B.E. COMPUTER SCIENCE AND ENGINEERING

CURRICULUM FOR

CHOICE BASED CREDIT SYSTEM

Regulations 2024

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MAHENDRA ENGINEERING COLLEGE

(AUTONOMOUS)

MALLASAMUDRAM WEST, TAMIL NADU 637503

MAHENDRA ENGINEERING COLLEGE,
(AUTONOMOUS)
MALLASAMUDRAM WEST, TAMIL NADU 637503
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Institute Vision

To be an internationally recognized institute for engineering education research with ethical values

Institute Mission

- To ensure the effective use of resources to mould the students as professionals and entrepreneurs
- To enhance industry institute interaction for innovative technology practice
- To encourage the faculty members and students for advanced research
- To inculcate ethical values among the faculty members and students

Department Vision

To produce competent computer engineers proficient with state of the art technologies

Department Mission

- To impart technical education through effective teaching-learning process
- To enhance the students employability through mentoring and skill development
- To promote research activities with analytical skills to face global challenges
- To enable students imbibe ethical and enterprising characteristics to become socially responsible engineers

Programme educational objectives

- PEO1 – Good communication, leadership and entrepreneurship skills
- PEO2 – Expertise on advanced computer technologies to become competitive
- PEO3 – The habit of learning and nurture the research attitude
- PEO4 – The ability to work in a team with professional ethics

Programme Specific Outcomes

1. PSO1 - Ability to comprehend the underlying principles and systematic methods for the development, operation and maintenance of software, using professional engineering practices
2. PSO2 - Ability to develop socially acceptable technical solutions to real world problems with various strategies for sustainable development

3. PSO3 - Ability to apply the skills in the areas related to Algorithms, Networking, Web Designing, Artificial Intelligence, Internet of Things and Data Analytics of various complexities towards successful employment

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulations 2024

I Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Cate-gory
THEORY							
1	24MA12101	Engineering Mathematics-I	3	1	0	4	BS
2	24PY12001	Engineering Physics	3	0	0	3	BS
3	24CS13001	Problem Solving Techniques using C	3	0	0	3	ES
4	24EE13001	Basics of Electrical and Electronics Engineering	3	0	0	3	ES
5	24HS11002	Heritage of Tamils	1	0	0	1	HS
6		Induction Program	-	-	-	-	MC
PRACTICAL							
7	24PY22001	Physics Lab	0	0	3	1.5	BS
8	24CS23001	Problem Solving Techniques using C Lab	0	0	3	1.5	ES
9	24GE23001	Engineering Practices Lab	0	0	3	1.5	ES
		TOTAL	**13**	**1**	**9**	**18.5**	

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Syllabus				Regulations 2024	
Department	MATHEMATICS		Programme Code	1041	
SEMESTER – I					

Course code	Course Name	Hours/week				Credit	Maximum marks
		L	T	P	C		
24MA12101	ENGINEERING MATHEMATICS-I (Common to all Branches)	3	1	0	4		100

Objectives	To enable the students to: - Learn the types of matrices and linear algebra in a comprehensive manner. - Familiarize with functions of several variables and its applications to engineering. - Define the geometric aspects of curvature, radius of curvature, evolutes and envelopes as application of differential calculus. - Explain various techniques of integration. - Learn double and triple integrals and give their representation as area and volume.
Outcomes	At the end of the course the students will be able to: - Determine the rank of a matrix, eigenvalues, eigenvectors and inverse of a given matrix and diagonalize symmetric matrix by orthogonal transformations, solve system of linear equations. - Determine maxima and minima of functions of several variables. - Apply the concepts of differential calculus in physical problems. - Apply different methods of integration in solving practical problems. - Compute the area and volume by using multiple integrals.

UNIT – I	MATRICES	9+3
Matrix and its types – Rank of matrix –Solving system of linear equations - Characteristic equation - Eigenvalues and Eigenvectors of the matrix - Cayley-Hamilton Theorem, Diagonalization of real and symmetric matrices by Orthogonal transformation – Reduce the quadratic form to canonical form.		

UNIT – II	DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES	9+3

Differentiation of implicit functions – Partial derivatives – Total derivative – Euler's theorem – Jacobian and properties – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT – III	APPLICATIONS OF DIFFERENTIAL CALCULUS	9+3

Curvature in Cartesian co-ordinates– Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes – Evolute as envelope of normals and their properties.

UNIT – IV	INTEGRAL CALCULUS	9+3

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals – Applications to Engineering problems.

UNIT – V	MULTIPLE INTEGRALS	9+3

Double integrals in Cartesian co-ordinates – Change of order of integration – Area as double integral – Triple integral in Cartesian co-ordinates – Volume as triple integral – Change of variables in double integrals. Applications to Engineering problems.

	Total	(L:45+T:15):60 Periods

TEXT BOOK:	
1	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017.
2	James Stewart, Calculus with Early Transcendental function, Cengage, 2013.

REFERENCES:	
1	Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2016.
2	Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, McGraw-Hill, 2013.
3	Ben Orlin, Change is the Only Constant: The Wisdom of Calculus in a Madcap World, Pearson 2018.

