CO	Internal Exam	Assignment	Lab Assessment	End Semester Examinations
CO 1	✓		✓	✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓		✓	✓

2. SYSTEM SOFTWARE

Discipline	COMPUTER SCIENCE				
Course Code	UK3DSCCSC201				
Course Title	SYSTEM SOFTWARE				
Type of Course	DSC				
Semester	III				
Academic Level	2				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	-	2 hours	5 hours
Pre-requisites	Basic knowledge on Operating Systems is desirable.				
Course Summary	This course is designed to provide students with an understanding of the core principles, components, and functionalities of system software.				

Detailed Syllabus:

Module	Unit	Content	Hrs (L+P)
I	**Types of Software**		**15**
	1	System Software vs Application Software, Different System Softwares– Assembler, Linker, Loader, Macro Processor, Text Editor, Debugger, Device Driver, Compiler, Interpreter, Operating Systems.	
	2	System software and machine architecture – The simplified Instructional Computer (SIC).	
	3	Machine architecture - Data and instruction formats - addressing modes - instruction sets.	
II	**Assemblers**		**15**
	4	Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures.	
	5	Machine dependent assembler features - Instruction formats and addressing modes – Program relocation.	
	6	Machine independent assembler features - Literals – Symbol-defining statements – Expressions.	
	7	One pass Assembler and Multi pass Assemblers.	
III	**Linkers & Loaders**		**15**
	8	Basic loader functions - Design of an Absolute Loader - Machine dependent loader features - Relocation – Program Linking.	
	9	Machine-independent loader features – Automatic Library Search – Loader Options.	
	10	Linkage Editors – Dynamic Linking – Bootstrap Loaders.	

IV	**MACROPROCESSOR AND SYSTEM SOFTWARE TOOLS**		**15**
	11	Basic macro processor functions - Macro Definition and Expansion.	
	12	Macro Processor system software tools, Text editors - Overview of the Editing Process - User Interface – Editor Structure.	
	13	Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.	
V		**Flexi Module: Not included in End Semester Exams**	**15**
	14	Introduction to compilers, Phases of compilation, Finite Automata, Context-free Grammars	

References

1. Leland L. Beck, *System Software – An Introduction to Systems Programming*, 3rd Edition, Pearson Education Asia, 2006.
2. D. M. Dhamdhere, *Systems Programming and Operating Systems*, Second Revised Edition, Tata McGraw-Hill, 2000.

Lab Exercises

1. Implement pass one of a two pass assembler.
2. Implement pass two of a two pass assembler.
3. Implement a single pass assembler.

Lab Resource: https://www.vtuloop.com/system-software-lab-all-in-one/

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO 1	Differentiate between various types of system software and their specific roles.	U	PSO -1
CO 2	Explain basic assembler and loader functions,	U	PSO -1,2,3
CO 3	Identify basic functions of loaders and linkers	U	PSO -1,2,3
CO 4	Use macro processor functionalities, text editing tools, and interactive debugging systems	Ap	PSO -1,3

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create *Note: 1 or 2 COs/module*

Name of the Course: SYSTEM SOFTWARE

Credits: 3:0:1 (Lecture: Tutorial: Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
1	Differentiate between various types of system software and their specific roles.	PO - 6, 7 PSO -1, 3	U	F, C	L	P
2	Explain basic assembler and loader functions,	PO - 1, 2, 6, 7 PSO -1,2, 3	U	F, C, P	L	P
3	Identify basic functions of loaders and linkers	PO - 1, 2, 6, 7 PSO -1,2, 3	U	F, C, P	L	P
4	Use macro processor functionalities, text editing tools, and interactive	PO - 1, 2, 6, 7 PSO -1, 3	Ap	F, C, P	L	P

	debugging systems					

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CO 1	1	1	-	-	-	2	1	-	3	1	2	-
CO 2	2	1	-	-	-	2	1	-	3	2	2	-
CO 3	2	1	-	-	-	2	1	-	3	2	2	-
CO 4	-	-	-	-	-	2	3	-	3	-	2	3

Correlation Levels:

Level	**Correlation**
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics: