SEMESTER-V

Title of the Paper: Software Engineering		
Credit: 4 **Course Outcome:**	At the end of this course, the successful students will be able to: • Know steps required to follow before writing software. • Write quality software. • Validate software. • Test software to identify vulnerabilities.	Theory

Unit –I

Software Engineering Definition, Cost, schedule and quality, Software quality attributes, Software Development Process Models, Waterfall Model, Prototyping Model, and Iterative Development.

Unit –II

Software Qualities, External qualities, internal qualities, Correctness, Reliability, Robustness, Usability, verifiability, Maintainability, reusability, Portability, interoperability, interoperability, Software Requirement Specification (SRS), Characteristics of SRS, Components of SRS.

Unit –III

Risk analysis, Spiral model, COCOMO Model, errors, fault and failure in software, Top-down approach and Bottom up approach for software design.

Unit –IV

Software Testing –System testing, Component testing, Integration testing, Black Box testing, White Box testing, alpha testing, Beta testing, Validation Vs Verification, Software errors and their causes of occurrence, Software quality definition, Cohesion and its types, Coupling and its major types.

Referenced Books:

[1] Pankaj Jalote, "Software Engineering: A Precise Approch", Wiley Publication.

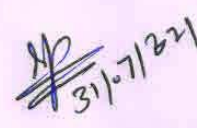[2] Rajib Mall, "Fundamentals of Software Engineering", PHI, Fifth Edition.

Suggested Readings:

[1] Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, "Fundamentals of Software Engineering", PHI.

[2] K K Agarwal, yogesh Singh, "Software Engineering", New Age international.

Weblinks:

[1] http://heecontent.upsdc.gov.in/

[2] http://web.firat.edu.tr/mbaykara/softwareengineering.pdf

Title of the Paper: Computer Architecture and Microprocessor		
Credit: 4 **Course Outcome:**	At the end of this course, the successful students will be able to: - Know various components of microprocessor. - Understand registers organization in Microprocessor - Develop assembly language program. - Understand DMA Controller.	**Theory**

Unit –I
Sequential circuit, Combinational Circuit, Flip-Flops (RS, Clocked RS, T, D, JK, Master Slave), Counters and its types, Registers, Encoder and Decoder, Half Adder, Full Adder, Half Sub-tractor, Multiplexer, De-Multiplexer.

Unit –II
Introduction of Microprocessor: Evolution of microprocessor, Embedded microprocessor, Bit-Slice Processor, RISC and CISC Processor, Vector Processor Array processor, Intel 8086 Microprocessor: Pin description of Intel 8086, operating model of 8086, Register organization of 8086, Bus Interface and Execution Unit (BIU and EU), Interrupts 8086 Read and write Bus Cycle.

Unit –III
8086 Instruction Group: Data transfer Instruction , Arithmetic Instruction, Logical Instruction processor Control Instructing, string Instructions, Interrupts instructions, Addressing modes of 8086 Micro–Processor

Unit –IV
Synchronous Data Transfer, Asynchronous Data Transfer, Interrupt Driven Data Transfer DMA Controller Address space partitioning – Memory mapped I/O scheme, I/O mapped I/O scheme.

Referenced Books:

[1] V. Rajaraman and T. Radhakrishnan, "Digital Logic and Computer Organization", PHI Publication, Fourth Edition.

[2] B. Ram, "Fundamentals of Microprocessor and Microcomputers", Dhanpat Rai Publications, Sixth Edition.

Suggested Readings:

[3] M. Morris Mano, "Computer System Architecture", PHI publication, Third Edition.

[4] Gaonkar, Ramesh S, "Microprocessor Architecture, Programming and Application with 8085", Penram International Publication.

Weblinks:

[1] http://heecontent.upsdc.gov.in/

[2] https://udrc.lkouniv.ac.in/Department/DepartmentDetail/StudyMaterial?dept=34

Title of the Paper: Cloud Computing		
Credit: 4		Theory
Course Outcome:	At the end of this course, the successful students will be able to: • Understand Cloud Computing concepts. • Avail global services of cloud computing. • Use different service models	

Unit –I
Cloud Computing, Characteristics of Cloud Computing, inherent risks with cloud computing, Service models, Deployment Models, Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud, Benefits and challenges in cloud computing.