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MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus			R 2024	
DEPARTMENT:	SCIENCE & HUMANITIES	Programme Code & Name	ENGINEERING PHYSICS	
SEMESTER-I&II				
COURSE CODE	**COURSE NAME**	**HOURS/WEEK**	**CREDIT**	**MAXIMUM MARKS**
24PY12001	**ENGINEERING PHYSICS (FOR ALL BRANCHES)**	L T P	C	
		3 0 0	3	**100**

Objective(s)	➢ To provide fundamental knowledge about lasers, Ultrasonic's, Properties of Matter, Quantum Physics and different kinds of Engineering Materials. ➢ To correlate the principles with application oriented Engineering studies.
Out come(s)	After completing the course the students ➢ Understand the basics of Laser, Fiber Optics and its types with its applications in various fields. ➢ Gain knowledge about Ultrasonic's their applications in various engineering fields. ➢ Have the necessary understanding on Properties of materials and their uses. ➢ Get Knowledge on basics concepts of Quantum Physics with their Applications. ➢ Understand the properties of SMA, metallic glasses, bio materials and their applications.

UNIT I	**LASER AND FIBER OPTICS**	9

Introduction – Principle of spontaneous emission, stimulated absorption and emission – Einstein's coefficient (derivation) – Types of lasers - CO_2, Nd: YAG – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, refractive index and mode) – losses associated with optical fibers - fiber optic sensors: pressure and displacement.

UNIT II	**ULTRASONICS**	9

Introduction – Production – magnetostriction effect - magnetostriction generator – piezoelectric and inverse piezoelectric effect- piezoelectric generator – properties – Cavitations - Velocity measurement – acoustic grating – SONAR - Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C –scan displays-Industrial Applications and medical applications-medical endoscope.

UNIT-III	**PROPERTIES OF MATTER**	9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever: theory and experiment – uniform and non-uniform bending: theory and experiment - I-shaped girders - stress due to bending in beams.

UNIT-IV	QUANTUM PHYSICS	9
Black body radiation – Planck's theory (derivation) –wave particle duality – electron diffraction – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box– scanning tunneling microscope- electron tunneling microscope.		
UNIT-V	ADVANCED ENGINEERING MATERIALS	9
Smart materials: Shape-memory alloys: Martensite, Austenite, Two way shape memory, characteristics and applications –Metallic glasses – Origin – Preparation – Structure, mechanical and electrical properties. **Biomaterials:** First, second and third generation biomaterials – Classification – Metals and alloys – Polymers – Hydrogels – Applications in medicine: Skin and Blood interfacing implants		
	Total hours	**45**

Text book :	
1.	Dr. G. Senthil kumar - Engineering Physics-VRB Publication & Co, Chennai- Latest edition 2022.
2.	Dr. P.K. Palanisamy , "Engineering Physics", Sci tech Publications, Chennai, 2022.
3.	Biomaterial Science and Engineering- JB Park- Plenum Press, NewYork(2014).
4.	M N Avadhanulu, A Textbook of Engineering Physics (2008), S. Chand Publishing, New Delhi.
5.	Bhattacharya, D.K. & Poonam, T. ―Engineering Physics. Oxford University Press, 2015.
REFERENCES:	
1.	Pillai S O, "Engineering Physics" (2014), New Age International Publishers, New Delhi.
2.	Karl F Renk, Basics of Laser Physics (2017)-Springer International Publishing, Switzerland.
3.	Introduction to Quantum Mechanics- J Griffiths-2nd edition(2016).
4.	Halliday.D, Resnick.R. & Walker.J, Principles of Physics (2020), Wiley.
5.	Serway, R.A. & Jewett, J.W. ―Physics for Scientists and Engineers. Cengage Learning, 2010.
6.	William T. Silfvast, Laser Fundamentals (2014), Cambridge University Press.

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MAHENDRA ENGINEERING COLLEGE
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Syllabus

Department	Computer Science and Engineering	Programme Code		1041	

I Semester

Course code	Course Name	Hours/week				Credit	Maximum marks
24CS13001	**PROBLEM SOLVING TECHNIQUES USING C**	**L**	**T**	**P**		**C**	**100**
		3	0	0		3	

Objective(s)	The student should be made to: • Understand the basics of computer and algorithm • Learn the basic concepts of C Programming. • Know the arrays and functions in C • Be familiar with pointers and structures in C • Learn the file handling techniques and preprocessors in C
Outcome(s)	Upon completion of this course , students will be able to • Illustrate algorithms for real time problems through various problem solving techniques • Explain the syntax of C Programming • Summarize the concept of arrays and functions in C • Apply the concepts of pointers and structure • Develop the concepts of files and preprocessors in C

UNIT-I	PROBLEM SOLVING ASPECTS	9

Computers: Hardware – Software – Processor – Memory – I/O devices – Interface – Programming Languages Problem Solving Aspects: Algorithms Pseudo code, Flowchart-Steps in Problem Solving – simple strategies for developing algorithms (iteration, recursion) – Steps for Creating and Running programs -Illustrative problems: Exchanging The Values – Find minimum in a list - Factorial Computation - Fibonacci Sequence

UNIT-II	C PROGRAMMING BASICS	9

Introduction to C programming – Header files – Structure of a C program – compilation and linking processes – Constants, Variables – Data Types – Expressions-, Expression Evaluation, Type conversion Statements – operators – Input and Output operations – Decision Making and Branching – Looping statements- Programming Examples

