will be able					
	of RMI	to:					
	• Task 1 : create an interface declare a function to	• Describe the steps involved					
	find area of a rectangle	in creating RMI services.					
	• Task 2: Create a class to implement the interface	• Explain the beauty of using					
	created above.	Interfaces.					
	• Task 3: create a server and initialize the object of	• Describe the working of					
	interface to invoke the methods.	UnicastRemoteObject.					
	• Task 4: create the clients which will send request	• Describe the working of					
	to the server.	Stub and Skeleton.					
		• Explain the purpose of					
		rmiregistry.					
		• Explain the purpose of rmic.					
3.	Creating a GUI for accepting the user id and user name.	At the end learners will be able					
	Use JDBC-ODBC bridge to connect the Java	to:					
	application developed with the database. Verify the	• Describe and use the JDBC					
	connectivity and perform the following operations.	components.					
	• Task-1: Creating GUI with two labels ID and	• They can use the benefits of					
	Name and use two text boxes to accept both.	JDBC-ODBC Bridge to					
	• Task-2: Use INSERT button. When user will click	develop an interactive Java					
	on it data which are given in both the text boxes	based applications.					
	must go into the Database.	• Able to demonstrate their					
	• Task-3: Use UPDATE button. When user want to	understand the meaning of					
	update any information in the database then it must	front end and back end.					
	work.						
	• Task-4: Use DELETE button. It will delete the data						
	which user wants to remove.						
	• Task-5: Use EXIT button. When user want to exit						
	from the GUI created user will simple click on this.						
	• Task-6: Create a database with table named						

	"USER". This table will contain two columns	
	namely "ID" and "NAME".	
	• Task-7: Create the data source using JDBC-ODBC	
	Bridge.	
	• Task-8: Compile and execute your program and	
	verify the connectivity and working of each	
	component given on the GUI.	
4.	Create a java program to perform the following task.	At the end learners will be able
	• Task-1: Create a layout with three text boxes for	to:
	Student Name, Roll Number and course	• Describe and use the JDBC
	information (B.Tech/M.Tech).	components.
	• Task-2: Create buttons "INSERT", "UPDATE",	• They can use the benefits of
	"DELETE" and "EXIT"	JDBC-ODBC Bridge to
	• Task-3: Insert: to insert information, Delete: to	develop an interactive Java
	remove information, Update: to update information	based applications.
	and Exit: to quite.	• Able to demonstrate their
	• Task-4: Create table name student with three field	understand the meaning of
	rollnumber, sname and course.	front end and back end.
	• Task-5: Create a data source named studata	
	• Task-6: Create connection between java code and	
	the data source.	
	• Task-7: Compile and execute the java program.	
	• Task-8: Finally, verify your connectivity by using	
	test cases.	
5.	Developing Servlets based applications	At the end learners will be able
		to:
		• Describe the working of
		Servlets.
		• Explain and demonstrate the
		architectural aspects

10.	Developing an interactive Android Application using	In process
	SDK.	
9.	Developing a simple Android based application using	In process
	working of Struts and creating Beans	
8.	Developing Java based application to demonstrate the	In process
		using EJP
		• Explain the benefits of
		• Develop an EJB application.
		EJB.
		• Describe the working of
		to:
7.	Developing application using Enterprise Java Beans	At the end learners will be able
		database.
		Tomcat of any other
		Java applications with
		• Perform the connectivity of
		using dynamic database.
		• Understand the benefits of
		Servlets and JSP.
		• Describe the working of
	Tomcat to create the database.	to:
6.	Developing Servlets and JSP based Application. Using	At the end learners will be able
		servlet life-cvcle.
		 Describe and understand the
		servlets as a middle layer
		the Tasks performed by
		application development.
		involved in Services
		involved in Servlets

SDK and understanding the working of application	
developed with the Android Architecture stand points.	

5.3Equipments

• Software: JDK, Net Beans, Eclipse, Tomcat, Android SDK as appropriate.

