NAWAB SHAH ALAM KHAN COLEEG OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LABORATORY IMPROVEMENT FOR FUTURE TRENDS (LIFT) - - -I

NAME OF THE LABORATORIES

S.No.	YEAR-SEM	NAME OF THE LAB
1.	III B.TECH-II SEM	COMPILER DESIGN

A Guide for execution of Lab Courses

VISION OF THE INSTITUTE:

- To impart quality technical education with strong ethics, producing technically sound engineers capable of serving the society and the nation in a responsible manner.

MISSION OF THE INSTITUTE:

- M1: To provide adequate knowledge encompassing strong technical concepts and soft skills thereby inculcating sound ethics.
- M2: To provide a conducive environment to nurture creativity in teaching- learning process.
- M3: To identify and provide facilities which create opportunities for deserving students of all communities to excel in their chosen fields.
- M4: To strive and contribute to the needs of the society and the nation by applying advanced engineering and technical concepts

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION:

To produce quality IT professionals, with an ability to adapt to ever changing IT needs of local, national and international arena, through effective teaching & learning, interactions with alumni and industry

MISSION:

- M1: To provide a holistic learning environment for students through ethical practices.
- M2: To provide quality infrastructure through practical exposure to the latest technology requirements.
- M3: To train the students in soft skills to excel in placements and competitive exams at higher level the industry ready.
- M4: To have a healthy Industry - Institute interaction through faculty development programs, student internships, guest lectures and using latest teaching learning methodologies.
- M5: To provide effective platform to meet the industrial requirement and provide research-oriented environment for the faculty to meet the continuous societal needs.

PROGRAM SPECIFIC OUTCOMES (PSO's)

- Develop efficient information management systems using latest development tools catering to the globally changing requirements in multi-disciplinary domains
- Manage real time IT projects with consideration of human, financial, ethical and environmental factors and an understanding of policy implications.

1. **AIM OF THE LIFT**:

The main aim of the LIFT programme is to innovate, modify the existing facilities in labs, to create awareness among the students and develop Industry –Institution interactions and reach the standards in laboratories

2. **FUNCTIONS OF THE LIFT**:

I. To create better understanding concepts of LIFT and other lab related activities among the staff and lab technicians for better improvement.

II. To Arrange LIFT Presentations from each department about the lab activities by the staff handling the labs. (Lab Planners)

III. To Prepare GAP ANALYSIS: This involves collection of requirements from each lab of every department, information about expansion of labs, repairs and maintenance of labs etc.

IV. To arrange Industrial Visits/ Industrial training programs in coordination with concerned lab staff and Heads of the departments.

V. A Report on Shadow Engineering: This involves arrangement of Industrial and Practical learning, Submission of Industrial Visit report, Technical Survey reports and Market Survey of a product for development in laboratories.

VI. Verification of all the laboratories in every department by the LIFT Team along with the Principal and the concerned HODs, to check whether the activities are going according to LIFT guidelines, to check the Record Keeping, Lab Manuals and Viva sessions etc.

VII. Check for LEAD Experiments and its follow up.

VIII. Submission of proposals related to R&D, Project and Consultancy from lab staff to the Principal for further approvals.

LAB IMPROVEMENT FOR FUTURE TRENDS PROGRAMME (LIFT)

INDEX

CONTENTS:

1. OBJECTIVES AND RELEVANCE:

The main objective of the LIFT concept in lab course is to provide practical hands on experience for each student by providing them with good exposure to different experiments and to uplift the knowledge levels of the student, with different applications in various fields.

2. SCOPE:

The main scope of the LIFT lab course is to cover all the experiments as per the schedule given in the prescribed week wise periods. With this, a student can better understand the concepts and operating systems so that he could get better knowledge about each lab.

3. PREREQUISITES:

The basic level idea related to each experiment should be provided to the students before conducting main lab course. Following details are to be explained related to experiment:

1. Introduction to experiment – 30 min
2. The Operating of the equipment/instrument/software
3. Record of Experimental Results.
4. Sample Calculations / Executable Programs

4. SYLLABUS AS PER JNTUH:

The lab course should be planned as per the JNTUH syllabus. In this, LEAD experiments should also be included in the cycle of experiments.