UNIT-III	ARRAYS AND FUNCTION	9

Arrays: Introduction – One-Dimensional Arrays – Two and multi-Dimensional Arrays - Strings: Operations of Strings. Function – definition of function – Declaration of function – Function prototype – Types of functions- user defined functions – Pass by value – Pass by reference – Recursion - Programming Examples

UNIT-IV	POINTERS AND STRUCTURES	9

Pointers - Definition – Initialization - Pointer variables, Pointer arithmetic, Pointers to Pointers, Pointers with Arrays, Pointers with Functions- Introduction to Structure – structure definition – Structure declaration – Structure within a structure-Structures fusion with Arrays- Unions – Storage classes

UNIT-V	FILE PROCESSING	9
Files: File modes – File functions – Types of file processing: Sequential access, Random access – Text and binary files - Command line arguments – C Preprocessor directives: Macros – Definition – Types of Macros - Creating and implementing user defined header files		
	Total hours	**45**

TEXT BOOK :	
1	Anita Goeland Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India)Pvt. Ltd. Pearson Education, 2016.
REFERENCES:	
1	Dromey R.G, "How to Solve it by Computer" Prentice Hall of India, Delhi., 2010.
2	E Balagurusamy, "Computer Programming", First Edition, Tata McGraw Hill Education (India) Private Ltd, New Delhi., 2013.
3	Pradip Dey, Manas Ghosh, " Computer Fundamentals and Programming in C", 2nd Edition, Oxford University Press.,2013.
4	M.Rajaram and P.Uma Maheshwari " Computer Programming with C", Pearson Education., 2013.
5	NPTEL course, Problem Solving Through Programming in C, https://nptel.ac.in/courses/106105171
6	NPTEL course, Introduction to Programming in C, https://nptel.ac.in/courses/106104128

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Department	Electrical and Electronics Engineering	Programme Code	1051

I Semester

Course Code	Course name	Hours/week			Credit	Maximum Marks
		L	**T**	**P**	**C**	
24EE13001	**BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**	**3**	**0**	**0**	**3**	**100**
Objective(s)	- To study the basic concepts of electrical circuits and measuring instruments - To understand the operation of magnetic circuits and electrical machines - To study the concepts of semiconductor devices - To acquire knowledge on the concepts of integrated circuits - To impart knowledge on the basic concepts of communication systems					
Outcome(s)	At the end of the course, students will be able to: 1. Summarize the concepts of electrical circuits and measuring instruments 2. Illustrate the constructional features and working principle of Electrical machines 3. Explain the operation of semiconductor devices 4. Interpret the concepts of integrated circuits 5. Discuss the basic concepts of Communications systems					
UNIT I	**ELECTRICAL CIRCUITS AND MEASUREMENTS**					**(9)**

-Ohm's Law – Kirchhoff's Law- Voltage and Current Sources - Basics of Resistance, Inductance, and Capacitance- Series and Parallel circuits- Average value and RMS value – Power and Power Factor- Classification of Instruments – Moving coil and Moving Iron Instruments – Energy Meter-Residential wiring - Earthing.

UNIT II	**ELECTRICAL MACHINES**	**(9)**

Introduction to Magnetic circuits, Faraday's law, Lenz's Law, Fleming's Left-Hand and Right-Hand Rule-Construction and Working Principle: DC Machines -Single phase Transformer – Three phase Squirrel Cage Induction motor- Single phase Induction motor (Qualitative treatment only).

UNIT III	**SEMICONDUCTOR DEVICES**	**(9)**

PN Junction Diode –Characteristics – Half wave and Full wave Rectifiers –Zener diode- Characteristics-Voltage Regulator-Bipolar Junction Transistor, FET, JFET-Characteristics.

UNIT IV	**DIGITAL ICs and MICROCONTROLLER**	**(9)**

Boolean Algebra - Logic gates - Demorgan's Theorem - Combinational circuits: Adder, Subtractor, Multiplexer, Demultiplexer - Pin Details and Architecture of Microprocessor (8086) and Microcontroller (8051).

UNIT V	**COMMUNICATION SYSTEMS**	**(9)**

Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude and Frequency Modulations (Qualitative Treatment). Communication Systems: TV, Modem, Microwave, Satellite and Mobile communication (Block Diagram Approach only)

	Total Hours	45

TEXT BOOKS

1.	V.K Mehta and Rohit Mehta, "Principle of Electrical Engineering and Electronics" S Chand & Company, Third Edition, 2016.
2.	S. Salivahanan, N. Suresh kumar and A. Vallavanraj, "Electronic Devices and Circuits", Tata McGraw Hill, Second Edition, 2011.
3.	Edward Hughes, "Hughes Electrical and Electronic Technology", Pearson Education, tenth Edition 2008.
4.	David A. Bell, "Electronic Devices and Circuits", Oxford University Press, Fifth Edition, 2008.