6. Assessment Criteria

(a) Guidelines for assessment of lab assignments (Internal)

- List of Experiments will include ten mandatory experiments and five design based experiments. These 5 design based experiments will be termed as open ended experiments. For design based experiments, design specifications will be provided to the students at the time when it will be conducted and not beforehand.
- 2) Lab work will be divided into two parts. The first part will be internal evaluation and will comprise of 30% of the total weight age. The second part will be external evaluation which will comprise of remaining 70% of the total weight age.
- Each student will have to perform ten mandatory experiments and one design based open ended experiment.

Marking criteria for internal evaluation of Mandatory Experiments: (5 marks are for attendance). Detailed marking criteria are given in **Annexure-A**).

Criteria	Total Marks	Marks Obtained	Comments
Concept (A)	2		
Implementation (B)	2		
Performance (C)	2		
Total	6		

Marking criteria for Design based experiments. Guidelines are given at Annexure-B

Criteria	Total Marks	Marks Obtained	Comments
Designing Concept (D)	3		
Application of Knowledge (E)	2		
Performance (F)	3		
Result (G)	2		
Total	10		

Table 2

• Performance will also include the lab record.

Marking Criteria for Viva components

Criteria	Total Marks	Marks Obtained	Comments
Clarity of the Subject (H)	2		
Quality of theoretical Discussion (I)	3		
Total	5		

Table 3

The marking scheme for internal evaluation is highlighted in Table 1. When a student will perform all the ten experiments, he/she will be evaluated again 6X10=60 marks. Out of the total 30, 5 marks are awarded for attendance. 10 for Mandatory experiments and remaining 10 for Design based open ended experiments. The total 60 marks of mandatory experiments will be scaled down to 10.

The evaluation scheme for Design based experiments is given in Table 2.

Each student is supposed to attach the assessment sheet on the covering page of his/her lab records.

The evaluation sheet is explained in Table 3.

Assessment Components

Assessment Type	Α	B		C	Tot	al	Effect	ive	Faculty Signature		
Mandatory Experiments											
Experiment 1	Experiment 1										
Experiment 2											
Experiment 3											
	De	esign B	Based (Open E	ndeo	l) Ex	perimen	ts			
Assessment Type	D	E	F	G	То	tal	Effectiv	ve	Faculty Signature		
Viva											
Assessment Type	Ι	Tot	Total Eff		Effective		Faculty Signature				

Table 4

(b) Guidelines for Assessment of Lab Assignments (External)

Head of the department shall appoint faculty/staff for lab examination as per following structure and forward the copy of the same to the COE through the Head of the Institute.

- (a) External Examiner: Preferably a professor, expert in the field
- (b) Internal Examiner: One for each lab course, competent faculty of the respective department.
- (c) Laboratory Assistant: One for each lab course preferably laboratory assistant/technical assistant of the respective laboratory.

In case of common courses in the same semester of different Programmes, different internal examiners and external examiners may be appointed for each Programme. In case external examiner

doesn' t report for the examination due to emergency, the concerned Department shall make alternative arrangement.

Internal examiners along with laboratory assistants shall make all the necessary arrangements of equipment/laboratory setup required for conducting lab examination of the courses.

Lab examination shall be conducted in the following manners:

- (a) Oral Examination (viva voce): Both internal and external examiners shall assess his/her knowledge of the course.
- (b) Practical Examination: The students are required to perform the given experiment/do the given job in the workshop/prepare a drawing / develop a computer program.

The performance of the students shall be assessed jointly by both the examiners.

After the lab examination of the course is over, internal examiner along with the other examiner shall prepare the mark list, and submit it in sealed envelope to exam cell on the same day, or latest by the next working day

Guidelines for Marking Scheme

(a) Demonstration of Design Experiment

- Concept: To generate ideas through the analysis of concepts at an abstract level with a command of specialized skills and the formulation of responses to well-defined and abstract problems
- 2) Methodology: To plan and develop investigative steps/strategies and to determine solutions to a variety of unpredictable problems; and operate in a range of varied and specific contexts, taking responsibility for the nature and quality of outputs.
- **3) Implementation:** To analyze and evaluate information; exercise significant judgment across a broad range of functions/ experimental results; and accept responsibility for determining and

achieving personal and/or group outcomes. To develop a rigorous approach to the acquisition of a broad knowledge base on the basis of the outcomes of the experiment/ implementation/ coding of the problem and to finally employ a range of specialized skills; to evaluate the final information.

