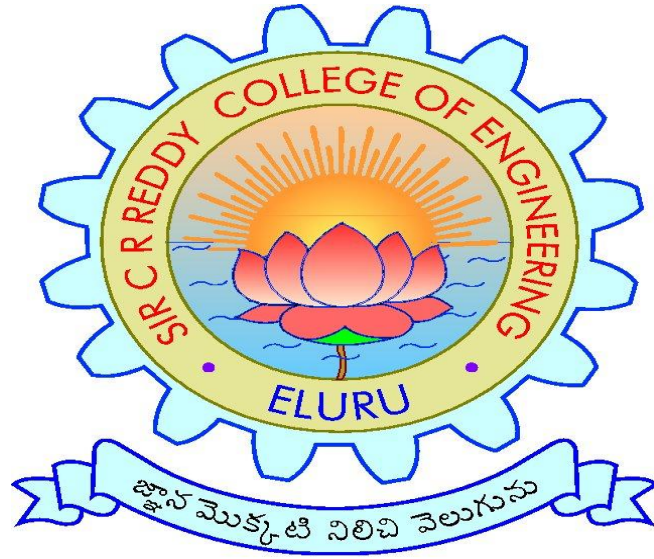


**SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**LESSON PLAN**



**SUBJECT: IT 2.1.5 SYSTEM PROGRAMMING**

**CLASS: 2/4 B.Tech., I SEMESTER, A.Y.2017-18**

**INSTRUCTOR: J.MALATHI**

**SIR C R REDDY COLLEGE OF ENGINEERING  
DEPT. OF INFORMATION TECHNOLOGY**

**PROGRAMME:** B.Tech

**SEMESTER:** II -I Semester

**A.YEAR : 2017-18**

Course: IT 2.1.5 SYSTEM PROGRAMMING

Instructor: J.Malathi

**Course Contents**

Category of Course	Course Title	Course Code	Credits- 4 C	Theory Paper
Departmental IT 2.1.5	System programming	IT 2.1.5	L-3 T-1	Max.Marks-70 Duration-3hrs.

**Course objectives:**

It provides an introduction to some basic perspectives of Microprocessors, Assembly language, language constructs, different machine tools like compilers, loaders and macro processors and other software tools also. Incorporates and anticipates the major in depths in Programming a system.It focus on internal working of the hardware and software interface of a typical system and finally designing some system components.

Students who have successfully completed this course will have clear understanding of the following concepts

**Course Outcomes for System Programming:**

CO1: To understand the concepts of system programming and basics in assembly language.

CO2: Able to apply the concepts of system software in developing different data bases for assembler, macro processor, loaders.

CO3: To analyze the design of assembler, macro processor and loaders.

CO4:To model and design different types of system components like assembler, macro processor and loaders and to know different types of system tools.

**ONLINE REFERENCES:**

1. <https://www.slideshare.net/guest3bd2a12/system-programming>
2. [lecturesppt.blogspot.com/2010/03/system-programming-ppt-slides.html](http://lecturesppt.blogspot.com/2010/03/system-programming-ppt-slides.html)
3. <https://www.scribd.com/presentation/.../01-Introduction-of-system-programming-ppt>
4. [www.vutube.edu.pk/.../system-programming](http://www.vutube.edu.pk/.../system-programming)

**Prerequisite** : Basics of microprocessors ,Operating system concepts, programming practices

**Internal Assessment Details:**

Attendance: 5 Marks

Internal Test 1& 2: 15 Marks

Assignment-1: 5 Marks

Assignment-2: 5 Marks

Total: 30 Marks

**SIR C R REDDY COLLEGE OF ENGINEERING :: ELURU**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**SUBJECT: IT 2.1.5 SYSTEM PROGRAMMING**

**SYLLABUS**

**UNIT 1:**Introduction to System Programming, Introduction to Assembly Language Programming based, Introduction Instruction Formats, Data Formats, Role of Base Register, and Index Register.

