

GOVERNMENT COLLEGE OF ENGINEERING, JALGAON.

Department of Computer Engineering.

Scheme for B. Tech. (Computer Engineering)

SEM V

Course Code	Name of the Course	Group	Teaching Scheme Hrs /week				Evaluation Scheme							Credits
			TH	TU T	P R	Total	Theory				Practical		Total	
							IS A	ISE 1	ISE 2	ES E	IC A	ES E		
CO301	Theory of Computer Science	D	3	---	---	3	10	15	15	60	---	---	100	3
CO302	Software Engineering	D	3	---	---	3	10	15	15	60	---	---	100	3
CO303	System Programming	D	3	---	---	3	10	15	15	60	---	---	100	3
CO304	Computer Network Technology	D	3	---	---	3	10	15	15	60	---	---	100	3
CO305	Microprocessor and MicroController Interfacing	D	3	---	---	3	10	15	15	60	---	---	100	3
CO306	Web Programming Lab	B	1	---	2	3	---	---	---	---	25	25	50	2
CO307	Software Engineering Lab	D	---	---	2	2	---	---	---	---	25	25	50	1
CO308	System Programming Lab	D	---	---	2	2	---	---	---	---	50	---	50	1
CO309	Computer Network Technology Lab	D	---	---	2	2	---	---	---	---	25	25	50	1
CO310	Microprocessor and MicroController Interfacing Lab	D	---	---	2	2	---	---	---	---	25	25	50	1
CO311	Self Study-I	D	---	---	---	---	---	---	---	---	---	---	50**	2
Total			16		10	26	50	75	75	300	150	100	800	23

TH :Theory Lecture, TUT:Tutorial, PR:Practical

ISA :Internal Sessional Assessment ISE: In Semester Examination ESE: End Semester Examination ICA : Internal Continuous Assessment

• ** Marks and hence grade of course Self Study shall be based on one test each conducted on 20% syllabus of Five Subjects- CO301,CO302,CO303,CO304,CO305.One faculty member should be appointed as course coordinator for the course 'self study' to compile the marks of all tests and enter in to MIS.

• The 20% syllabus for self - study shall be declared by subject teacher at the beginning of semester and he/she shall conduct the test examination for that corse, assess answer papers of test examination and submit the marks to course coordinator.

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SEM VI

Course Code	Name of the Course	Group	Teaching Scheme				Evaluation Scheme							Credits	
			Hrs /week				Theory				Practical				Total
			TH	TU T	P R	Total	IS A	ISE 1	ISE 2	ES E	IC A	ESE			
CO351	Database Management System	D	3	---	---	3	10	15	15	60	---	---	100	3	
CO352	Operating System	D	3	---	---	3	10	15	15	60	---	---	100	3	
CO353	Design and Analysis of Algorithms	D	3	---	---	3	10	15	15	60	---	---	100	3	
CO354	Artificial Intelligence and Expert System	D	3	---	---	3	10	15	15	60	---	---	100	3	
CO355	Finance and Management Information System	C	3	---	---	3	10	15	15	60	---	---	100	3	
CO356	Database Management System Lab	D	---	---	2	2	---	---	---	---	25	25	50	1	
CO357	Operating System Lab	D	---	---	2	2	---	---	---	---	50	---	50	1	
CO358	Design and Analysis of Algorithms Lab	D	---	---	2	2	---	---	---	---	25	25	50	1	
CO359	Advanced Programming Lab	B	---	---	2	2					25	25	50	1	
CO360	Miniproject	D	----	----	2	2	---	----	---	----	25	25	50	2	
CO361	Self Study-II	D	---	---	----	---	---	---	---	---	---	---	50**	2	
CO362	Industrial Lectures	D	1	---	----	1	---	---	---	---	---	---	---	---	
Total			16	---	10	26	50	75	75	300	150	100	800	23	

TH :Theory Lecture, TUT:Tutorial, PR:Practical

ISA :Internal Sessional Assessment ISE: In Semester Examination ESE: End Semester Examination ICA : Internal Continuous Assessment

* Evaluation of the course CO362 Industrial lectures shall be done in VIIIth semester along with the subject CO460 Industrial lectures

• ** Marks and hence grade of course Self Study shall be based on one test each conducted on 20% syllabus of Five Subjects- CO351,CO352,CO353,CO354,CO355.One faculty member should be appointed as course coordinator for the course 'self study' to compile the marks of all tests and enter in to MIS.

• The 20% syllabus for self - study shall be declared by subject teacher at the beginning of semester and he/she shall conduct the test examination for that course, assess answer papers of test examination and submit the marks to course coordinator.

CO301 THEORY OF COMPUTER SCIENCE

Teaching Scheme: 03L + 00T, Total: 03

Evaluation Scheme: 10 ISA + 15 ISE1 + 15 ISE2 + 60 ESE

Duration of ESE: 03Hrs

Credit: 03

Total Marks: 100

Course Description:

This course provide the knowledge of finite automata, regular grammar, context free grammar, pushdown automata and Turing machine concept and demonstrate how these concepts can be applied to solve nontrivial real life problems.

Desirable awareness/skills:

Discrete Structure and Graph Theory

Course Objectives:

The objectives of offering this course are:

- 1 to Study computing machines by describing, classifying and comparing different types of computational models
- 2 encourage students to study & develop fundamentals for Computational Theory

Course Outcomes:

On the successful completion of this course student shall be;

- 1 able to develop analytical thinking and intuition for problem solving situations in related areas of theory of computation
- 2 able to understand and design Regular Grammar, Finite Automata, Context Free Grammar, Pushdown Automata and Turing Machines.
- 3 able to Simplify Context Free Grammar and then convert to CNF and GNF.
- 4 able to understand Pumping Lemma, Properties of Regular Languages and Context Free Languages.

Relevance of PO's and Strength of Co- Relation:

Sr. No	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	3
B	An ability to identify, formulates, and solves engineering problems.	3
C	An ability to design and conduct experiments, as well as to analyze and interpret data.	2
D	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	1

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

Finite Automata: Alphabet, language, operations, finite state machine, definitions, finite automation model, acceptance of strings and languages. Non deterministic finite automation, deterministic finite automation, equivalence between NFA and DFA, conversion of NFA into DFA, minimization of FSM, Moore and Mealy machines.

Regular Expressions: Regular sets, regular expressions, identity rules, manipulation of regular expressions, equivalence between RE and FA, inter conversion, pumping lemma, closure properties of regular sets.

Regular Grammars: Right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion between RE and RG.

Context Free Grammars and Languages: Context free grammars, parse trees, application of context free grammars, ambiguity in grammars and languages, derivation trees, Chomsky normal form, greibach normal form, closure properties of context free languages

Push Down Automata: Definition of the pushdown automaton, the languages of a PDA, equivalence of PDA's and CFG's, interconversion, deterministic **pushdown automaton**.

Turing Machine: Definition, model, design of TM, computable functions, church's hypothesis, counter machine, types of TM's, universal Turing machine, chomsky hierarchy of languages, linear bounded automata and context sensitive language. Introduction of DCFL and DPDA, decidability of problems.

Text Books:

- 1 Introduction to Automata Theory, Languages and Computation by John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman ,3rd Edition, Addison-Wesley Publishing Co.,2007, ISBN-9788131720479 .
- 2 An Introduction to Formal Languages and Automata by Peter Linz, 4th Edition, Jones and Bartlett Publication, 2006, ISBN:13: 9780763737986.
- 3 Elements of Discrete Mathematics by C. LIU, 2nd Edition, Tata McGraw-Hill, 2002, ISBN 0-07-043476 X.

Reference Books:

- 1 Introduction to Languages and the Theory of Automata by John C. Martin, 2nd Edition, McGraw- Hill Publication, 2003, ISBN:9780072322002.
 - 2 Theory of Computer Science Automata, Languages and Computation by K.L.P.Mishra ,N. Chandrasekaran, , 2nd Edition PHI, 2007, ISBN- 9788120329683.
 - 3 Elements of Theory of Computation, Lewis H.P. and Papadimition C.H., 2nd Edition, Prentice Hall Publication, 1997, ISBN:0132624788
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CO302 SOFTWARE ENGINEERING

Teaching Scheme: 03L + 00T, Total: 03

Credit: 03

Evaluation Scheme: 10 ISA + 15 ISE1 + 15 ISE2 + 60 ESE

Total Marks: 100

Duration of ESE: 03 Hrs

Course Description:

This course introduces students the knowledge of Software Development Life Cycle, Software Engineering Process, Agile development process, SCRUM process, requirement engineering, software analysis, software design, user interface design, software testing principles and project planning & management concepts to develop quality software economically, formal methods, automation and trends in software engineering.

Desirable awareness/skills:

Knowledge of programming languages and data structures.

Course Objectives :

The objectives of offering this course are:

1. to understand the nature of software complexity in various application domains, disciplined way of software development and software lifecycle process models.
2. to introduce principles of agile software development, the SCRUM process and agile practices.
3. to know methods of capturing, specifying, visualizing and analyzing software requirements.
4. to understand concepts and principles of software design and architecture.
5. to understand user-centeredness approach and principles of designing effective user interfaces.
6. to present formal methods, automation and recent trends in software engineering.

Course Outcomes:

On the successful completion of this course students shall be;

1. able to identify unique features of various software application domains and classify software applications.
2. able to apply appropriate lifecycle model of software development.
3. able to apply principles of agile development.
4. able to identify user needs and formulate software specifications.
5. able to analyze software requirements by applying various modeling techniques.
6. able to translate the requirements model into the design model

Relevance of POS and Strength of Co-Relation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	2
B	An ability to design and conduct experiments, as well as to analyze and interpret data	1
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	2
D	An ability to identify, formulates, and solves engineering problems.	1
E	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	3

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Contents:

Software Engineering Process-Nature of software – application domains, web-apps, mobile-apps, cloud computing, product line software introduction to software engineering – The discipline, layers, the process (guiding principles), the practice (guiding principles) and myths Process models – Generic process model, process assessment and improvement, prescriptive models, specialized models, unified process, product and process

Agile Development Process – Agile manifesto, agility and cost of change, agility principles, myth of planned development, toolset for the agile process Extreme Programming – XP values, process, industrial XP SCRUM – process flow, scrum roles, scrum cycle description, product backlog, sprint planning meeting, sprint backlog, sprint execution, daily scrum meeting, maintaining sprint backlog and burn-down chart, sprint review and retrospective Agile Practices - test driven development, refactoring, pair programming, continuous integration, exploratory testing versus scripted testing

Requirement Engineering-Requirements Capturing - requirements engineering (elicitation, specification, validation, negotiation), eliciting requirements, elicitation techniques, developing use cases, building requirements model, negotiating requirements, requirements monitoring, validating requirements, prioritizing requirements (kano diagram)

Requirements Analysis – basics, scenario based modeling, UML models, data modeling, data and control flow model, behavioral modeling using state diagrams Agile Requirements - user stories, 3 Cs of user story, INVEST characteristics.