REFERENCES

1.	Robert T. Paynter, "Introducing Electronics Devices and Circuits", Pearson Education, Seventh Education, 2006.
2.	William H. Hayt, J.V. Jack, E. Kemmebly and steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, Sixth, Edition, 2002.
3.	J. Millman &Halkins, Satyebranta Jit, "Electronic Devices & Circuits", Tata McGraw Hill, Second Edition, 2008.
4.	**NPTEL :** **Prof. L. Umanand, Basic Electrical Technology, IISc Bangalore** https://nptel.ac.in/courses/108108076 **Prof. M.B. Patil Basic Electronics IIT Bombay** https://onlinecourses.nptel.ac.in/noc21_ee55/preview

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Regulations 2024

Semester - I
(Common to all B.E./B.Tech. Programmes)

Course Code	Course Name	Periods/Week				Maximum Marks
		L	T	P	C	
24HS11002	தமிழர் மரபு	1	0	0	1	100

அலகு 1	மொழிமற்றும் இலக்கியம்	3

இந்தியமொழிக் குடும்பங்கள்–திராவிடமொழிகள்–தமிழ்ஒருசெம்மொழி–தமிழ்செவ்வியக்கங்கள்–சங்கஇலக்கியத்தின் சமயச் சார்பற்றதன்மை–சங்கஇலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில்மேலாண்மைக் கருத்துக்கள்–தமிழ்க் காப்பியங்கள், தமிழகத்தில்சமணபௌத்தசமயங்களின் தாக்கம் –பக்திஇலக்கியம், ஆழ்வார்கள்மற்றும் நாயன்மார்கள்– சிற்றிலங்கியங்கள்–தமிழில்நவீனஇலக்கியத்தின் வளர்ச்சி –தமிழ்இலக்கிய வளர்ச்சியில்பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு 2	மரபு–பாறைஓவியங்கள்முதல்நவீனஓவியங்கள்வரை–சிற்பக் கலை	3

நடுகல்முதல்நவீனசிற்பங்கள்வரை–ஐம்பொன் சிலைகள்–பழங்குடியினர் மற்றும் அவர்கள்தயாரிக்கும் கைவினைப் பொருட்கள்,பொம்மைகள்–தேர் செய்யும் கலை–சுடுமண் சிற்பங்கள்–நாட்டுப்புறத் தெய்வங்கள்– குமரிமுனையில்திருவள்ளுவர் சிலை–இசைக் கருவிகள்–மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூகபொருளாதாரவாழ்வில்கோவில்களின் பங்கு.

அலகு 3	நாட்டுப்புறக் கலைகள்மற்றும் வீரவிளையாட்டுகள்	3

தெருக்கூத்துகரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு 4	தமிழர்களின் திணைக் கோட்பாடுகள்	3

தமிழகத்தின் தாவரங்களும் விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்கஇலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள்–தமிழர்கள்போற்றிய அறக்கோட்பாடு–சங்ககாலத்தில்தமிழகத்தில்எழுத்தறிவும் கல்வியும் – சங்ககாலநகரங்களும் துறைமுகங்களும் – சங்ககாலத்தில்ஏற்றுமதிமற்றும் இறக்குமதி– கடல்கடந்தநாடுகளில்சோழர்களின் வெற்றி.

அலகு 5	இந்தியதேசியஇயக்கம் மற்றும் இந்தியபண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	3

இந்தியவிடுதலைப்போரில்தமிழர்களின் பங்கு–இந்தியாவின் பிறப்குதிகளில்தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதைஇயக்கம் – இந்தியமருத்துவத்தில்,சித்தமருத்துவத்தின் பங்கு–கல்வெட்டுகள்,கையெழுத்துப்படிகள்– தமிழ்ப் புத்தகங்களின் அச்சுவரலாறு.

TOTAL – 15 PERIODS

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Regulations 2024

Semester - I
(Common to all B.E./B.Tech. Programmes)

Course code	Course Name	Periods/week			Credit	Maximum marks
		L	T	P	C	
24HS11002	HERITAGE OF TAMILS	1	0	0	1	100

UNIT-I	LANGUAGE AND LITERATURE	3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan

UNIT-II	HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT-III	FOLK AND MARTIAL ARTS	3

Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT-IV	THINAI CONCEPT OF TAMILS	3

Flora and Fauna of Tamils &Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT-V	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

	TOTAL HOURS	15

TEXT BOOK ANDREFERENCE BOOKS

1.	தமிழகவரலாறு–மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடுதமிழ்நாடுபாடநூல்மற்றும் கல்வியியல்பணிகள்கழகம்)
2.	கணினித் தமிழ்–முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி–வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
4.	பொருநை–ஆற்றங்கரைநாகரிகம் (தொல்லியல்துறைவெளியீடு)
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

BoS Chairman

MAHENDRA ENGINEERING COLLEGE(Autonomous) Syllabus						R 2024	
DEPARTMENT:	SCIENCE & HUMANITIES		Programme Code			1051	
SEMESTER – I & II							
COURSE CODE	**COURSE NAME**		**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
24PY22001	**PHYSICS LABORATORY (FOR ALL BRANCHES)**		**L**	**T**	**P**	**C**	**100**
			0	0	3	1.5	
Objective(s)	To provide exposure to the students with hands on experience on various basic Physics practices for all branches.						
OUTCOMES	• The hands on exercises undergone by the students will help them to apply physics principles • Principles of optics and Liquid to evaluate engineering properties of materials.						