**UNIT 2:**Introduction to Assembler, databases used in assembler design, Design of assembler Single Pass & Double Pass

**UNIT 3:**Introduction to Macros, Various types' macros, Design of Macro Processor – Single Pass & Double Pass.

**UNIT 4:**Introduction to Loaders, functions of a Loader, Types of Loaders, database used in Loaders, Design of Loader, Absolute & DLL.

**UNIT 5:**Introduction to Software Tools, Text Editors, Interpreters, Program Generators, Debug Monitors.

**Required Text Book:**

**Text Book:** Systems Programming, **Author:** Donovan,

**Publisher:** Tata McGraw Hill

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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**COURSE SCHEDULE**

The schedule for the whole course/subject is:

<b>Unit No</b>	<b>Description of the Chapter</b>	<b>Description of the Topics</b>	<b>Total no of periods (L+T)</b>
1	Introduction Systems Programming	Machine Structure  Evolution of the Components of a Programming System  Assemblers  Loaders  Macros  Compilers  Formal systems  Evolution of Operating Systems  Operating System User View Point: Functions  Operating System User View Point: Batch Control Language  Operating System User View Point: Facilities	5+2
2	Assembly Language, Introduction to Instruction and Data Formats	General Machine Structure  General Approach to a New Machine  Machine Structure-360 and 370	4+1

3	Role of Base Register and Index Register	Machine Language Long Way, No Looping Address Modification Using Instructions as Data Address Modification Using Index Registers. Looping	5+1
4	Introduction to Assembler: Databases used in Assembler Design	General Design Procedure Design of Assembler Statement of Problem Data structure	3+1
5	Design of Assembler- Single Pass and Double Pass	Format of Data Bases Algorithm Looking for Modularity	5+1
6.	Introduction to Macros  Various types of Macros	Macro Instructions  Features of Macro Facility Macro Instruction Arguments Conditional Macro Expansion Macro Calls Within Macros Macro Instructions Defining Macros Implementation Implementation of a Restricted Facility: A Two Pass Algorithm A Single-Pass algorithm Implementation of Macro Calls Within Macros	6+2

8.	Design of Macro Processor-Single Pass and Double Pass	<p>Implementation</p> <p>Implementation of a Restricted Facility: A Two Pass Algorithm</p> <p>A Single-Pass algorithm</p> <p>Implementation of Macro Calls Within Macros</p>	5+2
9.	Introduction to Loaders, Functions of a Loader, Types of a Loaders, Data bases used in Loaders	<p>Loader Schemes</p> <p>Compile and Go Loaders</p> <p>General Loader Scheme</p> <p>Absolute Loaders</p> <p>Sub-routine Linkages</p> <p>Relocating Loaders</p> <p>Direct- Linking Loaders</p> <p>Other Loader Schemes-Binders, Linking Loaders, Overlays,Dynamic Binders.</p>	5+2
10.	Design of Loaders-Absolute and DLL	<p>Design of an Absolute Loader</p> <p>Design of a Direct- Linking Loader</p> <p>Specification of Problem</p> <p>Specification of Data Structures</p> <p>Format of Data Bases</p> <p>Algorithm</p>	5+1
11	Introduction to Software Tools	<p>Software tools for programming development</p> <p>Program Design and Coding</p> <p>Program Entry and Editing</p> <p>Program Testing and Debugging</p> <p>Enhancement of Program</p>	4+1

		Performance Program Documentation	
12	Text Editors	Editors Screen Editors Word Processors Structure Editors Design of Editor Debug Monitors Testing Assertions	3+1