- 4) Result: To finalize and sum up the clear explanation of the problem including additional functionality, demonstrating complete understanding of task and issues involved and especially performance issues.
- 5) Examination Copy Evaluation: To evaluate on the basis of good account of handling conflicts and problems, showing insight into the processes involved and reflecting on how to do it better.
- 6) Viva voce: To evaluate on the basis of explained solution about given problem.

(b) Demonstration of Allotted Experiment

1). Implementation: To analyze and evaluate the provided approach to achieve the expected information, function, outcomes and experimental results. It also assesses the in-depth level of the knowledge of student in area of allotted program/task. On the basis of implementation strategy of the program/task a broad knowledge base is to be analyzing to evaluate the final judgment about student in context of allotted program.

2). Performance: This will include the capacity for analytical and design skill. It also includes:

- a) Ability to define problem on allotted open ended question or situation
- b) Ability to assess adapted methodology to provide the solution and/or other required area to complete the allotted task.
- c) Ability to locate tools, software and information(s) relevant to allotted problem
- d) Ability to produce information relevant to a problem

The marking sheet for students is shown as **Annexure C** and distribution of marks for each component in **Annexure D**.

7. Lab Report

The student needs to submit two reports – One for Mandatory Lab assignments and another for Design based open ended assignment.

(a) The laboratory report is the primary means of communicating the student's experience and conclusions to other professionals. The student will use the lab report to inform the faculty member what he did and what the student have learned from the experience. Engineering results are meaningless unless they can be communicated to others.

The laboratory report should be clear and concise. The lab report shall be typed on a word processor or be hand written. The format is shown in **Annexure E**.

The last page of each experiment will contain the evaluation sheet as mentioned in Table 1

- (b) Design reports are written to introduce and document engineering and scientific designs. A design report is different than a lab report. A lab report describes an experiment and its conclusions. The major difference between design and lab reports is that design reports do not include a methods section.
- (c) Organization of design report

Summary: The summary, sometimes labeled the abstract or executive summary, is a concise synopsis of the design itself, the motivation for having the design, and the design' s effectiveness. The author should assume that the reader has some knowledge of the subject, but has not read the report. For that reason, the summary should provide enough background that it stands on its own.

Problem Definition: The "Introduction" of a design report identifies the design problem, the objectives of the design, the assumptions for the design, the design alternatives, and the selection of the design being reported. Also included for transition is a mapping of the entire report.

Design Description: The discussion presents the design itself, the theory behind the design, the problems encountered (or anticipated) in producing the design, how those problems were (or could be) results of design overcome, and the any tests on the Evaluation: The "Conclusions" section summarizes the design and testing work completed and assesses how well the design meets the objectives presented in the "Introduction. Appendices: information that is too detailed to be placed into the report's text

The format of report to be submitted for design based open ended assignment is in **Annexure F**.

Marking criteria for the Mandatory experiments

Assessment aspect	Total mark	Marking scheme
(i) Concept	2	 2 A full, clear concept of the problem including additional functionality, demonstrating complete understanding of task and issues involved especially performance issues. 1 A fair explanation of above aspects, but some bits missing or poorly explained, some lack of understanding or confusion; 0 No overview of the concept given.
(ii) Implementation	2	 2 A very good implementation of the concept with clear application 1 A reasonable implementation of the concept diagrams a little unclear, partitioning adequate but some problems, i.e. too large/small, too many/few etc., confusing approach to solution or some lack of understanding; 0 No useful implementation of the concept presented.
iii) Performance	2	 2 A very good account of the sensible application of implementing the concept within a specified time frame. 1 Good account of handling conflicts and problems, showing insight into the processes involved and reflecting on how to do it better; 0 A poor attempt at explaining the aspects mentioned above with many of them missing.
Total	6	