1. (a) Determination of Wavelength, and particle size using Laser

  (b) Determination of acceptance angle in an optical fiber.

2. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
3. Determination of Thickness of a thin wire-Air Wedge
4. Determination of wavelength of mercury spectrum – spectrometer grating
5. Determination of Young's modulus by Non uniform bending method
6. Determination of viscosity of liquid – Poiseuille's method
7. Determination of Rigidity modulus -Torsional Pendulum
8. Determination of Band gap of a semiconductor-PN Diode
9. Determination of Young's modulus by Uniform bending method

(Choose Any 7 Experiments)

REFERENCES	
1.	Physics Laboratory Manual (2023), Department of Physics, Mahendra Engineering College, Namakkal.
2	Geeta Sanon, B.Sc Practical Physics, 5th Edn. (2015), R. Chand & Co.
3	C. L. **Arora** B.Sc. Practical Physics (2001), S. Chand and Company Limited, New Delhi.
4	Indu Prakash and Ramakrishna, A. K. Jha (2012), A Text Book of Practical Physics, Kitab Mahal, New Delhi.
5	D. P. Khandelwal, A Laboratory Manual of Physics: For Undergraduate Classes (1985), Vani Educational books, New Delhi.

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MAHENDRA ENGINEERING COLLEGE

(Autonomous)

Syllabus

Department	Computer Science and Engineering	Programme Code		1041

I Semester

Course Code	Course Name	Hours/Week			Credit	Maximum marks
		L	T	P	C	
24CS23001	**PROBLEM SOLVING TECHNIQUES USING C LAB (Common to All Branches)**	0	0	3	1.5	100

Objective(s)	The student should be made to: ● Understand developing applications using Office package. ● Formulate problems and implement algorithms using Scratch and Raptor tool ● Make use of arrays and functions in C. ● Learn how to use pointer concepts. ● Know the concepts of structures, unions and files
Outcome(s)	Upon completion of this course , students will be able to ● Demonstrate the applications of Office Packages ● Solve the real world problems using Scratch and Raptor Tool ● Develop programs using arrays and functions in C. ● Illustrate the working of pointers in C ● Develop the concepts using structures, unions and files in C

LIST OF EXPERIMENTS

1	Prepare A bio-data Using MS Word With Appropriate Page ,Text And Table Formatting Options And Send The Same To Recipients Using Mail Merge
2	Create budget planning of your family with cell referencing, formulae, conditional formatting using Excel
3	Create a Program flow to illustrate the use of Variables and Constants using Scratch Tool
4	Construct flowchart to find the Factorial for a given number Using Raptor
5	Students mark generation using decision statements
6	Calculator using switch statement
7	Prime number generation and to check whether the given number is armstrong or not using looping
8	Greatest number using array (one dimensional)
9	Matrix multiplication using array (two dimensional)
10	Check the given string is palindrome or not.
11	Write a C Program to swap two numbers using two functions one using pointer and other one without using pointer
12	Factorial calculation and Fibonacci series using function
13	Student mark sheet using structures
14	Copy text from one file to other File

	Total hours	30

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MAHENDRA ENGINEERING COLLEGE				
(Autonomous)				
Regulations 2024				
Department	**Electrical and Electronics Engineering**		**Programme Code**	**1051**
I Semester				

COURSE CODE	COURSE NAME	Hours/week			Credit	Maximum Marks
		L	**T**	**P**	**C**	
24GE23001	**ENGINEERING PRACTICES LABORATORY**	**0**	**0**	**3**	**1.5**	**100**

Objectives	• To learn the concepts of electrical wiring and power measurements. • To study the concepts of electronic devices
Outcomes	At the end of the course, students will be able to: 1. Demonstrate the domestic wiring and power measurements. 2. Demonstrate the operation of Electric Circuits and PN Junction Diode

LIST OF EXPERIMENTS	
1	Residential House Wiring using Switches, Fuse, Indicator, Lamp and Energy meter
2	Two way, CFL and LED Lamp Wiring
3	Measurement of Voltage, Current and Power
4	Measurement of Energy using Single Phase Energy Meter
5	Soldering Practice –Assembly of Electronic Components
6	Verification of Logic Gates
7	V-I Characteristics of PN Junction and Zener Diode
8	Half Wave and Full Wave Rectifiers
	Total **45 Hours**

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MAHENDRA ENGINEERING COLLEGE
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Regulations 2024

II Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Category
		THEORY					
1	24MA12201	Engineering Mathematics-II	3	1	0	4	BS
2	24CY12001	Engineering Chemistry	3	0	0	3	BS
3	24HS11001	Communicative English	3	0	0	3	HS
4	24IT34201	Information Technology Essentials	2	0	2	3	ES
5	24CS13201	Data Structures	3	1	0	4	PC
6	24HS11003	Tamils and Technology	1	0	0	1	HS
		PRACTICAL					
7	24CY22001	Chemistry Laboratory	0	0	3	1.5	BS
8	24CS23201	Data Structures Lab	0	0	3	1.5	PC
9	24HS21001	Personality Development Practice Lab	0	0	2	1	EEC
		TOTAL	16	2	10	22	

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MAHENDRA ENGINEERING COLLEGE(Autonomous)

Syllabus		Regulations 2024	
Department	**MATHEMATICS**	**Programme Code**	

SEMESTER – II

Course code	Course Name	Hours/week				Credit	Maximum marks
24MA12201	**ENGINEERING MATHEMATICS - II** (Common to all Branches)	L	T	P	C		100
		3	1	0	4		

Objectives	To enable the students to: • Define vector function, operators and working procedure to evaluate line, surface and volume integrals. • Explain different types of higher order ordinary differential equations with variable coefficients and various methods to solve the equations. • Learn Laplace transform, inverse Laplace transform and its properties to solve differential equations. • Know about functions of complex variables, properties and problems involving conformal mapping. • Learn about Taylor's and Laurent's series expansion of complex functions and the process of evaluating complex integrals.
Outcomes	At the end of the course the students will be able to • Solve problems related to vector differentiation, line, surface and volume integrals and theorems involving them. • Solve higher order differential equations with variable coefficients. • Describe Laplace transform and its properties inverse Laplace transform and the solution of linear differential equation using Laplace transform techniques. • Solve Analytic functions, harmonic functions, conformal mapping and its applications. • Expand the functions as Taylor's and Laurent's series and evaluate the complex integrals.

UNIT-I	**VECTOR CALCULUS**	9+3

Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs).Verification and application in evaluating line, surface and volume integrals.

UNIT -II	**ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDERS**	9+3

Second and Higher order linear differential equations with constant coefficients– Method of variation of parameters – Cauchy Euler equation, Legendre's type differential equations – System of simultaneous linear differential equations with constant coefficients.

UNIT-III	**LAPLACE TRANSFORM**	9+3

Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem, solving Initial value problems by Laplace Transform method.

UNIT-IV	ANALYTIC FUNCTIONS	9+3
Functions of a complex variable, Cauchy-Riemann equations – Analytic functions – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: w= z+c, cz, 1/z, and Bilinear transformation.		
UNIT -V	COMPLEX INTEGRATION	9+3
Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula(without proof) – Taylor and Laurent expansions –Types of Singularities-Singular points – Residues – Residue theorem(without proof) – Application of residue theorem to evaluate real integrals – Contour integration.		
	Total	(L:45+T:15): 60 Periods

TEXT BOOK :	
1	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017.
2	Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2018.
REFERENCES:	
1	Michael D. Greenberg, Advanced Engineering Mathematics, Pearson 2013.
2	Lokenath Debnath and Dambaru Bhatta,"Integral Transforms and Their Applications, CRC Press 2015.
3	Dennis G. Zill and Warren S. Wright "Advanced Engineering Mathematics", Jones and Bartlett 2014.

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MAHENDRA ENGINEERING COLLEGE(Autonomous)

SEMESTER – I (For Non Circuit Branches & ECE) & SEMESTER – II (For Circuit Branches & Except ECE)

COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
24CY12001	**ENGINEERING CHEMISTRY**	**L**	**T**	**P**	**C**	**100**
		3	0	0	3	

Objectives	To make the students familiar with: 1. The treatment of water used for domestic and industrial purpose. 2. Various types of polymers in our day today life. 3. The basic principle and preparation methods of Nanomaterials. 4. The Construction and applications of different types of batteries. 5. The preparation, properties and combustion method of fuels.
Outcomes	At the end of the course the student will be able to 1. Explain the various water quality parameters and their treatments for domestic and industrial applications. 2. Classify the reaction mechanism, synthesis and application of polymers. 3. Develop the essential concepts of nanoscience and nanotechnology in designing the nanomaterial for Engineering. 4. Compare the working principles of batteries and super capacitors. 5. Illustrate the suitable fuels for engineering processes and applications.

UNIT-I	**WATER TECHNOLOGY**	9 Hrs

Types of water - Alkalinity, types and determination - Hardness, types and Estimation by EDTA method. Domestic water treatment – disinfection methods (Chlorination, ozonation, UV treatment) – Boiler feed water – requirements – Decreased efficiency of using hard water in boilers – external conditioning – demineralization process, Electro dialysis process, reverse osmosis - Internal conditioning (phosphate, calgon and carbonate conditioning methods) – Conservation of Water using 3R method– WHO and BIS guidelines for drinking water.

UNIT-II	**POLYMER CHEMISTRY**	9 Hrs

Introduction - Classification of polymers – Natural and synthetic - Thermoplastic and Thermosetting - Functionality – Degree of polymerization - Types and mechanism of polymerization: Addition (Free Radical); condensation and copolymerization - Preparation, properties & applications of selected commodity and engineering polymers (Polyester, Polystyrene, PVC, Nylon, Teflon, Bakelite and Epoxy resin).

UNIT-III	**NANOCHEMISTRY**	9 Hrs

Basic - Distinction between molecules, nanoparticles and bulk materials - size-dependent properties (optical, electrical, mechanical and magnetic) - Types of nanomaterials: Definition, properties and uses of –nanoparticles , nanocluster, nanorod, nanotube and nanowire - Synthesis of nanomaterials: laser ablation, Sol gel, Synthesis of Carbon nano tubes by CVD Method- SWCNT and MWCNT- Applications (Medicine, Agriculture and Electronics).