Total no of instructional periods available for the course : 80 periods

Total no of estimated periods : 65 periods

**Signature of the H.O.D**

**Signature of the Faculty**

**Date:**



	<b><u>LECTURE PLAN</u></b>
DEPARTMENT	INFORMATION TECHNOLOGY
NAME OF LECTURER	J.Malathi

Sl.No	Topics to be covered	No. of Lecture hours	Teaching method	Program Outcomes
1	Evolution of components of S.P	1	BB	a,c
2	Evolution of O.S	1	BB	a,c
3	Function of O.S / in user view point	1	BB	a,b,c
4	Study hour (t) OS structures	1	BB	a,b,c
5	O.S batch control language	1	BB	b,c,d
6	Facilities of O.S	1	BB	b,c,d
7	General machine structure	1	BB	b,c,d
8	Flow chart for addition	1	PPT with LCD	b,c,d
9	Data formats in IBM/360	1	BB	b,c,d
10	Memory and registers in IBM/360	1	BB	b,c,d
11	Instruction formats in IBM/360 370	1	BB	b,c,d,e
12	Example assembly language program(T)	1	BB	b,c,d,e

13	Introduction to assemblies, general design procedure	1	BB	b,c,d,e
14	Pass 1 over view F.C	1	BB	b,c,d,e
15	Pass 2 over view F.C	1	PPT with LCD	b,c,d,e
16	Database table used in assembler	1	BB	b,c,d,e
17	Database formats in assembler	1	BB	b,c,d,e
18	Pass 1 in assembler detail F.C	1	BB	b,c,d,e
19	Pass 1 assembler	1	BB	b,c,d,e
20	Design of pass 2 of assembler	1		b,c,d,e
21	Loops in assembler	1	BB	b,c,d,e
22	Design of assemblers, look for modularity	1	BB	b,c,d,e
23	Macro's introduction, basic structures of macro	1	BB	b,c,d,e
24	Macro instruction with arguments	1	PPT with LCD	b,c,d,e
25	Macro call within macro, conditional macro expansion	1		b,c,d,e
26	Macro inst defining macro, statement of problem	1		
27	Databases used in pass 1 and pass 2, database formats	1	BB	b,c,d,e
28	Design of pass 1 in macro definition over view	1	BB	b,c,d,e
29	Over views of macro call	1		
30	F.C for macro inst defining	1	BB	b,c,d,e

	macros			
31	Read subroutine for macro inst defining macros	1	BB	b,c,d,e
32	Explanation of macro call within macro program	1	PPT with LCD	b,c,d,e
33	Macro call stack organization example	2	BB	b,c,d,e
34	Read subroutine for macro call	1	BB	b,c,d,e
35	Macro call single pass flowchart	2	BB	b,c,d,e
36	Loaders , functions of loaders	1	BB	b,c,d,e
37	Compile and go, general loader scheme	1	BB	b,c,d,e
38	Absolute and BSS loader scheme	2	BB	b,c,d,e
39	DIL loader scheme adv/disadv	1	BB	b,c,d,e
40	Dynamic loading overlay struct	1	BB	b,c,d,e
41	Dynamic linking , tree struct	1	BB	b,c,d,e
42	Design of absolute linking loader	1	PPT with LCD	b,c,d,e
43	Specify the problem 4 cards	1	BB	b,c,d,e
44	Design of DIL over view passes	1	BB	b,c,d,e
45	Sample program along with cards	2	BB	b,c,d,e
46	Databases and formats	1	BB	b,c,d,e
47	Pass 1 of DIL	1	PPT with LCD	b,c,d,e

48	Pass 2 of DIL	2	BB	b,c,d,e
49	Text editors	1	BB	b,c,d,e
50	Interpreters / debug monitions	1	BB	b,c,d,e
51	Program generators	1	BB	b,c,d,e
52	System tools	1	BB	b,c,d,e
53	System tools	1	BB	b,c,d,e
	Total classes	<b>62</b>		

**SIR C R REDDY COLLEGE OF ENGINEERING  
DEPARTMENT OF INFORMATION TECHNOLOGY**

**Subject: System Programming**

**Class: II/IV–I Sem**

**Question Bank for Unit-I**

**Short answer questions**

- 1) What is SP?
- 2). Differentiate between system software and application software.
- 3) What is the difference between assembler and Interpreter?
- 4) Define virtual memory, Time sharing, Multiprogramming.
- 5) What are the facilities offered by OS?
- 6) What is the role of Base register and index register?
- 7) What is Machine Language?