Software Design – definition of design, translating requirements model to design model, design considerations (quality guidelines and attributes), design concepts, design model,

design strategies or methods (function oriented, data-flow-oriented, object-oriented, data-structure-centered, aspect-oriented), design methods classification , design trade-offs, Software architecture, architectural styles (data-centered, data-flow, call and return, layered, peer-to-peer, publish-subscribe, event-based, client-server), architectural trade-off analysis method (ATAM), domain-specific architectures and product-lines

User Interface Design – Seeheim model and definition of user interface User-centeredness in design - dealing with different types of users, collecting user-requirements, building narratives, creating personas and scenarios Interface design principles–place the user in control, reduce user’s memory load, make interface consistent, Shneiderman's 8 Golden Rules UI Analysis – context of use, user analysis, task analysis Interface design steps – user interface design process, applying design steps, interface design issues Usability - characteristics (ISO, Shneiderman, Nielson) , principles (principle of proximity, visibility, visual feedback, visual prominence, mental models and metaphors, consistency, affordance and constraints, confirmation, Hick’s law, Fitt’s law)

Formal Methods, Automation and Trends in Software Engineering- Cleanroom Design – cleanroom strategy, process model, black-box, state-box, clear-box specifications, design refinement and verification, cleanroom testing Software configuration management – SCM basics, SCM repository, SCM process CASE – taxonomy, tool-kits, workbenches, environments, components of CASE, categories(upper, lower and integrated CASE tools) emerging software engineering trends – technology evolution, process trends, collaborative development, model-driven development, test-driven development , challenges of global software development.

Text Books:

1. Software Engineering: A Practitioner's Approach by Pressman, R., 7th or 8th Edition, Singapore: McGraw Hill, 2010, ISBN- 9780071267823
2. Agile Software Development with SCRUM by Schwaber, K. and Beedle, M., 1st Edition, New Jersey : Pearson, 2001, ISBN- 9780130676344.
3. User-Centered Design by Lowdermilk, T., 1st edition, O'Reilly Media, 2013, ISBN- 9781449359836.

Reference Books :

1. Software Engineering: Principles and Practice by Vliet, H, Ian Sommerville, Peter Sawyer, Requirement Engineering A Good Practice Guide,3rd Edition, New Delhi: Wiley India Pvt Ltd., 2012, ISBN- 978-81-265-2457-0.
 2. Software Engineering, by Somerville, I. 9th Edition, New Jersey: Pearson Education, 2010, ISBN - 9788131762165.
 3. An Integrated Approach to Software Engineering by Jalote P., 3rd Edition, Narosa Publishing House, 2011, ISBN- 9788173197024.
 4. Agile Web Development with Rails by Ruby, et. Al, Pragmatic, ISBN- 9789350234303.
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CO303 SYSTEM PROGRAMMING

Teaching Scheme: 03L + 00T, Total: 03

Credit: 03

Evaluation Scheme: 10 ISA + 15 ISE1 + 15 ISE2 + 60 ESE

Total Marks: 100

Duration of ESE: 03 Hrs

Course Description:

This course introduces system programming concepts. Provide knowledge of compiler and different phases of compilers, assemblers, various parsers and linkers and loaders.

Desirable awareness/skills:

Data Structures, Computer Organization, Microprocessors, Basic searching and sorting algorithms

Course Objectives:

The objectives of offering this course are:

1. to learn and understand fundamentals of System Software Programs as Assembler, Macro-processor, Linkers and Loaders.
2. to learn how to design and develop various System Software Programs.
3. to study and implement phases of compiler.

Course Outcomes:

At the end of this course, students shall be able to;

1. able to design & implement system programs as assembler, macro-processor, linker and loader.
2. able to use tool Lex for generation of Lexical Analyzer.
3. able to use tool YACC for generation of Syntax Analyzer.

Relevance of POS and Strength of Co-Relation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering	2
B	An ability to design and conduct experiments, as well as to analyze and interpret data.	1
C	An ability to identify, formulates, and solves engineering problems.	2
D	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	2

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

Introduction to System Programming: Machine structure, evolution of component of a programming system, evolution of operating system, operating system user viewpoint: functions, operating system user viewpoint: batch control language, operating system user viewpoint : facilities

Machine Structure, Machine Language and Assembly Language: General machine structure, machine language, assembly language

Assemblers: General design procedure, design of assembler, table processing, hash or random entry searching.

Macro Language and Macro Processor: Macro instructions, features of a macro facility, implementation.

Loader: Loaders- loader schemes, design of an absolute loader, design of a direct linking loader, algorithm.

Programming Languages: Importance of high level languages, features of a high level language, data types and data structure, storage allocation and scope of names, accessing flexibility, functional modularity, asynchronous operation, extensibility and compile-time macros.

Operating System: I/O Programming : Multiple processors and interrupt mechanism, evolution of multiple processors system, I/O programming, I/O processor structure, examples of I/O programs, communication between CPU and channel, interrupt structure and processing, example of I/O interrupt processing, multiple processors.

Text Books:

1. Systems Programming by John J. Donovan, 1st edition, Tata McGraw-Hill, 1991, ISBN 0-07-460482-1.
2. Systems Programming and Operating Systems by D.M. Dhamdhere, 2nd Edition, Tata McGraw-Hill, ISBN:13:9780074630839.

Reference Books:

1. System Software An Introduction to Systems Programming by Leland L. Beck, 3rd Edition, Pearson Education, 1997, ISBN 81-7808-036-2.
 2. System Programming with C and Unix by Adam Hoover, 1st edition, Pearson, SPD, 2009, ISBN-13: 978-0-13-606712-2.
 3. Compilers Principles, Techniques, and Tools by Alfred V. Aho, 2nd Edition, Addison Wesley, 2007, ISBN 981-235-885-4.
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CO304 COMPUTER NETWORK TECHNOLOGY

Teaching Scheme: 03L + 00T, Total: 03

Credit: 03

Evaluation Scheme: 10 ISA + 15 ISE1 + 15 ISE2 + 60 ESE

Total Marks: 100

Duration of ESE: 03 Hrs

Course Description:

This course introduces data communication techniques and concept of computer network technology. Provide knowledge of networking and different protocols of network at different layer. It also provides wired and wireless network concepts. Provides the concept of third generation satellite network communication.

Desirable awareness/skills:

Data communication, data structure. discrete structure.

Course Objectives:

The objectives of offering this course are:

1. to learn general principles of network design and different network protocols.
2. to learn various addressing and format.
3. to understand various techniques of namespace, resolution, remote logging and electronics mail.
4. to learn the concept of cryptography and firewalls.

Course Outcomes:

On the successful completion of this course student shall be;

1. able to design wired and wireless network.
2. able to wired as well as wireless Communication Methods.
3. able to design secure communication over the network.
4. able to provide in-depth knowledge of data link layer, network layer, transport layer, application layer technologies.

Relevance of POS and Strength of Co-Relation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to design and conduct experiments, as well as to analyze and interpret data.	2
B	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	3

C	An ability to identify, formulate, and solve engineering problems.	1
D	An ability to communicate effectively.	3
E	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	2

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

Data Link Control: TCP/IP protocol suite: physical and data link layers, network layer, transport layer, application layer addressing: physical addresses, logical addresses, port addresses, specific addresses.

Wired LANs- Ethernet: IEEE standards- data link layer, physical layer standard Ethernet: MAC sublayer, physical layer changes in the standard: bridged ethernet, switched ethernet, full-duplex ethernet fast Ethernet: MAC sublayer, physical layer gigabit ethernet: MAC sublayer, physical layer, ten-gigabit ethernet.

Network Layer: IPv4 Addresses- address space, notations, classful addressing, classless addressing, network address translation, IPv4- datagram, fragmentation, checksum, options IPv6 addresses: structure, address space IPv6- advantages, packet format, extension headers transition from IPV4 to IPV6- dual stack, tunnelling, header translation address mapping: mapping logical to physical address- ARP, mapping physical to logical address- RARP, BOOTP, and DHCP ICMP- types of messages, message format, error reporting, query, debugging tools delivery- direct versus indirect delivery, forwarding techniques, routing table.

Transport Layer: process-to-process delivery- client/server paradigm, multiplexing and demultiplexing, connectionless versus connection-oriented service, reliable versus unreliable, three protocols user datagram protocol (UDP)- well-known ports for UDP, user datagram, checksum, UDP operation use of UDP, TCP- TCP services, TCP features, segment, A TCP connection, flow control, error control, congestion control, quality of service- flow characteristics, flow classes.

Application Layer: Name space: flat name space, hierarchical name space, domain namespace- label, domain name, domain distribution of namespace- hierarchy of name servers, zone, root server, primary and secondary servers. DNS in the internet- generic domains, country domains, inverse domain resolution- resolver, mapping names to addresses, mapping address to names, recursive resolution, iterative resolution, caching. remote logging- telnet, electronic mail- architecture, user agent, message transfer agent- smtp, message access agent- pop and imap, web-based mail, file transfer- file transfer protocol (ftp), anonymous ftp architecture- client (browser), server, uniform resource locator, cookies.

Wireless LANs and WANs : IEEE 802.11- architecture, MAC sublayer, addressing mechanism, physical layer cellular telephony- frequency-reuse principle, transmitting, receiving, roaming, first generation, second generation, third generation satellite networks- orbits, footprint, three categories of satellites, GEO satellites, MEO satellites, LEO satellites.