UNIT-IV	**ENERGY STORAGE DEVICE**	9 Hrs

Types of batteries - Primary battery - dry cell - Secondary battery - Construction and application of lead acid battery and Lithium ion batteries – Battery used in EV application – Nuclear energy – Fission and Fusion reactions – Light water nuclear reactor for power generation (block diagram only) - Fuel cell (H_2-O_2) - Super Capacitors.

UNIT-V	FUELS AND COMBUSTION	9 Hrs

Introduction - classification of fuels - Coal - analysis of coal (proximate and ultimate) - carbonization - manufacture of metallurgical coke (Otto Hoffmann method) - Petroleum - manufacture of synthetic petrol (Bergius process) - calorific value - higher and lower calorific values- theoretical calculation of calorific value - ignition temperature - spontaneous ignition temperature - flue gas analysis (ORSAT Method).

	TOTAL	45 Hrs

TEXT BOOK :

1.	Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2022.
2.	Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2021.
3.	Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2019.

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MAHENDRA ENGINEERING COLLEGE(Autonomous)

SYLLABUS - REGULATION - 2024

SEMESTER – I (Non-Circuit Branches)   **SEMESTER- II (Circuit Branches)**

Course Code	Course Name	Hours / Week			Credit	Maximum Marks
		L	**T**	**P**	**C**	
24HS11001	**COMMUNICATIVE ENGLISH** (Common to all B.E/B.Tech Degree Programmes)	3	0	0	3	100

Objectives	- To help learners to improve their knowledge of grammar - To enable them to use vocabulary appropriately in different academic and professional contexts - To support learners to acquire listening and speaking skills - To facilitate them to develop their reading skills by familiarizing different types of reading strategies - To equip them with writing skills needed for academic as well as professional context
Outcomes	At the end of the course, the learners will be able to - Develop listening and reading skills and comprehend the academic articles in English - Develop vocabulary skills and use words appropriately in different academic contexts. - Analyze and interpret the data with correct usage of grammar - Demonstrate effective LSRW skills with emerging technology - Create strong communication skills in both personal and professional life

UNIT I	**9 Hrs**

Listening- Listening to Short Conversations (Formal and Informal)
Speaking – Introducing Oneself and Others
Reading – Skimming and Scanning-Reading Comprehension Passages and Answering Multiple Choice Questions
Writing - Leave/On Duty application, Bonafide Certificate-requisition, Check list, Instructions
Grammar & Vocabulary – Parts of Speech, Articles, Prefixes and Suffixes

UNIT II	**9 Hrs**

Listening – Listening to Telephonic Conversations
Speaking –Word Building Activity
Reading – Short stories
Writing- Recommendations, Composing E-Mail(Formal & Informal), Letter Writing- Letter to the Editor
Grammar & Vocabulary – Sentence Pattern, Tenses, British Terms and American Equivalents

UNIT III	**9 Hrs**

Listening - Listening to TED Talks and Note taking
Speaking – Role Play
Reading –Cloze Reading and Fill up the Gaps
Writing - Letter Writing – Permission Letter (In-Plant Training/Industrial Visit), Business letters-Calling for Quotation and Placing Order
Grammar & Vocabulary – Modal Verbs, Voice- Active Voice, Passive Voice and Impersonal Passive, Numerical Expressions

UNIT IV	**9 Hrs**

Listening - Listening to Audio Lectures
Speaking – Taking part in Casual Conversation
Reading - Reading Advertisements
Writing – Poster Making, and Job Application
Grammar & Vocabulary – Cause and Effect Expressions, Question tags, Gerunds and Infinitives, One word substitution

UNIT V	9 Hrs

Listening – Listening to Academic lectures
Speaking – Describing Objects
Reading – Transcoding (Conversion of Flow Chart, Bar chart, Pie chart into a paragraph)
Writing –Review writing (Films & Books), Essay Writing
Grammar & Vocabulary – If Conditionals, Concord, Same Word used as Noun and Verb, Nominal Compounds

	Total Hours	45

Textbook:	
1	Murphy, Raymond, *English Grammar in Use*, Fifth Edition. Cambridge University Press, New Delhi, 2019
2	N.P.Sudharshana and C.Savitha, *English For Technical Communication*, Cambridge University Press, New Delhi, 2016
Reference Books:	
1	Lewis Norman, *Word Power Made Easy,* Goyal Publishers: New Delhi. 2020.
2	Ashraf Rizvi. *Effective Technical Communication*, Tata McGraw Hill, 2017.
3	Jack C. Richards with Jonathan Hull and Susan Proctor, *Interchange*. 4th Edition, Cambridge University Press, New Delhi, 2016
Extensive Reading:	
1	Khera, Shiv. *You can Win*. Macmillan, Delhi. 2014
Websites:	
1	http://www.englishclub.com
2	http://www.talkenglish.com
3	https:// www.ted.com/talks
4	https://nptel.ac.in/

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MAHENDRA ENGINEERING COLLEGE					
(Autonomous)					
Syllabus					
Department	**Information Technology**		**Programme Code**		**2071**
II Semester					
Course code	**Course Name**	**Hours/week**		**Credit**	**Maximum Marks**
24IT34201	**INFORMATION TECHNOLOGY ESSENTIALS**	L	T	P	C	**100**
		2	0	2	3	

Objective(s)	• To study HTML, CSS and JavaScript concepts to develop dynamic web pages. • To understand the general concepts of PHP scripting language, MySQL Functionalities & Mobile Application development of simple data-centric applications. • To learn GIT and GIT HUB repository and to apply the version control concepts
Outcome(s)	**Upon completion of this course , students will be able to** • Create Interactive web Applications. • Design websites and Mobile Application Development of simple data-centric applications. • Analyze and apply GIT and GIT HUB operations and advanced repository actions.