ANNEXURE B

Marking criteria for the Design based assignments

Assessment aspect	Total marks	Marking scheme
 (i) Problem Statement This includes the competency of the student including: (a) Ability to use math or science (b) Proficiency in engineering (c) Ability to design process using engineering principles (d) Ability to use techniques, skills and modern engineering tools necessary for the practice of engineering 	3	 a full, clear explanation of the problem including additional functionality, demonstrating complete understanding of task and issues involved and especially performance issues. Clear explanation of the problem. A fair explanation of above aspects, but some bits missing or poorly explained, some lack of understanding or confusion; A poor explanation of main problem, missed out additional functionality, little understanding of problem; No overview of the problem given at all, i.e. started with solution.
 (ii) Application of knowledge This includes the critical thinking ability and the cooperation with the teammates including: (a) Ability to analyze/solve open ended problems in engineering (b) Ability to evaluate solutions or designs giving constraints (c) Ability to work effectively in teams with others having different backgrounds (d) Ability to fill both leadership and supporting roles in a team 	2	 2 A very good explanation of the solution with clear diagrams showing overall structure with appropriate partitioning and a good approach to solution, should clearly state which of the additional enhancements have been attempted; 1.5 A reasonable explanation of the solution, diagrams a little unclear, partitioning adequate but some problems, i.e. too large/small, too many/few etc., confusing approach to solution or some lack of understanding; 0.5 A poorly presented solution showing little comprehension of approach, incomplete or very confused explanation, structure poor or not explained, approach flawed; 0 No useful explanation of the solution presented
 iii) Performance This will include the capacity for lifelong learning and building effective communication skills includes: (a) Ability to define problem given an open ended question or situation (b) Ability to locate tools and information relevant to a given problem (c) Ability to assimilate information relevant to a problem (d) Ability to assess his own knowledge to solve a problem and determine when to seek 	3	 3 A very good account of the group dynamics with clear evidence of good team working and sensible management 2 Good account of handling conflicts and problems, showing insight into the processes involved and reflecting on how to do it better; 1.5 A good report on the aspects above but with some aspects missing, presentation weaker; 1 A poor attempt at explaining the aspects mentioned above with many of them missing; 0 No comment on this aspect.
iv) Result	2	

ANNEXURE C

Marking sheet for external examination

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY AMITY UNIVERSITY UTTAR PRADESH EXTERNAL PRACTICAL EXAM AWARD SHEET

Course name: Semester: Programme Name: Course Code: Batch:

S.No	Enrolment No.	Name of	Performance-PR(35)						Viva(35)		Total
		Student	Demonstration of design			Demonstration	of allotted	Result	Evaluation	Viva	
			assignment/Experiment		nment/Experiment experiment			of exam			
							сору				
			Con	Design	Implemen	Performance	Implementation				
			cept		tation						
			10	5	10	5	5	10	5	20	

Signature of Internal Examiner

Signature of External Examiner:

ANNEXURE D

Marking criterion for external examination

S.No.	Assessment criteria		Total Marks	Marking scheme		
1	PR (35)	Demonstration of Design Experiment	Concept	10	 Concept covers all aspects of the question /experiment/ problem. Covers most aspects of the question/experiment/ problem. May not cover some major aspect of the question / experiment /problem Fails to address a number of major aspects of the Question/experiment/ problem. Addresses relatively few of the major aspects of the Question/experiment/problem. May be too short Addresses none of the major aspects of the Question/experiment/problem. Probably too short 	
			Design/ Methodology	05	 5 Shows excellent appreciation of the strengths and weaknesses of theories, methodologies and empirical evidence and their interplay. May show knowledge of the historical development of the field. 4 Shows good appreciation of the strengths and weaknesses of theories, methodologies and empirical evidence and their interplay. Perhaps some indication of the history of the area. 3 Makes some attempt to evaluate theories, methodologies and empirical evidence and empirical evidence and their interplay. Perhaps some indication of the history of the area. 2 Assertion with little concern for evidence. 1 Assertion without concern for evidence. 0 Assertion without evidence 	
			Implementation	10	 Excellent organisation of the material/ ideas/ steps. All steps followed are expressed clearly and Succinctly. Very clear organisation of material/ ideas/ steps. Most steps followed are expressed clearly and succinctly. Clear organisation of material / ideas/ steps. Some steps followed are not be expressed clearly. Some organisation of the material / ideas/ steps. Not Always clear what steps were intended Little structure apparent. Often difficult to discern what was steps were intended No structure apparent Hardly ever possible to discern what steps were intended 	