**Essay Type Questions**

- 1) Differentiate between system software and application software
- 2) What is Structure of machine?
- 3) What is the role of registers MAR and MBR, LC, IR
- 4) Draw flowchart for add instruction
- 5) Write about instruction formats
- 6) What is Batch processing and how it can be performed?
- 7) Write evolution of OS.
- 8) Write about components of SP?
- 9) What is the difference between pure and impure procedures?
- 10) Write a program to add 49 to data stored in consecutive 10 locations by the concept Address Modification using instruction as data.

**Question Bank for Unit-II**

**Short answer questions**

- 1) Define an Assembler
- 2) List databases used in design of an assembler
- 3) What is the structure of POT
- 4) Give the common databases for pass1 and pass 2 of an assembler
- 5) Give the additional database of Pass1 other than pass1

**Essay type questions**

- 1) Write format of ST, LT, MOT, POT
  - 2) . Write the design of a one pass assembler
  - 3) Explain the pass2 of two pass assembler
- For the following assembly code, design
- a) Symbol table
  - b) Literal table
  - c) Base table

```

SIMPLE  START
BALR   15, 0
USING  *, 15
LOOP L  R1, TWO
      A  R2, TWO
      ST R1, FOUR
      CLI FOUR +3,4
      BNE LOOP
      BR  14
R1     EQU  1
R2     EQU  2
TWO    DC   F'2'
FOUR   DS   F
      END

```

- 4) Draw a flowchart which resembles all the databases needed to design assembler
- 5) What is overview of pass2?

### Question Bank for Unit-III

#### Short answer questions

- 1) What is Macro? List the functions of macro
- 2) What is the format of databases MDT, MNT
- 3) List the databases used in pass1 and pass2
- 4) What is the difference between one pass macro processor and two pass macro Processor
- 5) Why one pass macro processor is not suitable to implement macro calls with in macros. Justify your answer

#### Essay type questions

- 1) Write the design of macro calls with in macro with neat flowchart
- 2) Write the design of macro which is defined in another macro with neat Flowchart.
- 3) Write the Design of macro processor pass2 with neat flowchart.
- 4) Write the Design of macro processor pass1 with neat flowchart
- 5) . Explain about macro instruction arguments
- 6) . What do you mean conditional macro expansion? Explain with suitable example
- 7) Explain macro calls within macros

### Question Bank for Unit-IV

#### Short answer type questions

- 1) What is Loader and Enumerate functions of Loader
- 2) . What is Absolute Loader and Enumerate functions of Absolute Loader
- 3) Write about Dynamic Linking and Dynamic Loading
- 4) Write about cards ESD, TXT, RLD, END
- 5) Write the format for GEST, LESA

### **Essay type questions**

- 1) Explain the following
  - a.) Absolute loader
  - b.) DLL
  - c.) Subroutine Linkage
- 2) Explain the design of direct linking loader with flowcharts
- 3) Write about Pass2 of the design of DLL with flowchart
- 4) Write about databases for the design of DLL
- 5) Write about design of Absolute Loader
- 6) Write about binders and types of binders
- 7) Write about Relocating Loaders with example program
- 8) What is Subroutine linkage and Explain with example program

### **Question Bank for Unit-V**

#### **Short answer type questions**

- 1) Define software tool
- 2) . Write software tools for program development
- 3) Define user interfaces
- 4) Write Principles of user interfaces
- 5) . Define Editors
- 6) Define Interpreters
- 7) Define Debug Monitors

#### **Essay type questions**

- 1) Write about how concurrency can be occurred
- 2) Write about Program Generators
- 3) Write about the steps involved in debugging
- 4) Write about different types of Interpreters
- 5) Write about structure of editor
- 6) Write command dialogs of user interfaces