Text Books:

1. Data Communications and Networking by B. A. Forouzan, 4th Edition, TMH, 2009, ISBN-13-9780070634145.
2. Computer Networks by A. S. Tanenbaum, 4th Edition, Pearson Education, 2005, ISBN-8177581651.
3. Computer Networks: A Systems Approach by Larry L. Peterson, 5th Edition, Morgan Kaufmann Publishers, 2011, ISBN- 9789380501932.

Reference Books:

1. 802.11 Wireless Networks: The Definitive Guide by Matthew S. Gast, 2nd Edition, O'Reilly, 2005, ISBN-13: 978-0596100520
 2. Communication networks- Fundamental concepts and key architectures by Alberto, Leon Garcia, 2nd edition, TMH, 2004, ISBN- 9780070595019.
 3. Computer Networking - A Top-Down Approach featuring the Internet by James F. Kurose, 6th Edition, Pearson Education, 2009, ISBN-13: 978-0132856201.
 4. Computer and Communication Networks by Nader. F. Mir, 2nd Edition, Pearson Prentice Hall publishers, 2010, ISBN-13: 978-0-13-381474-3.
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CO305 MICROPROCESSOR AND MICROCONTROLLER INTERFACING

Teaching Scheme: 03L + 00T, Total: 03

Credit: 03

Evaluation Scheme: 10 ISA + 15 ISE1 + 15 ISE2 + 60 ESE

Total Marks: 100

Duration of ESE: 03Hrs

Course Description:

This course introduces the student to the 8085 8-bit microprocessor, 8086 16-bit microprocessor, microprocessor configuration, 80386 32-bit microprocessor, Pentium processor and 8051 microcontroller.

Desirable awareness/skills:

Basics of digital and electronics.

Course Objectives:

The objectives of offering this course are:

1. to use appropriate set, functions, or relation models to analyze practical examples, interpret the associated operations and terminology in context.
2. to determine number of logical possibilities and probability of events. Learn logic and proof techniques to expand mathematical maturity.
3. to formulate problems precisely, solve the problems, apply formal proof techniques, and explain their reasoning clearly.

Course Outcomes:

On the successful completion of this course student shall be;

1. able to learn basic terminology, formal logic, mathematical induction, sets, relations, functions and recursion.
2. able to understand discrete objects and relationships among them.
3. able to design graphs, trees, groups and rings and related algorithms.
4. able to demonstrate how these concepts can be applied to solve nontrivial real life problems.

Relevance of POS and Strength of Co-Relation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	2
B	An ability to design and conduct experiments, as well as to analyze and interpret data.	1
C	An ability to identify, formulate, and solve engineering problems.	2
D	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	2

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Contents:

Evolution of Microprocessor : features of 8085, architecture of 8085, 8085 instruction timing & execution, and 8085 interrupts. 8086 (16 Bit microprocessor): features of 8086, 8086 architecture (min mode, max mode), addressing modes, instruction formats, pins & signals, 8086 interfacing- PIC, DMA,PPI and UART. 8086 interrupts (dos and bios). Simple assembly language programs using instruction of 8086, macro and procedure.

Multiprocessor Configuration: Tightly & loosely coupled system, Bus arbitration schemes, NDP Basics, 8087 architecture and programming model, 8087 data types, 8087 instruction set and programming, Interfacing of 8087 with 8086.

80386 (32 Bit Microprocessor): introduction to 80386 microprocessor, architecture, pins & signals, memory system, registers, memory management in 80386, paging technique, protected mode operation. Brief introduction to 80387 math coprocessor.

Introduction to Advanced Processors: introduction to pentium processors, memory system, input /output system, branch prediction logic, floating point module, cache structure, superscalar architecture. Features of itanium, introduction to core i3 ,core i5 & core i7 , Architecture of Core i7.

Introduction to Microcontroller: Introduction to 8051 microcontrollers architecture, pin description), hardware features of interrupt of 8051, assembly language programming (jump, loop, call instructions), i/o port programming, 8051 addressing modes, arithmetic & logic instructions, interfacing of microcontroller with 8255.

Microcontrollers and Interfacing: Interfacing LEDs and of 7-segment displays, Interfacing keys and keyboard interfacing ,Interfacing 0808/0809 ADC , Interfacing DAC 0808, Interfacing stepper motor.

Text Books:

1. Advance Microprocessor and Peripherals (Architecture, Programming and Interfacing) by A. K.Roy and K. M. Bhurchandi, 3rd edition, TMH, 2014, ISBN- 978-125900613-5.
2. The 8051 Microcontroller and Embedded System by Mazidi and Mazidi, 2nd edition, Pearson/PHI publication, 2008, ISBN- 9788131710265.
3. The 8051 Microcontroller by Kenneth Ayala, 3rd edition. Thomson Cengage Learning India,ISBN -9781401861582

Reference Books:

1. Microprocessor – Theory and Applications. (Intel and Motorola) by M. Rafiqzaman, 1st Edition, Prentice Hall; Rev Sub edition, 1992, ISBN-13: 978-0135881460.
 2. Microprocessors and Programmed Logic by Kenneth L. Short., 2nd Edition, Pearson Education, 2007, ISBN 13:9788131709160.
 3. The 8051 Microcontroller and Embedded Systems Using Assembly and C by M. A.Mazidi, R. D. Mckinlay, 2nd edition, Pearson/ Prentice Hall, 2008, ISBN- 9788131710265.
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CO306 WEB PROGRAMMING LAB

Teaching Scheme: 01L + 00T + 02P, Total: 03

Credit: 02

Evaluation Scheme: 25 ICA + 25 ESE

Total Marks: 50

Duration of ESE: 03 Hrs

Minimum 10 experiments (five from Group B and five from Group C) shall be performed to cover entire curriculum of course CO306. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Every assignment should include use of syntax, use of command/function used for coding and printout of code with proper comment and output. Use of Open source tool/ technology is recommended for laboratory assignments. The concern faculty member must engage first six practical turns to cover syllabus of group-A.

Group A

XHTML and PHP:

XML: Introduction to XML, tree, syntax, elements, attributes, namespaces, display, XSLT

XHTML: Introduction, syntax, doctype, elements, attributes, events, namespaces, DTDs.

PHP: Install, syntax, variable, echo/print, data types, strings, constants, operators, if else, switch, while loop, for loop, functions, arrays, php forms.

Ruby:

Basics of Ruby: Introduction, variables, constants, data types, basic arithmetic operators, input and output-output using variables, display user inputs, common programming errors, comments.

Conditional structures: if, if-then-else, else if statements, testing conditional flows, case statements

Loop Structures: while loop, until loop, for loops, infinite loop.

Array: creating array, One dimensional array, multidimensional array, Hashes

Methods: Return value from method, return statement, variable number of parameters, class method, alias and `indef` statements.

Classes and Objects: Defining a class, variables in ruby class, creating object using `new` method, custom method to create ruby object, member functions in ruby class, HTML.

Group B

1. Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the `` tag.

2. Develop and demonstrate a XHTML file that includes Javascript for the following problems:

- a. Input : A number n obtained using prompt.
Output : The first n Fibonacci numbers.
- b. Input : A number n obtained using prompt
Output : A table of numbers from 1 to n and their squares using alert

3. Develop and demonstrate a XHTML file that includes Javascript that uses functions for the following problems:
 - a. Parameter: A string
Output: The position in the string of the left-most vowel
 - b. Parameter: A number
Output: The number with its digits in the reverse order
4. Develop and demonstrate, using Javascript, a XHTML document that:
 - a. Collects the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper- case characters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.
 - b. Modify the above program to get the current semester also (restricted to be a number from 1 to 8).
5. Develop and demonstrate, using JavaScript, a XHTML document that:
 - a. Contain three short paragraphs of text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.
 - b. Modify the above document so that when a paragraph is moved from the top stacking position, it returns to its original position rather than to the bottom
6. Design an XML document:
 - a. To store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS stylesheet and use it to display the document.
 - b. Create an XSLT stylesheet for one student element of the above document and use it to create a display of that element.
7. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
8. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.
9. Using PHP and MySQL develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.

Group C

1. Write a program to calculate compound interest using a while loop. The user inputs the amount deposited, the interest rate (as a percentage) per period, and the number of periods the deposit accumulates interest.
2. Create two classes to represent the following two objects: televisions and speakers. Include an initialize function and several methods to interact with your objects.
3. Define a class that compares two numbers and outputs the larger one. Test your solution.
4. Write a ruby class called Student that contains a student's name, gender, phone number, and exam score. It should also include the initialize, accumulated_score, and display methods.
5. Create a ruby class called customer and declare two methods display_details and total_number_of_customers. Write a ruby program that create two objects cust1, cust2 and display customer details along with total number of customers.
6. Create two objects of the Customer class as cust1 and cust2 and pass the necessary parameters with the new method. The initialize method is invoked, and the necessary properties of the object are initialized. Once the objects are created, call cust1.display_details(), cust1.total_no_of_customers() the methods of the class by using the two objects
7. Write a program that create one global variable that can be accessed by two ruby classes called Class1 and Class2.
8. Mini Project: Design an interactive Web based Application(Mandatory).

Text Book:

1. Learning XML by Erik T. Ray, 2nd Edition, O'RELLY, 2003, ISBN-10-8184048963.
2. Computer Science Programming Basics in Ruby by Ophir Frieder, Gideon Frieder, and David Grossman, 1st edition, O'RELLY, april 2013.

Reference Books:

1. Web Programming: Building Internet Applications by Chris Bates, 3rd Edition, Wiley India, 2012, ISBN:13:9788126512904.
2. HTML & CSS: The Complete reference, Thomas A. Powell, 5th edition, TMH, 2010, ISBN-13: 978-0071496292.
3. Head First Ruby- A Brain Friendly Guide by Jay McGavren, 1st Edition, O'REILLY, November 2015, ISBN-13:978-93-5213-253-9

NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

ESE-The End Semester Examination (ESE) for this laboratory course shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO 307 SOFTWARE ENGINEERING LAB

Teaching Scheme: 02P Total: 02

Credit : 01

Evaluation Scheme: 25 ICA + 25 ESE

Total Mark : 50

Minimum six experiments (five from Group A and one from Group B) shall be performed to cover entire curriculum of course CO302. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Group A assignment should include use documentation and group B use of command/function used for coding and printout of code with proper comment and output. Use of Open source tool/ technology is recommended for laboratory assignments.