Unit –II
Cloud Service Models, Software-as-a-service, Platform-as-a-service, Infrastructure-as-a-service, Benefits and Characteristics of SaaS, PaaS and IaaS, Cloud based services and Applications, Virtualization, Hypervisor, Guest OS.

Unit –III
Explanations about Full Virtualization, Para-virtualization, Hardware-Virtualization, Load Balancing, Scalability and Elasticity, Deployment, Replication and its types, Cloud Application Development life-cycle, Software Defined Networking (SDN).

Unit –IV
SDN architecture, SDN layers, elements of Software Defined Networking, Network Function Virtualization, NFV architecture, Cloud reference Model, Cloud Services, Cloud Stack architecture, Azure platform, Hadoop Schedulers.

Referenced Books:

[1] Arshdeep Bahga and Vijay Madisetti, "Cloud Computing: A Hands on Approach", University Press.

[2] Ray J Rafaels, "Cloud Computing: from beginning to end", McGraw Hill.

Suggested Reading:

[1] Jagannath Kallakurchi and Kailash Jayaswal, "Cloud Computing Black Book", Dreamtech Publication.

[2] Mehul Mahrishi, Kamal Kant Hiran, Ruchi Doshi, Fagbol, "Cloud Computing", BPB Publication.

Weblinks:

[1] http://heecontent.upsdc.gov.in/

[2] https://www.sanog.org/resources/sanog26/SANOG26_Tutorial%20-%20Introduction_Cloud_Computing_Sreenath.pdf

Title of the Paper: Database Technologies		
Credit: 4 Course Outcome:	At the end of this course, the successful students will be able to: • Know basic concepts of Database. • Organize and Clustering Data • Normalize stored data	Theory
Unit –I		
Data Modeling for a Database, Entities and their attributes, relationship, Record and files, Abstraction and Data Integration, The three level architecture proposal for a DBMS, Components of Database, Classification of DBMS Users, Role of Database Administrator.		
Unit –II		
Data Definition Languages, Data Manipulation Languages, DBMS facilities, Structure of DBMS, Advantages and Disadvantages of DBMS, Database association, Entities, Attributes, Data Models Classification, Entity-relationship model.		
Unit –III		
Normalization, first Normal form, Second Normal form, third Normal form, BCNF. Database Schema, Primary keys, super key, simple key, composite key, foreign key, candidate key. Relational Data Model, Network Data Model.		
Unit –IV		
Hierarchical Model, Attributes and Domains, Tuples, Database Design, Design process, Entity relationship model, Entity-relationship design issues, Relational Database design, Features of Good Relational Design, Deadlock.		

Referenced Books:

[1] Bipin C Desai, "An Introduction to Database Systems", Galgotia Publication.

[2] Abraham Silberschatz, Henry F. Korth, S. Sudarshan "Database System Concepts", McGraw Hill.

Suggested Readings:

[1] C J Date, A. Kannan and S. Swamynathan, "An Introduction to Database Systems", Pearson

[2] P. joseph, "Introduction to Database Systems", ITL Education Solutions Limited

Weblinks:

[1] http://heecontent.upsdc.gov.in/

[2] http://www.ddegjust.ac.in/studymaterial/mca-3/ms-11.pdf

Title of the Paper: Internship/Assignment		
Credit: 4	At the end of this course, the successful students will learn:	**Theory**
Course Outcome:	• To identify problems. • To Dataflow diagrams. • To establish relations among entities	

In internship/Assignment the students are expected to learn project management. Students will have to do following tasks in their fifth semester:

1. Choosing a real time problem.
2. Defining the area of coverage in problem statement.
3. Identifying Entities and relationships among them.
4. Constructing E-R diagram
5. Constructing the data Flow among the entities.
6. Identification of primary key, foreign key and composite key.
7. Identifying the number of tables required across the project.

*** Student should remember that the Title of their Internship project/Assignment taken in fifth semester will get converted into Minor project (same title) and shall be continue till end of six semester. In the fifth semester exam, the marks shall be given to the students on the basis of above seven points performed in semester.