SYSTEM SOFTWARE INTERNALS **3 0 0 3**

OBJECTIVE

Issues related to the design and implementation of assembles, role of linkers and loaders as well as their interactions with hardware, working nature of macro processors and design of virtual machines are the core of this course.

UNIT – I ASSEMBLERS **12**

Review of Computer Architecture – Machine Instructions and Programs – Assemblers –Basic Assembler Functions – Assembler Features – Assembler Design Options.

UNIT – II LOADERS AND LINKERS **8**

Loaders and Linkers – Basic Loader Functions – Machine-Dependent Loader Features –Machine-Independent Loader Features– Loader Design Options-Dynamic Linking and Loading- Object files- Contents of an object file – designing an object format – Null object formats- Code sections- Relocation – Symbols and Relocation – Relocatable a.out- ELF.

UNIT – III MACROPROCESSORS **7**

Macroprocessors – Basic Macro Processor Functions – Machine-Independent Macro Processor Features – Macro Processor Design Options - Emulation - basic Interpretation – Threaded Interpretation – Interpreting a complex instruction set – binary translation.

UNIT – IV VIRTUAL MACHINES **9**

Introduction to Virtual Machines (VM) – Computer Architecture- Virtual machine basics – Process virtual machines – System virtual machines – Taxonomy – Summary - Pascal P-Code VM – Object-Oriented VMs – Java VM Architecture – Common Language Infrastructure – Dynamic Class Loading.

UNIT – V EMERGING APPLICATIONS **9**

Instruction Set Issues – Profiling – Migration – Grids – Code optimizations- Garbage Collection - Examples of real world implementations of system software.

TOTAL : 45

TEXT BOOKS:

1. Leland L. Beck, “System Software”, 3rd ed., Pearson Education, 1997.
2. John R. Levine, “Linkers & Loaders”, Morgan Kauffman, 2003.
3. James E Smith and Ravi Nair, “Virtual Machines”, Elsevier, 2005.

REFERENCES:

1.. Robert W. Sebesta, “Concepts of Programming Languages”, 7th ed., Pearson Education, 2006.
2. Terrance W Pratt, Marvin V Zelkowitz, T V Gopal, “Programming Languages”, 4th ed.,Pearson Education, 2006.
3. Srimanta Pal, “ Systems Programming “ , Oxford University Press, 2011.
4. John J.Donovan, “ “Systems Programming”, Tata McGraw-Hill, 1991.