Group A

Perform documentation of Mini-projects from list given in group-B covering Problem Definition, Analysis & Design using following process models (Every model should be applied on distinct mini project).

1. Waterfall Model
2. Prototype Model
3. Code-and-Fix Model
4. RAD Model
5. Spiral Model
6. Incremental Model
7. Agile Model

Group B

Implementation of any one of following System project.

1. ATM System
2. Library Management System
3. Inventory Control System
4. Reservation System
5. College Admission System
6. University Result Management System
7. Vehicle Navigation System
8. Hospital Management System
9. Banking System
10. Web based/Online Auction System

Text Books:

1. Software Engineering: A Practitioner's Approach by Pressman, R., 7th or 8th Edition, Singapore: McGraw Hill, 2010, ISBN- 9780071267823
2. Agile Software Development with SCRUM by Schwaber, K. and Beedle, M., 1st Edition, New Jersey : Pearson, 2001, ISBN- 9780130676344.
3. User-Centered Design by Lowdermilk, T., 1st edition, O'Reilly Media, 2013, ISBN- 9781449359836.

Reference Books:

1. Object Oriented Software Engineering – A Practical Software Development using UML and JAVA by Timonhy C. Lethbridge, 2nd Edition, Tata McGraw-Hill, 2005, ISBN: 0-07-70109082.
 2. Object-Oriented Analysis and Design – Understanding System Development with UML 2.0 by Mike O’Docherty, 3rd Edition, Wiley, 2005, ISBN: 978-0-470-09240-8.
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NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

ESE–The End Semester Examination (ESE) for this laboratory course shall be based on **oral Examination** on syllabus of course CO302 and experiments performed by student in the semester followed to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO308 SYSTEM PROGRAMMING LAB

Teaching Scheme: 02P Total: 02

Credit: 01

Evaluation Scheme: 50 ICA

Total Marks: 50

Minimum 10 experiments (five from Group A and five from Group B) shall be performed to cover entire curriculum of course CO303. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Every assignment should include use of syntax, use of command/function used for coding and printout of code with proper comment and output. Use of Open source tool/ technology is recommended for laboratory assignments.

Group A

1 Implementation of Pass-I Two Pass assembler with hypothetical Instruction set. Instruction set should include all types of assembly language statements such as Imperative, Declarative and Assembler Directive. While designing stress should be given on

1. How efficiently Mnemonic op-code table could be implemented so as to enable faster retrieval on op-code.
 2. Implementation of symbol table for faster retrieval. (Concepts of DSF should be applied while design)
2. Implementation of Pass-II Two Pass assembler with hypothetical Instruction set.
3. Implementation of Pass-I of Macro Processor. Following cases to be considered
1. Macro without any parameters
 2. Macro with Positional Parameters
 3. Macro with Keyword parameters
4. Implementation of Pass-II Of Macro Processor (Macro with Positional Parameters).
5. Implementation of Calculator using LEX and YACC.
6. Write a program to check balance parenthesis of a given program. Also generate the error report.

Group B

1. Develop a lexical analyser for generating keywords, symbols, operators and identifiers within the source code.
2. Develop a syntax analyzer for generating a parse tree from source code.
3. Develop a parser from the grammar specified within a source code.
4. Screen Editor with following Features
 1. Open an existing file
 2. Create and Save the current file.
 3. All cursor movements up, down, left, right arrow keys
 4. Delete and backspace keys
5. Implementation of DLL.
6. Exploring various features of debug command.

Text Books:

1. Compilers Principles, Techniques, and Tools by Alfred V. Aho, 2nd Edition, Addison Wesley, 2007, ISBN 981-235-885-4.
2. Systems Programming by John J. Donovan, 1st edition, Tata McGraw-Hill, 1991, ISBN 0-07-460482-1.

Reference Books:

1. System Software an Introduction to Systems Programming by Leland L. Beck, 3rd Edition, Pearson Education, 1997, ISBN 81-7808-036-2.
 2. System Programming with C and Unix by Adam Hoover, 1st edition, Pearson, SPD, 2009, ISBN-13: 978-0-13-606712-2.
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NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

CO309 COMPUTER NETWORK TECHNOLOGY LAB

Teaching Scheme: 02P Total: 02

Credit: 01

Evaluation Scheme: 25 ICA + 25 ESE

Total Marks: 50

Duration of ESE: 03 Hrs

Minimum 10 experiments (five from Group A and five from Group B) shall be performed to cover entire curriculum of course CO304. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Every assignment should include use of syntax, use of command/function used for coding and printout of code with proper comment and output. Use of Open source tool/ technology is recommended for laboratory assignments.

Group A

1. UNIX Sockets: WAP program in C/C++ /Python/Java sockets API.
 - a. TCP sockets
 - b. UDP sockets

Server accepts operation and floating point numbers from the clients; performs arithmetic operations and sends the result back to client. Server application must handle at least five clients simultaneously. Both the server and client should display input and output numbers as well as the operation. The server and client processes should be run on different machines. During evaluation, students will demonstrate via creating multiple client processes on different machines.

2. Using Packet Tracer configure
 - a. Static Routing
 - b. RIPv2 routing protocol
 - c. OSPF
3. Simulate the Ethernet LAN/WLAN for wired networks.
4. Simulate MANET/WSN for wireless network.
5. Implementation of Telnet / FTP.
6. Implement Client-server application for chat.
7. Develop a Client that contacts a given DNS Server to resolve a given host name.

Group B

1. Write a program to find internet address of remote computer.
2. Write a program to trace the port of a particular host.
3. Write a program to implement the echo client.
4. Write a program to implement the finger client.
5. Write a program to implement the who is client.
6. Implement a chat server using TCP/IP protocol.
7. Implementation of IIS and Apache Server and web hosting.
8. Mini Project that covers all the concepts of computer network and prepare documentation of it (Mandatory).

Text Books:

1. Data Communications and Networking by B. A. Forouzan, 4th Edition, TMH, 2009, ISBN-13-9780070634145.
2. Computer Networks: A Systems Approach by Larry L. Peterson, 5th Edition, Morgan Kaufmann Publishers, 2011, ISBN- 9789380501932.

Reference Books:

1. Unix Network Programming by W.R. Stevens, 3rd Edition, Vol.1, Pearson Education, 2004, ISBN-13: 978-0131411555.
2. An Engineering Approach to Computer Networking by S. Keshav, Addison Wesley, 1997, ISBN:8131711455.
3. Internetworking with TCP/IP by Comer, Vol.1, 4th Edition, Pearson Education, 2001, ISBN:8178084449.

NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

ESE-The End Semester Examination (ESE) for this laboratory course shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO310 MICROPROCESSOR AND MICROCONTROLLER INTERFACING LAB

Teaching Scheme: 02P Total: 02

Credit: 01

Evaluation Scheme: 25 ICA + 25 ESE

Total Marks: 50

Duration of ESE: 03 Hrs

Minimum 10 experiments (six from Group A and four from Group B) shall be performed to cover entire curriculum of course CO305. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Every assignment should include use of syntax, use of command/function used for coding and printout of code with proper comment and output. Use of Open source tool/ technology is recommended for laboratory assignments.

Group A

1. Program using Macro.
2. Display personal information using Macro.
3. Program using NEAR and FAR Procedure Addition of two numbers using NEAR and FAR Procedure Perform.
4. Perform addition/subtraction/multiplication of two numbers Laboratory.
5. BINARY ADDITION: 16 bytes are residing at location starting from DATA WAP: to add all bytes and store the result location SUM and SUM + 1.
6. BCD ADDITION: 16 BCD NUMBER are residing at location starting from DATA WAP to add all bytes and store the result location SUM and SUM + 1.
7. MULTIPLICATION: Two bytes are residing at location DATA 1 and DATA 2 Write a program to multiply the two bytes and store the result at location PROD 1 and PROD 2.
8. Program for HEX to BCD Conversion and vice versa.
9. Convert HEX no. to BCD no. and BCD no. to HEX no.
10. Generate sine wave using 8087 instructions Generate sine wave using 8087 instructions.
11. Generate sum of series using 8087 instructions Generate sum of series such as $1+x/1!-x/2!$

Group B

Assembly language programming for 8051.

1. Program for interfacing LEDs.
2. Program for interfacing 7-segment displays.
3. Program for keyboard interfacing.
4. Program for ADC interfacing.
5. Program for DAC interfacing.
6. Program for stepper motor interfacing.
7. Traffic Light.
8. Text LCD Module

Text Books:

1. Advance Microprocessor and Peripherals (Architecture, Programming and Interfacing) by A. K.Roy and K. M. Bhurchandi, 3rd edition, TMH, 2014, ISBN- 978-125900613-5.
2. The 8051 Microcontroller and Embedded System by Mazidi and Mazidi, 2nd edition, Pearson/PHI publication, 2008, ISBN- 9788131710265.
3. The 8051 Microcontroller by Kenneth Ayala, 3rd edition. Thomson Cengage Learning India, ISBN -ISBN -9781401861582

Reference Books:

1. Microprocessor – Theory and Applications. (Intel and Motorola) by M. Rafiqzaman, 1st Edition, Prentice Hall; Rev Sub edition, 1992, ISBN-13: 978-0135881460.
2. Microprocessors and Programmed Logic by Kenneth L. Short., 2nd Edition, Pearson Education, 2007, ISBN 13:9788131709160.
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C by M. A.Mazidi, R. D. Mckinlay, 2nd edition, Pearson/ Prentice Hall, 2008, ISBN- 9788131710265.

NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

ESE–The End Semester Examination (ESE) for this laboratory course shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO311 SELF STUDY-I

Teaching Scheme: 00 Total: 00

Credit: 02

Evaluation Scheme: 50 ICA + 00 ESE

Total Marks: 50

Grade of course Self Study-I shall be based on one test each conducted on 20% syllabus of five subjects – CO301, CO302, CO303, CO304, CO305. One faculty member should be appointed as course coordinator for the course ‘Self Study’ to compile the marks of all tests and enter into MIS.

The 20% syllabus for self - study shall be declared by subject teacher at the beginning of semester and he/she shall conduct the test examination for that course, assess answer papers of test examination and submit the marks to course coordinator.

CO351 DATABASE MANAGEMENT SYSTEM

Teaching Scheme: 03L+00T Total: 03

Credit: 03

Evaluation Scheme: 10 ISA+15 ISE1 +15 ISE2 + 60 ESE

Total Marks:100

Duration of ESE: 03 Hrs

Course Description:

This course introduces the student Database Management System (DBMS), different data models, relational algebra concept, sql queries, Relational Database design theory and Transaction management and query optimization in DBMS. This course also introduces the Object Oriented databases and Database architecture. This course equips students with fundamental knowledge and basic technical competence in the field of DBMS.

Desirable awareness/skills:

knowledge of Data Structure, Discrete Mathematics

Course Objective:

The objectives of offering this course are:

1. to learn and understand various Database Architectures and Applications.
2. to implement an entity relationship diagrams (ERD) to express requirements and demonstrates skills to model data requirements and create data models into normalized designs.
3. to develop understanding of database systems theory in order to apply that knowledge to any particular database implementation using SQL.

Course Outcomes:

On the successful completion of this course student able to;

1. create a good database design
2. handle relational databases.
3. use advanced storage technologies.

Relevance of POs and Strength of Correlation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	2
B	An ability to design and conduct experiments, as well as to analyze and interpret data.	2
C	An ability to identify, formulates, and solves engineering problems.	1
D	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	3

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

Introduction to Conceptual Modelling: Characteristics of the database approach, actors on the scene, workers behind the scene, advantages of using the dbms approach, data models, schemas, and instances, three-schema architecture and data independence, database languages and interfaces, the database system environment, centralized and client/server architectures for dbms, database design and implementation process.

Data Modeling using E-R Relationship: Using high-level conceptual data models for database design, entity types, entity sets, attributes, and keys, relationship types, relationship sets, roles and structural constraints weak entity types, ER diagram, relationship types of degree higher than two, enhanced entity-relationship model, relational database design by ER and EER to relational mapping.

Concepts and Constraints: Relational model concept, relational model constraints and relational database schemas, update operations, transactions, and dealing with constraint violation

Relational Algebra and Relational Calculus: Unary relational operations: SELECT and PROJECT, relational algebra operation from set theory, binary relational operations: JOIN and DIVISION, additional relational operation, tuple relational calculus, domain relational calculus

SQL: Data definition and datatypes, specifying constraints in SQL, schema change statements in SQL, basic queries in SQL, complex SQL queries, INSERT, DELETE, and UPDATE statements in SQL, additional features of SQL, specifying constraints as assertions and actions as triggers, views (virtual tables) in SQL, XML database.

Functional Dependencies and Normalization: Informal design guidelines for relational schemas, functional dependencies (FDs), Normal form based on primary keys, 2NF, 3NF, Boyce-Codd NF, properties of relational decomposition, algorithms for relational database schema design, multivalued dependencies and 4NF, join dependencies and 5NF, inclusion dependencies, other dependencies and NF.

Data Storage, Indexing and Query Processing: Disk storage, basic file structure, hashing, indexing structure for files, measures of query cost, selection operation, sorting and join operation.

Introduction, Transaction and System Concepts, desirable properties of transactions, characterizing schedules based on recoverability, characterizing schedules based on serializability, transaction support in sql, concurrency control : concurrency and recovery system, Different concurrency control protocols such as timestamps and locking, validation, multiple granularity, deadlock handling, recovery system: different crash recovery methods such as log based recovery, shadow paging, buffer management and remote backup system, database security and authorization

Introduction to: Cloud computing, data management, mobile databases, hadoop, sqlite database and no sql- mongodb.

Text Books:

1. Fundamentals of Database Systems by Ramez Elmasri, Shamkant B Navathe, 5th Edition, Pearson, 2008, ISBN- 9788131250.
2. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, 5th Edition, McGraw-Hill, 2006, ISBN- 007-124476-X.

Reference Books:

1. Database Management Systems by R. Ramakrishnan, J. Gehrke, 2nd Edition, McGraw-Hill, 2000, .ISBN-13: 978-0072322064.
 2. Introduction to Database Management Systems by C. J. Date, 8th Edition, Pearson, 2003, ISBN- 978-0321197849.
 3. Database Management Systems by G. K. Gupta, 1st Edition, McGraw–Hill, 2011, ISBN 13: [9780071072731](https://www.isbn-international.org/product/9780071072731).
 4. Database Systems Concepts, Design and Applications by S. K. Singh, 2nd Edition, Pearson Education, 2006, ISBN- 9788131760925.
 5. Introduction to Database Management System by Atul Kahate, 3rd Edition, Pearson, 2004, ISBN- 9788131700785.
 6. Database Management System by V.K.Jain, Dreamtech Press (Wiley India), 2002, ISBN: 9788177222272.
 7. Introduction to database management systems by Bipin Desai, 1st Edition, Concordia university Montral 1999.
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CO352 OPERATING SYSTEM

Teaching Scheme: 03L + 00T, Total: 03

Credit: 03

Evaluation Scheme: 10 ISA + 15 ISE1 + 15 ISE2 + 60 ESE

Total Marks: 100

Duration of ESE: 03 Hrs

Course Description:

This course introduces the role of operating system in computer. It provide the knowledge of process, thread, scheduling algorithms and process synchronization and memory management concept and demonstrate how these concepts can be applied to solve nontrivial real life problems.

Desirable awareness/skills:

Computer Organization and Data Structure

Course Objectives:

The objectives of offering this course are:

1. to learn basic concepts and functions of modern operating systems
2. to learn the concept of process, and thread management
3. to learn resource scheduling and management.
4. to learn the concepts of process synchronization and deadlock
5. to learn the concept of I/O and File management
6. to learn various Memory management techniques
7. to learn latest trends in Operating Systems

Course Outcomes:

On the successful completion of this course student able to;

1. implement scheduling algorithms for processes and threads.
2. synchronize processes.
3. check deadlock and different ways to handle it.
4. implement various memory management techniques.
5. implement I/O management and File system.

Relevance of POS and Strength of Correlation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	2
B	An ability to design and conduct experiments, as well as to analyze and interpret data.	2

C	An ability to identify, formulates, and solves engineering problems.	3
D	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	1

1 - Weakly correlated

2 – Moderately correlate

3 – Strongly correlated

Course Contents:

Operating System Overview: Operating system objectives and functions, the evolution of operating systems, developments leading to modern operating systems, virtual machines OS design considerations for multiprocessor and multicore architectures, modern UNIX systems, linux, android, Booting process of all the above operating systems.

Process Description and Control: Process: concept of a process, process states, process description, process control (process creation, waiting for the process/processes, loading programs into processes and process termination), and execution of the operating system. Threads: processes and threads, concept of multithreading, types of threads, thread programming using pthreads, multicore processors and threads , linux process and thread management, android process and thread management scheduling: uniprocessor scheduling - types of scheduling, scheduling algorithms, and thread scheduling, an introduction to multiprocessor and real-time scheduling, traditional unix scheduling, linux scheduling.

Concurrency: Mutual Exclusion and Synchronization: Concurrency- process/thread synchronization and mutual exclusion principles of concurrency, requirements for mutual exclusion, mutual exclusion- hardware support, operating system support (semaphores and mutex), programming language support (monitors), classical synchronization problems- readers/writers problem, producer and consumer problem. Deadlock and starvation principles of deadlock, deadlock prevention, deadlock avoidance, deadlock detection, an integrated deadlock strategy, example- dining philosophers problem, linux inter-process communication and concurrency mechanisms, android inter-process communication mechanisms and concurrency mechanisms.

Memory Management: Memory management requirements, memory partitioning- fixed partitioning, dynamic partitioning, buddy system, relocation, paging, segmentation. Virtual memory: hardware and control structures, operating system software, case study: linux memory management, android memory management.

Input and File I/O: Management and disk scheduling- I/O devices, organization of the I/O function, operating system design issues, I/O buffering, disk scheduling, disk cache, linux I/O. File management- overview, file organization and access, file directories, file sharing, record blocking, secondary storage management, linux virtual file system, android file management.

Recent and Future Trends in OS: linux kernel module programming, embedded operating systems: characteristics of embedded systems, embedded linux, and application specific OS basic services of NACH OS, introduction to Service Oriented Operating System (SOOS), introduction to ubuntu EDGE OS, etc.

Text Books

1. Operating System: Internals and Design Principles by William Stallings, 8th Edition, Prentice Hall, 2014, ISBN-13: 9780133805918.
2. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, 9th Edition, John Wiley & Sons, 2012, ISBN 978-1-118-06333-0.
3. Design of UNIX Operating System by Maurice J. Bach, 1st Edition, PHI, 2005, ISBN:0-13-201757-1 025.

Reference Books

1. Linux System Administration by Tom Adelstein and Bill Lubanovic, Inc., 1st Edition, O'Reilly Media, 2007, ISBN-13: 978-0596009526.
 2. Operating Systems by Harvey M. Deitel, 3rd Edition, Prentice Hall, 2003, ISBN-13: 978-0131828278.
 3. Modern Operating System by Andrew S. Tanenbaum, 3rd Edition, Prentice Hall, 2007, ISBN-13: 978-0136006633.
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CO353 DESIGN AND ANALYSIS OF ALGORITHMS

Teaching Scheme: 03L + 00T, Total: 03

Credit: 03

Evaluation Scheme: 10 ISA + 15 ISE1 + 15 ISE2 + 60 ESE

Total Marks: 100

Duration of ESE: 03 Hrs

Course Description:

This course provides knowledge of divide and Conquer method, Greedy Method, Dynamic programming, backtracking, basic traversal. This course also provides knowledge of different search techniques like DFS, BFS.