		Demonstration of Allotted Experiment	Performance	05	 5 A very good account of the group dynamics with Clear evidence of good team working and sensible management. 4 Good account of handling conflicts and problems, showing insight into the processes involved and reflecting on how to do it better; 3 A good report on the aspects above but with some aspects missing, presentation weaker; 2 A average performance during academic study. 1 A basic attempt at explaining the aspects mentioned above with many of them missing; 0 A limited attempt of explaining the allotted program 	
			Implementation	05	 5 A very good implementation of the of the allocated program/task with clear application (s) is provided 4 A reasonable implementation of the allocated program/Task. 3 Unclear but reasonable approach is presented in the result. 2 Confusing approach and lack of understanding is inbuilt in the provided solution. 1. No useful implementation of the allocated program/ task presented. 0 Solution not provided 	
2	Viva (35)	Result Examination Copy Evaluation		10 5	 10 Error free results with documentation 8 Error free results without documentation 6 Result with missing cases 4 Embedded error in program/hardware 2 Program/circuit/hardware Not executed 0 No knowledge of program 5 Program with proper indentation and comments 4 Program without indentation and comments 3 Incomplete solution provided 2 Program with logical errors 1 Incorrect program 0 Solution not provided 	
		Viva		20	 20 Clear explanations about provided solution 16 Reasonable explanations about provided solution 12 Fair explanations about provided solution 8 Average explanations about provided solution 4 Poor explanations about provided solution 0 No solution provided 	

Format of Lab Report

1. The first page of lab files to include the Index of the following format

S.No	Category of Assignment	Code	Experiment No.	Name of Experiment	Date of Allotment of experiment	Date of Evaluation	Max. Marks	Marks obtained	Signature of Faculty
1.	Mandatory Experiment*	LR (10)	1				1		
2.			2				1		
3.			3				1		
4.			4				1		
5.			5				1		
6.			6				1		
7.			7				1		
8.			8				1		
9.			9				1		
10.			10				1		
11.	Design Based Open Ended experiment**	PR (10)					10		
12.	Viva	Viva (5)					5		

*Individual experiments **In groups

Format for writing Mandatory experiments

DATE - Indicate the date the lab was performed.

OBJECTIVE - Clearly state the objective of performing the lab.

EQUIPMENT/SOFTWARE USED - Indicate which equipment was used in performing the experiment. The manufacturer and model number should be specified.

PROCEDURE - Provide a concise summary of the procedure used in the lab. Include any modifications to the experiment.

DATA - Provide a record of the data obtained during the experiment. Data should be retrieved from the lab notebook and presented in a clear manner using tables.

OBSERVATIONS AND DISCUSSIONS - The student should state what conclusions can be drawn from the experiment. Plots, charts, other graphical medium, and equations should be employed to illustrate the student's viewpoint. Sources of error and percent error should be noted here.

RESULT:

CONCLUSIONS - The student should present conclusions, which may be logically deduced, from his/her data and observations.

SIGNATURE -

Format of Design based assignment

Title page	Key info and one illustration			
Executive summary	One page summary of the project			
Table of contents				
Problem definition	Introduces and defines the problem			
Problem scope				
Technical Review				
• Design requirements				
Design description	Describes the design			
Overview				
• Detailed description				
• Use				
Evaluation	Evaluates the design			
Overview				
• Prototype				
• Testing and results				
• Assessment				
• Next Steps				
References	List of references used			
Appendices	All of backup information			