5. (A) LAB SCHEDULE:

The lab schedule should be planned once in a week. The week wise scheduled experiment should be completed.

Batches	week-1	week-2	week-3	week-4	week-5	week-6
B1	Demo	Exp.1	Exp.2	Exp.10	Exp.9	Exp.8
B2	Demo	Exp.2	Exp.10	Exp.9	Exp.8	Exp.1
B3	Demo	Exp.10	Exp.9	Exp.8	Exp.1	Exp.2
B4	Demo	Exp.9	Exp.8	Exp.1	Exp.2	Exp.10
B5	Demo	Exp.8	Exp.1	Exp.2	Exp.10	Exp.9

(B) Scheme of Evaluation:

The scheme of evaluation for internal and external exams as follows:

LAB INTERNAL:							
Day to Day Evalution-15					**Internal Exam-10**		
Uniform	**Observation & Record**	**Performance Of the Experiment**	**Result**	**Viva**	**Write up**	**Execution & Results**	**Viva**
Marks-3	**Marks-3**	**Marks-3**	**Marks-3**	**Marks-3**	**Marks-4**	**Marks-3**	**Marks-3**
Total Marks-25							

LAB EXTERNAL:			
S.NO	Write up	Final Evaluation	Viva
1	**1. Aim 2. Procedure 3. Program 4. Expected output.**	**Based on correctness of the program and Results**	**Based on understanding of Experiment and theoretical questions in the related subjects**
Marks	**20**	**20**	**10**
Total Marks-50			

6. SUGGESTED BOOKS:

The suggested books should be recommended to the students as per the JNTUH syllabus prescribed.

7. WEBSITES (USEFUL LINKS):

The useful links should be provided to the students, where they can get an easy access to the knowledge of the experiment.

COMPILER DESIGN LAB

CONTENTS:

1. OBJECTIVES AND RELEVANCE

The main objective of the lab course is to gain practical knowledge of the language translation peculiarities by designing a complete translator for a mini language.

2. SCOPE

The scope of this lab is to make students to acquire knowledge in different phases and passes of compiler, and specifying different types of tokens by lexical analyzer, and also able to use the compiler tools

3. PREREQUISITES

Students should have foundation in formal language .The student should have programming experience (in C/C++).

4. JNTUH Syllabus:

PREAMBLE:

This lab covers the experiments in Compiler Design lab. The JNTU has given 6 experiments in the syllabus out of which first two experiments are based on the lexical Analyzer, following four experiments deals with predictive parser, LALR bottom up parser for given language, and convert the BNF rules into Yacc form, and Program to generate machine code from the abstract syntax tree generated by the parser

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification

(Unit-1)
Objective: The main objective of this program states that identifiers can be arbitrarily long; you may restrict the length to some reasonable value.

Prerequisites: Require knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer.

Applications: A lexer forms the first phase of a compiler frontend in modern processing, and is generally done in a single pass.

3. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.

Objective: The main objective of the programs is student able to learn the computer language tools (preprocessor Directives)

Prerequisites: Require knowledge of data structures in compilation, regular expressions and c code called rules

Applications: Flex is a tool for generating scanners. A scanner, sometimes called a tokenizer, is a program which recognizes lexical patterns in text.

3. Design Predictive parser for the given language

Objective: The main objective of the programs is student able to learn the Recursive Predictive Parsing and Non-Recursive predictive parsing

Prerequisites: Require knowledge of constructing LL Parsing table and top-down parsing

Applications: Able to recover errors in predictive parsing.

4. Design LALR bottom up parser for the above language.

Objective: The main objective of the programs is student able to learn the operator precedence parsing algorithm, shift reduce parsing

Prerequisites: Require knowledge of constructing LR Parsing table and Bottom-up parsing

Applications: Able to recover errors phrase-level error recovery and panic mode error recovery in LALR bottom up parsing

5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.

6. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code.
The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.
In the description of the individual instructions below, instruction argument types are specified as follows:

R
specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc.).
L
specifies a numerical label (in the range 1 to 9999).
V
specifies a "variable location" (a variable number or a variable location pointed to by a register - see below).
A
specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.
So, for example, an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).
The instruction set is defined as follows:
LOAD A,R
loads the integer value specified by A into register R.
STORE R,V
stores the value in register R to variable V.

Objective: The main objective of the two programs is student able to learn formal mathematical way to describe the language. Translate each sub-tree of the decorated AST (Abstract syntax Trees) into intermediate code.

Prerequisites: Require knowledge of linked lists and trees

Applications: Able to use the formally define the grammar of a language, so that there is no disagreement or ambiguity BNF is so unambiguous that there is a lot of mathematical theory around these kinds of grammars

LEAD: 1. Configure a CFG which will accept the user input string following the given CFG.
S -> aBb/ccA
A -> b/c
B -> a/b

2. Check whether the given program contains comments.

5 (A) LAB SCHEDULE:

CYCLE 1:

Batches	week-1	week-2	week-3	week-4	week-5	week-6	week-7	week-8
B1(501 to 512)	Demo & Introduction	Exp.1	Exp.1	Exp.2	Exp.2	Exp.2	Exp.3	test
B2(513 to 524)	Demo & Introduction	Exp.1	Exp.1	Exp.2	Exp.2	Exp.2	Exp.3	test
B3(525 to 536)	Demo & Introduction	Exp.1	Exp.1	Exp.2	Exp.2	Exp.2	Exp.3	test
B4(537 to 548)	Demo & Introduction	Exp.1	Exp.1	Exp.2	Exp.2	Exp.2	Exp.3	test
B5(549 to 560)	Demo & Introduction	Exp.1	Exp.1	Exp.2	Exp.2	Exp.2	Exp.3	test

(B) VIVA SCHEDULE: The viva schedule should be planned prior to the lab experiment

Batches	week-1	week-2	week-3	week-4	week-5	week-6	week-7	week-8	week-9	week-10	week-11	week-12	week-13	week-14
B1,B2,B3	viva					viva					viva			
B4,B5,B1		viva					viva					viva		
B2,B3,B4			viva					viva					viva	
B5,B1,B2				viva					viva					viva
B2,B3,B4					viva					viva				

(C) **SCHEME OF EVALUATION OF LABS**

LAB INTERNAL:							
Day to Day Evalution-15					**Internal Exam-10**		
Uniform	**Observation & Record**	**Performance Of the Experiment**	**Result**	**Viva**	**Write up**	**Execution & Results**	**Viva**
Marks-3	**Marks-3**	**Marks-3**	**Marks-3**	**Marks-3**	**Marks-4**	**Marks-3**	**Marks-3**
Total Marks-25							

LAB EXTERNAL:			
S.NO	Write up	Final Evaluation	Viva
1	**1. Aim 2. Procedure etc 3. Program 4. Result etc**	**Based on correctness of the program and Results**	**Based on understanding of Experiment and theoretical questions in the related subjects**
Marks	**20**	**20**	**10**
Total Marks-50			

6. SUGGESTED BOOKS:

T1: Principles of compiler design – A.V. Aho. J.D. Ullman; Pearson Education.
T2: Modern Compiler Implementation in C – Andrew N. Appel, Cambridge University Press.

7. WEBSITES

1. www.compilerdesign/ ...../compilerdesign.
2. *fita.hua.edu.vn/pttien/Setups/../beginning-compilerdesign.**pdf***
3. www.cse.hcmut.edu.vn/~hungnq/courses/nap/alp.**pdf**
4. https://sites.google.com/site/cdlabjntu09/home
5. http://youtube.com/compilerdesign
6. http://www.nptel.com/computerscience/compilerdesign

http://nptel.iitm.ac.in/courses.php?disciplineId=106