Desirable awareness/skills:

Programming Language, Discrete Mathematical Structure and Data Structures

Course Objectives:

The objectives of offering the course are:

1. demonstrate knowledge of how to measure the complexity of an algorithm.
2. understand best-case, worst-case, and average complexities.
3. know the basic algorithmic design strategies, including recursion, divide-and conquer, greedy method.
4. learn dynamic programming and backtracking.
5. use data structure in providing efficient algorithms solutions.

Course Outcomes:

On successful completion of this course student able to;

1. apply mathematical principles to solve various problems
2. analyze the complexities of various algorithms and select the best.
3. apply different strategies that are known to be useful in finding efficient algorithms to solve problems.
4. use appropriate data structure and algorithms to solve a particular problem

Relevance of POS and Strength of Co-Relation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	1
B	An ability to design and conduct experiments, as well as to analyze and interpret data.	2
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social,	2

	political, ethical, health and safety, manufacturability, and sustainability.	
D	An ability to identify, formulates, and solves engineering problems.	1
E	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	3

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

Divide and Conquer: What is an algorithm, performance analysis- space complexity, time complexity, asymptotic notation, and divide-and-conquer- introduction, binary search-iterative and recursive, finding the maximum and minimum, merge sort, quick sort, heap sort.

Greedy Method: Introduction, 0/1 knapsack problem, job scheduling, huffman codes, minimum cost spanning trees- prim’s algorithm, kruskal’s algorithm, optimal merge patterns.

Dynamic Programming: Multistage graphs, all pairs shortest path, single source shortest path, optimal binary search tree, traveling salesman problem, flow shop scheduling.

Backtracking: Introduction, the 8 queens problem, sum of subset, graph coloring, hamiltonian cycles, branch and bound

Basic Traversal and Search Techniques: techniques for binary trees, techniques for graphs- breadth first search and traversal, depth first search and traversal, connected components and spanning trees.

Text Books:

1. Fundamental of Computer Algorithm by Horowitz, Sahani, Rajasekaran, 2nd Edition, Galgotia Publication universities of press. 2008, ISBN: 9788173716126.
2. Introduction to Algorithms by Coreman, Leiserson, Rivest, Stein, 2nd Edition, PHI,2001, ISBN- 9788120321410.

Reference Books:

1. Design and Analysis of Algorithms,by Aho Ulman, Hopcroft, Pearson Edition, Addison Wesley, 2009, ISBN- 9788131702055.
 2. Introduction to design and Analysis of algorithms by Anay Levitin, 2nd Edition, Pearson Education, 2008, ISBN- 978813118377.
 3. Introduction to the Design and Analysis of Algorithms, A Strategic approach by R.C.T. Lee, S.S. Tseng, R.C. Chang, TMH, 2005, ISBN- 13: 978-1259025822.
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CO354 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

Teaching Scheme: 03L + 00T, Total: 03

Credit: 03

Evaluation Scheme: 10 ISA + 15 ISE1 +15 ISE2 + 60 ESE

Total Marks: 100

Duration of ESE: 03 Hrs

Course Description:

This course introduces the role of artificial Intelligence in computer. It provides the knowledge of AI applications, heuristics, Expert Systems, NLP, and Machine Learning techniques and demonstrates how these concepts can be applied to solve nontrivial real life problems.

Desirable awareness/skills:

Data Structure and Algorithms

Course Objectives:

The objectives of offering this course are:

1. to learn the basic concepts of NLP and Machine Learning
2. to learn various knowledge representation schemes and various AI applications
3. to learn various heuristic and game search algorithms
4. to learn various Expert System tools and applications

Course Outcomes:

On the successful completion of this course student able to;

1. understand the knowledge of AI applications, heuristics, Expert Systems, NLP, and Machine learning techniques
2. communicate effectively about AI problems, algorithms, implementations, and their experimental evaluation.
3. design intelligent agents for problem solving, reasoning, planning, and decision making.

Relevance of POS and Strength of Correlation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	2
B	An ability to design and conduct experiments, as well as to analyze and interpret data .	2
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	2
D	An ability to identify, formulates, and solves engineering problems.	1

E	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	2
F	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	3

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Contents:

Introduction to Artificial Intelligence: definitions of AI, history, AI representation, turing test, AI problem and techniques: problem as state space search, problem characteristics.

Production System: production rules, water jug problem, heuristic search techniques: bfs, dfs, A*, AO*, mean ends analysis.

Knowledge Engineering: knowledge representation issues, knowledge representation using predicate logic, knowledge representation using rules, weak and strong filler structures for knowledge, semantic net, frames, script, conceptual dependency.

Game Playing and Planning: minimax search with additional refinements, overview of planning, goal stack planning, block world, strips, nonlinear, hierarchical planning techniques, perception and action.

Understanding as a Constraint Satisfaction: waltz's algorithm, constraint determination, trihedral and non-trihedral figures labeling, natural language processing steps, learning techniques.

Neural Network Learning: biological neuron, artificial neuron, architecture of neural network and learning.

Expert Systems: architecture of expert system, utilization and functionality, knowledge representation and utilization in expert system, case studies of expert system, expert system shell, applications of expert system

Text Books:

1. Artificial Intelligence a Modern Approach by Russel and Norvig, 2nd Edition, Pearson Education, 2003, ISBN- 9788177583670.
2. Artificial Intelligence by Elaine Rich, Kevin Knight and Shiva Shankar B. Nair, 3rd Edition TMH, New Delhi- 2009, ISBN- 13: 978-0070087705.
3. Introduction to Artificial Intelligence and Expert System by Dan W. Patterson, PHI, 2010, ISBN- 9788120307773.

Reference Books:

1. Neural Networks, Fuzzy Logic, and Genetic Algorithms by S. Rajasekaran and G. A. Vijayalakshmi, PHI, 2003, ISBN-13: 978-8120321861.
2. Fuzzy Logic with Engineering Application by Timothy J Ross, 2nd Edition, John Wiley and Sons, 2004, ISBN:0-470-86075-8.
3. Artificial Neural Network by B. Yegnanarayana, PHI, 2012, ISBN- 978-8120312531.
4. Artificial Intelligence by G. Luger, W. A. Stubblefield, 3rd Edition, Addison-Wesley Longman, 1998.

CO355 FINANCE AND MANAGEMENT INFORMATION SYSTEMS

Teaching Scheme: 02P+00T Total: 02

Credit: 03

Evaluation Scheme: 15ISE+15ISE++10ISA+60ESE

Total Marks: 100

Duration of ESE: 03 Hrs

Course Description:

The main objective of this course is to provide students with an overall understanding of the main concepts of Finance management, information systems, and to highlight the importance of information systems in modern organizations and societies. To know how information system makes businesses more competitive and efficient. It covers a range of topics including: Finance Management, Management Theory, Basics of Management Information system, E-Business, ENterprise and global management Enterprise management system, Laws and case studies oflaw.

Desirable awareness/skills:

General proficiency, Humanities and Social Science

Course Objective:

The objectives of offering this course are:

1. to learn why information system are so important today for business and management.
2. to evaluate the role of the major types of information system in business environment.
3. assess the impact of the Internet and Information technology on business, electronics, commerce and Electronics business.
4. to provide students with basic concepts in information system and the benefits with these systems in modern society.
5. to differentiate between data, information, and knowledge.
6. to understand systems definition, systems requirements, and information needed for decision maker.
7. to identify several methods to enhance and develop information systems and to manage the information system recourses

Course Outcomes:

On the successful completion of this course student able to;

1. demonstrate effective MIS and DSS reports.
2. demonstrate effective analytical and critical thinking skills to make an appropriate business related decisions
3. distinguish and analyze ethical problems that occur in business and society
4. apply leadership skills and competencies in business situations
5. apply current technologies and decision-support tools for business operations.

Relevance of POS and Strength of Co-Relation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	3
B	An understanding of professional and ethical responsibility.	2
C	An ability to communicate effectively.	3
D	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	2
E	The recognition of the need for, and an ability to engage in life-long learning.	2
F	The knowledge of contemporary issues.	2

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

Basic of Management Theory and Practice: Evolution of management thoughts, system approach to management process, functions of manager, social responsibilities of manager. International management and multinational corporation, cultural differences in international management. Quality perspective, HR management and selection, performance appraisal and career strategies

Finance: Overview of financial management: goal of financial management, fundamental principle of finance, risk return trade off, forms of business organization .Financial statements taxes and cash flow: balance sheet, profit and loss account, finance topics, taxes, free cash flow. Time value of money: time lines and notations, present and future value of single amount. Mergers & acquisition: Mergers, acquisition, takeover, privatization, Divestitures. Corporate Security: Share, debentures & International Security

Basics of MIS: Decision making- Concepts, process and organizational decision making, role of MIS in decision making. Development process of MIS: MIS plan, development & implementation of MIS. Strategies design of MIS, business process reengineering, relevance of IT, DSS concepts, philosophy and application, knowledge management and system.

E-business: E-business enterprise- Organization of business in digital form, e-business, e-commerce, e-communication, e-collaboration and real time enterprise. Modern business technology: security and businesses, web enabled business management, CMS, ECM, enterprise portal.

Enterprise and Global Management Enterprise Management System: EMS, ERP, SCM, CRM. Information security challenges, Global management: outsourcing and offshoring, cultural,

political and economical challenges, global business IT strategies and applications, global IT platform, global data access issues.

Laws and Case Studies Law: cyber law, IT act, right to information act, IPR law, IT impact on society. Case studies.

Text books:

1. Management information system, text and cases: A digital firm perspective by W.S. Jawadekar, 3rd Edition, Tata Mcgraw Hill, 2008, ISBN- 9780070616349.
2. Management information system by J.A.O'Brien, 9th edition, Tata Mcgraw hill, 2009.
3. Essentials of management: An international perspective by H. Koontz, 5th edition, Tata Mcgraw Hill, 1998, ISBN- 007463227-2.
4. Financial management theory and practice by P. Chandra, 6th edition, Tata Mcgraw Hill, 2007, ISBN- 0074630687.
5. Concepts in Enterprise resource planning by Ellen Monk and Bret Wagner, 4th Edition, Course Technology cengage learning, 2013, ISBN:13:978-1-111-82039-8.

References Books:

1. Business law for managers by P.K.Goel, Wiley India, 2009, ISBN:9788177225358.
 2. Fundamentals of financial management by V. Sharan, 2nd Edition, Pearson Education 2012, ISBN:13: [97881317614273](#).
 3. Information technology for management by E.Turban, 8th edition, Wiley Edition, 2011, ISBN : 978-1-118-09225-5.
 4. Management information system by R. Mclead, 10th Edition, Pearson Education, 2006, ISBN-13: 978-0131889187.
 5. Management Information System by M. Azam, V. Nicole, TMH, 2012, ISBN-9788182093171.
-

CO356 DATABASE MANAGEMENT SYSTEM LAB

Teaching Scheme: 02P+00T Total:02

Credit: 01

Evaluation Scheme:25 ICA+25 ESE

Total Marks:50

Duration of ESE: 03 Hrs

Minimum 10 experiments (Six from Group A and six from Group B) shall be performed to cover entire curriculum CO351. The list given below is just a guideline. All assignments are to be implemented using open source technology only. Every assignment should include use of syntax, commands/sql statements/ clauses used for Querying database and printout of queries with proper comment and output. The concern faculty member must engage first six practical turns to cover syllabus. Use of Open source tool/ technology is recommended for laboratory assignments.

Group A

1. Map the ER/EER diagrams to a relational schema. Be sure to underline all primary keys, include all necessary foreign keys and indicate referential integrity constraints. Create database of the same schema using Data Definition Language(DDL). Use all DDL statements(Create, Alter, Drop) with all possible options and constraints(Primary key, Foreign Key, unique, Not Null, Default, Check etc.) .
2. Design at least 10 SQL queries for suitable database application using SQL DML statements to retrieve, insert, delete and update data and queries which involves DML Features like Set Operation,Set Comparisons, Aggregation, group by, having, order by,nested queries. (DBMS using connections(Client-application server-Data server, three tier)).
3. SQL queries to demonstrate Transaction control language(TCL): commit, savepoint, Rollback and Data Control Language (DCL): Grant Revoke.
4. SQL queries to demonstrate View,Triggers and Indexing.
5. SQL queries to:
 - a. create and use sequences.
 - b. demonstrate Stored Procedure and stored functions.
6. Perform DML and DLL using PL/SQL.
7. Demonstrate Object relational Database using SQL.
8. Program to Perform DML and DDL using all possible SQL commands and with the help any one host languages like C, C++ etc (i.e. embedded SQL).
9. Mini- Project which includes all RDBMS concepts.

Group B

1. Install MongoDB, run MongoDB on your OS and setup a python environment with MongoDB.
2. Connect to MongoDB with python, get a Database Handle . Create a collection and insert a document into it.
3. Perform following operations on a collection:
 - a. Retrieve all documents in a collection which matches certain property.

- b. Perform queries that uses MongoDB query operators (minimum six)
4. Perform Queries that read, count and sort documents in a collection.
5. Perform following operations on a collection:
 - a. Update the document in a collection(use MongoDB update modifiers).
 - b. Delete documents from a collection
6. Demonstrate following MongoDB and python patterns.
 - a. Embedding
 - b. Fast Accounting pattern
7. Design a simple web application using MongoDB as backend.

Text Book

1. SQL and PL/SQL for Oracle 11g Black Book by Dr. P. S. Deshpande, DreamTech, 2011, ISBN- 9788177229400.
2. MongoDB ,Niall O’Higgins, SPD O’Reilly Publications.

Reference Books

1. Oracle 9i/10g The Complete Reference, Kevin Loney, George Koch, Tata McGraw Hill.
2. SQL Server – Black Book by Dalton Patrik, 1st Edition, DreamTech Press, 2007, ISBN-8 817722722X.
3. SQL, PL/SQL: The Programming Language of Oracle by Ivan Bayross, 3rd Revised Edition, BPB Publication ISBN- 817656964-X.
4. Managing and Using MySQL, Reese G., Yarger R., King T., Williams H, 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., ISBN 81 - 7366 - 465 – X.

NOTE:

ICA–Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

ESE–The End Semester Examination (ESE) for this laboratory course shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO357 OPERATING SYSTEMS LAB

Teaching Scheme: 02P Total: 02

Credit : 01

Evaluation Scheme: 50 ICA + 00 ESE

Total Marks: 50

Duration of ESE: 00 Hrs

Minimum 10 experiments (five from Group A and five from Group B) shall be performed to cover entire curriculum of course CO352. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Every assignment should include use of syntax, use of command/function used for coding and printout of code with proper comment and output. Use of Open source tool/ technology is recommended for laboratory assignments.

Group A

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir.
2. Write programs using the I/O System calls of UNIX operating system (open, read, write etc.).
3. Write C programs to simulate UNIX commands like ls, grep, etc.
4. Given the list of processes, their CPU burst times and arrival times. Display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
5. Given the list of processes, their CPU burst times and arrival times. Display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
6. To write a C program for Dining Philosophers Program.

Group B

1. Develop application using Inter-Process Communication (using shared memory, pipes or message queues).
2. Implement the Producer-Consumer problem using semaphores (using UNIX system calls).
3. Implement Memory management schemes like paging and segmentation.
4. Implement Memory management schemes like First fit, Best fit and Worst fit.
5. Implement any file allocation techniques (Contiguous, Linked or Indexed).
6. Mini Project: Students can design and implement any simple OS.

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, 9th Edition, John Wiley and Sons, 2012, ISBN 978-1-118-06333-0.
2. Operating System: Internals and Design Principles by William Stallings, 8th Edition, Prentice Hall, 2014, ISBN-13: 9780133805918.
3. Design of UNIX Operating System by Maurice J. Bach, 1st Edition, PHI, 2005, ISBN:0-13-201757-1 025.

Reference Books:

1. Modern Operating System by A. S. Tanenbaum, 3rd Edition Pearson publication, 2013, ISBN- 9788120339040.
2. Operating System by H. M. Deitel, P. J. Deitel, D. R. Choffnes, 3rd Edition, Pearson publication, 2013, ISBN- 978-81 317- 12894.
3. Operating Systems-A Practical Approach by Rajiv Chopra, 1st Edition, S. Chand Publication, 2009.
4. Operating Systems by Sibsankar Haldar, Alex A. Arvind., 1st Edition, Pearson Publication, 2009, ISBN- 978-8131715482 .

NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

CO358 DESIGN AND ANALYSIS OF ALGORITHMS LAB

Teaching Scheme: 02P Total: 02

Credit: 01

Evaluation Scheme: 25 ICA + 25 ESE

Total Marks: 50

Duration of ESE: 03 Hrs

Minimum 10 experiments (five from Group A and five from Group B) shall be performed to cover entire curriculum of course CO353. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Every assignment should include use of syntax, use of command/function used for coding and printout of code with proper comment and output.

Group A

1. Recursive and non-recursive algorithm for a specific problem and there complexity measures.
2. Implement any two algorithms using divide and conquer approach (finding Min-Max problem, merge sort, quick sort).
3. Write a program using greedy method:
 - a. for minimal spanning tree using Prim's algorithm
 - b. Write a program for minimal spanning tree using Kruskal's algorithm.
4. Write a program to solve
 - a. knapsack ,0/1 knapsack problem using greedy method.
 - b. 0/1 knapsack problem using dynamic programming using memory function.
5. Write a program using dynamic programming to
 - a. find single source shortest path for multistage graph problem.
 - b. find all pairs shortest path for multistage graph problem.
6. Write a program to solve
 - a. Huffman code problem.
 - b. Optimal Binary Search tree.using dynamic programming.
7. Write a program to solve
 - a. Traveling Salesman problem.
 - b. Flow shop Scheduling.using dnyamic programming.

Group B

1. Apply Heap sort technique on a given set of elements.
2. Develop a simulator for a given set of elements using Merge sort technique / Selection sort technique/ Quick sort technique.
3. A disorganized carpenter has a mixed pile of bolts and nuts and would like to find the corresponding pairs of bolts and nuts. Each nut matches exactly one bolt (and vice versa).

By trying to match a bolt and a nut the carpenter can see which one is bigger, but she cannot compare two bolts or two nuts directly. Can you help the carpenter match the nuts and bolts quickly?

4. Check whether a graph is connected using Depth first Search technique.
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
6. Implement a minimum cost spanning tree for a given undirected graph using Prim's algorithm or Kruskal's algorithm.
7. Print all the nodes reachable from a given starting node in a digraph using Breadth first search technique.
8. Develop a simulator for all pair shortest paths problem using Floyd's algorithm.
9. Design a simulator for n-Queens problem using backtracking technique.

Text Books:

1. Fundamental of Computer Algorithm by Horowitz, Sahani, Rajasekaran, Galgotia publication.
2. Introduction to Algorithms by Coreman, Leiserson, Rivest, Stein, 2nd Edition, PHI, 2001, ISBN- 9788120321410.

Reference Books:

1. Design and Analysis of Algorithms, by Aho Ulman, Hopcroft, Pearson Edition, Addison Wesley, 2009, ISBN- 9788131702055.
2. Introduction to design and Analysis of algorithms by Anay Levitin, 2nd Edition, Pearson Education, 2008, ISBN- 978813118377.
3. Introduction to the Design and Analysis of Algorithms, A Strategic approach by R.C.T. Lee, S.S. Teseng, R.C. Chang, TMH, 2005, ISBN- 13: 978-1259025822.

NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

ESE-The End Semester Examination (ESE) for this laboratory course shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO359 ADVANCED PROGRAMMING LAB

Teaching Scheme: 02P Total: 02
Evaluation Scheme: 25 ICA + 25 ESE
Duration of ESE: 03 Hrs

Credit: 01
Total Marks: 50

Minimum 10 experiments (Five from Group B and Five from Group C) shall be performed to cover entire curriculum of course CO359. The list given below is just a guideline. All assignments are to be implemented using open source technology (preferably). Every assignment should include use of syntax, use of command/function used for coding and printout of code with proper comment and output. Use of Open source tool/ technology is recommended for laboratory assignments. The concern faculty member must engage first six practical turns to cover syllabus of group-A.

Group A

1. Introduction to Python and learn the basic types and control flow statement.
2. Functions: definition default arguments, multiple return values, variable arguments.
3. Python data structures: Lists, directories and tuples in detail.
4. Modules, imports, listing module contents, standard modules.
5. To build simple python apps.
6. String formatting and file I/O.
7. Errors exceptions and exception handling.
8. To access mysql database from python.
9. Decimal datatypes.
10. Object oriented programming in python.
11. Operator overloading and inheritance.
12. Get started with GTK+.
13. create widgets and associate callbacks.
14. packing using boxes.
15. packing using tables.
16. simple applications using GTK+ toolkit.
17. installation and execution of a guest os within Qemu.
18. sharing and transfer file between the host and guest.

Group B

1. Write a program in python for the following
 - a. To print first 10 numbers in the Fibonacci series(Use range() function to emulate C's for statement)
 - b. Perform operation on word "governmentcollege", extract second letter, extract first four letter and extract last six letters.
2. Write a function that accepts a text and a character as argument and returns the no. of occurrences of the character in the text.
3. Write a function that returns the smallest and largest element in a list (with multiple return values).

4. Write a program for python's data structures-list,directories and tuples.
5. Write a function that:
 - a. prints the contents of a file in uppercase. The function should accept the filename as argument.
 - b. sorts that contents of the file. The function should accept the filename as argument.
6. Write a python script to print the current date in different format.
7. Write a python program for creating virtual file system on Linux environment.
8. Write a program in python for USB Device File Management. Check usefulness of command e2fsck for different file systems mounted on computer.

Group C

1. Write a Python script to create a populate a customer account balance database. The database consists of records of 3 fields:
 - a. Account ID
 - b. Account Name
 - c. Account Balance

Accounting transactions are used to update the account balance. Each transaction consists of the account no. and the amount. The amount can be positive or negative depending upon whether the transaction is credit or debit. Write a Python program that takes in transactions as input, updates the database.

2. Write a Python script that:
 - a. creates a button with the text "Hello World"; print "Hello World" when the user clicks the button.
 - b. creates a combo-box with three elements. When the selection is changed the selected item is to be printed.
3. Write a program that displays the following system information from /proc files.
 - a. CPU Information /proc/cpuinfo
 - b. Memory Usage Information /proc/meminfo
 - c. Interrupt Information /proc/interrupts

The program window should have two panels. The panel on the left should have buttons to select one of the above specified information. The panel on the right should have TextView that displays the selected information. When window is scaled only the TextView should expand and fill to occupy the available space.

4. Write a program that converts from currency from USD to INR. Use tables to pack the label and entry widgets.
5. Write a simple image viewer application. The application should have three widgets:
 - a. An Image widget to display the image.
 - b. An Entry widget to enter the filename.
 - c. A Button widget when clicked will set the image file on the Image widget.
6. Use Python for Socket Programming to connect two or more PCs to share a text file.
7. Write a program in Python to test that computer is booted with Legacy Boot ROMBIOS or UEFI.

8. Write a Python/Java/C+ program to verify the operating system name and version of Mobile devices.

Text Book:

1. Learning Python by Mark Lutz, 4th Edition, O’Rielly, 1999, ISBN- 978-0-596-15806-4.

References:

1. Exploring Python by Timothy A Budd, McGraw Hill Education, ISBN-13 9780071321228.
2. Core Python Learnig by Wesley J. Chun, 1st Edition, Prentice Hall, 2000, ISBN- 0-13-026036-3.

NOTE:

ICA-Internal Continuous Assessment shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using internal continuous assessment format (S 10).

ESE-The End Semester Examination (ESE) for this laboratory course shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO360 MINI PROJECT

Teaching Scheme: 02P+00T Total: 02

Credit: 02

Evaluation Scheme: 25 ICA + 25 ESE

Total Marks: 50

Duration of ESE: 03 Hrs

Course Description:

The mini project is one of the most important single piece of work in the degree programme. It is introduced in curriculum to put into practice some of the techniques that have been taught to students in earlier years. It also provides the opportunity to students to demonstrate independence and originality, to plan and organise a large project over a long period. The mini-project topic should be selected to ensure the satisfaction of the need to establish a direct link between the techniques they learnt and productivity. Thus it should reduce the gap between the world of work and the world of study.

Desirable awareness/skills:

Knowledge of concepts, principles and techniques studied in all earlier courses.

Course Objectives:

The objectives of offering this course are:

1. To design or investigation of a technical problem.
2. To explores the knowledge of design, experiment and analysis of data.
3. To develop ability to synthesize knowledge and skills previously gained and to put some of them into practice.
4. To make students capable to select from different methodologies, methods and forms of analysis studied to produce a suitable system or sub-system.
5. To plan and organise a large project over a long period.
6. To inculcate ability to present the findings of their technical solution in a written report.

Course Outcomes:

On the successful completion of this course student shall be able to

1. Work in team.
2. Improve leadership quality among students.
3. Apply techniques and engineering skills.

Relevance of POS and Strength of Correlation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to apply knowledge of mathematics, science, and engineering.	2

B	An ability to design and conduct experiments, as well as to analyze and interpret data.	2
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	2
D	An ability to function on multidisciplinary teams.	3
E	An ability to identify, formulates, and solves engineering problems.	2
F	An ability to communicate effectively.	3
G	A knowledge of contemporary issues.	2
H	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	3

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

1. Every student shall undertake the Mini Project.
2. Each student shall work on an approved project; a group of 04 students (maximum) shall be allotted for the each mini project.
3. Mini project may involve design or investigation of a technical problem (industrial/domestic/social) that may take design, experimental or analytical character or combined element of these areas.
4. The project work shall involve sufficient work so that students get acquainted with different aspects of design and analysis.
5. Each student is required to maintain separate logbook for documenting various activities of mini project.
6. Before the end of semester, student shall deliver a presentation and submit the mini project report (paper bound copy) in following format:
 - a. Size of report shall be of justified size.
 - b. Student should preferably refer minimum five reference books/magazines/standard research papers.
 - c. Format of report
 - i. Introduction.
 - ii. Literature survey.

- iii. Theory
- iv. Design and Implementation
- v. Future scope.
- vi. Conclusion.
- vii. References

Use of Open source tool/ technology is recommended.

Assessment of Mini Project (ICA)

Name of the Project: _____

Name of the Guide: _____

Table-A

Sr. No.	PRN	Name of Project	Project Selection	Documen tation	Design	Hardware/ programming	Result Verifica tion	Presentati on	Total
			05	10	10	10	10	05	50

Note:

ICA: The Internal Continuous Assessment shall be based on the active participation of the students in the Project work and knowledge / skill acquired. Assessment of Mini Project shall be done as per **Table-A**.

ESE: The End Semester Examination for this course shall be based on demonstration of the system or subsystem developed by the group of students, deliverables of mini project and depth of understanding (oral examination). It shall be evaluated by two examiners out of which one examiner shall be out of institute.

CO361 SELF STUDY-II

Teaching Scheme: 00 Total: 00

Credit: 02

Evaluation Scheme: 50 ISE + 00 ESE

Total Marks: 50

Duration of ESE: 00 Hrs

Note: Grade of course Self Study shall be based on one test each conducted on 20% syllabus of five subjects - CO351, CO352, CO353, CO354, CO355. One faculty member should be appointed as course coordinator for the course 'Self Study' to compile the marks of all tests and enter into MIS.

The 20% syllabus for self - study shall be declared by subject teacher at the beginning of semester and he/she shall conduct the test examination for that course, assess answer papers of test examination and submit the marks to course coordinator.

CO362 INDUSTRIAL LECTURES

Teaching Scheme: 01TH Total: 01

Credit : 00

Evaluation Scheme: 00 ISA + 00 ESE

Total Marks: 00

Duration of ESE: 00 Hrs

Course Description:

This course introduces institutes committed to creation and growth of technological knowledge of student also it helps to bridge the gap between industry needs and the academic community.

Course Objective:

The Objectives of Offering this course are:

1. To bridge the gap between industry needs and the academic community.
2. To develops ability of student as per expectations of the industrialists from the fresh engineers.
3. To make students familiar with industrial environment.
2. To communicate the industrial experience, attitudes, needs, and viewpoints of industrial expert to students.
3. To denote and understand the role of various stakeholders viz., employers, employees, and state in maintaining industrial relations.
4. To provide appropriate exposure to world of work.

Course Outcomes:

On the successful completion of this course student shall be able to

1. Understand recent trends in technology.
2. Enhance the industry institute interaction.

Relevance of POS and Strength of Correlation:

Sr. No.	Program Outcomes	Level of Operation
A	An ability to function on multidisciplinary teams.	3
B	An ability to identify, formulates, and solves engineering problems.	2
C	A knowledge of contemporary issues.	2

1 - Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

Course Content:

1. There shall be minimum 6 lectures of 60 -90 minutes duration.
2. The lecture shall include presentation, informal discussions with students and faculty, and laboratory tours (if required).
3. Topics of Industrial Lectures shall be Technical in nature and should not be the specific part of the curriculum.
4. Typically speakers should
 - i. Their own career following (and sometimes including) university
 - ii. Interesting jobs they've had or projects they've worked on
 - iii. What areas of work they're currently involved in
 - iv. The type of work graduates could expect
 - v. Current job opportunities that may be available
 - vi. Any suggestions for students with regard to job hunting / CV writing / interviews etc.
5. Course coordinator shall discuss with students on the content of lecture and may conduct oral or give written assignments to judge the depth of understanding of students.
6. Students shall submit the report based on minimum five lectures giving summary of the lecture delivered.
7. The summary should contain brief resume of the expert, brief information of his organization and brief summary of the lecture in the format provided by institute/department.
8. **Industrial Lecture deliverables:** An industrial lecture report as per the specified format (available on in the department and institutes website) and assignments given by course coordinator (if any).

Note: Evaluation of the course CO362 Industrial Lectures shall be done in VIIIth semester along with the course CO460 Industrial Lecture.