UNIT-I	**INTRODUCTION TO WEB ESSENTIALS**	8

Internet Basics-Introduction to Web-Standards and Terminologies.HTML-HTML5-standards and tags-Tables-Forms-Videos and Audios. CSS: Introduction to CSS- Selectors-Layouts-Colors and Backgrounds. JavaScript: Event Handling-Document Object Model (DOM). Introduction to Bootstrap.

UNIT-II	**SERVER-SIDE ESSENTIALS & MOBILE APPLICATION DEVELOPMENT**	8

Introduction to PHP – PHP Variables – Constants – Operators – Flow Control and Looping. Introduction to MySQL – MySQL Commands – MySQL Database Creation – Connecting MySQL and PHP.Types of Mobile OS (Android and IOS)-Architecture- Phases of Mobile Application Development -MIT app inventor-Components-Viewer-Properties - Publishing an app.

UNIT-III	**VERSION CONTROLLER & APPLICATIONS**	9

Introduction to Git and GitHub-Terminologies-Local Repository Actions- Remote Repository Actions- Advanced Repository Actions-Branching-Merging. Shell Scripting: Processing (PS) and Listing (LS) - File Creations and Handling-Users and Groups..Multimedia: Design with Canva and Blender-Image and Video Editing.

	Total	25 Hrs
LIST OF EXPERIMENTS		
1	a).Creation of interactive web pages - Design using HTML and CSS b). Design of static web site primarily with text and CSS and JavaScript	
2	Creation of simple PHP scripts - Dynamism in web sites.	

3	Design the HTML forms (text boxes, text areas, radio buttons, check boxes and other elements by understanding the input types and specified needs).
4	Handling multimedia content in web sites, include image/audio and video elements in the web pages.
5	Validate the HTML form elements by creating small client-side validation scripts using JavaScript.
6	Create a local repository using Git and perform basic operations such as initializing the repository, adding files, committing changes, creating and managing multiple branches to organize and track changes
7	Create a shell script that can automate file management tasks such as processing, listing, creation and handling of files and user and group management tasks
8	Develop mobile applications using MITAI (Simple calculator, Step counter, a Weather app that retrieves current weather information from an API, Talk to Me, Translation App)
9	a).Design a poster for an event using Canva templates b).Create a visual info graphic using Canva tools to present data and information.
10	Develop a simple 2D & 3D game using a Construct visual interface and event system
	Total :20 Hrs
	Total :45 Hrs

TEXT BOOKS:	
1	Internet & World Wide Web How to Program, 5th edition, by Paul Deitel Harvey Deitel, Abbey DeiteI,Pearson Publication, 2018.
2	Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites", O'Reilly Media, Inc, 2014.
3	App Inventor 2: Create Your Own Android Apps 2nd Edition by David Wolber, Hal Abelson, Ellen Spertus, Liz Looney, 2014.
4	Version Control with Git, by Jon Loeliger, Matthew McCulJough, 2nd Edition, 2012
REFERENCES:	
1	Niederst Robbins, Jennifer, "Learning Web Design: A Beginner's Guide to HTML, CSS, Javascript, and Web Graphics", Fifth Edition, O'Reilly Media, 2018.
2	Steven Holzner, "PHP: The Complete Reference", Fifth Edition, Mc Graw Hill, 2017.
3	R. Kelly Rainer, Casey G. Cegielski, Brad Prince, "Introduction to Information Systems", Fifth Edition, Wiley Publication, 2014.
4	Jochen Schiller, "Mobile Communications", Pearson Education, 2012.

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<table>
<tr><td colspan="7" align="center">MAHENDRA ENGINEERING COLLEGE
(Autonomous)</td></tr>
<tr><td colspan="7" align="center">Syllabus</td></tr>
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Department	Computer Science and Engineering	Programme Code		1041		

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<tr><td colspan="7" align="center">II Semester</td></tr>
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Course code	Course Name	Hours/week			Credit	Maximum marks
24CS13201	**DATA STRUCTURES**	**L**	**T**	**P**	**C**	**100**
		3	**1**	**0**	**4**	

Objective(s)	The student should be made to: • To know the concepts of abstract data types • To learn the linear data structures – lists, stacks, and queues • To be familiar with non-linear data structures – Trees • To understand the non-linear data structure – Graphs • To learn the sorting, searching and hashing algorithms
Outcome(s)	Upon completion of this course , students will be able to • Explain the concepts of abstract data types • Classify the linear data structures to problem solutions • Apply the different tree data structures to problem solutions • Demonstrate the non-linear data structure – graph • Interpret the various sorting, searching and hashing algorithms

UNIT-I	**LINEAR DATA STRUCTURES – LIST**	**9**

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation —singly linked lists and its basic operations - circularly linked lists and its basic operations - doubly-linked lists and its basic operations.

UNIT-II	**LINEAR DATA STRUCTURES – STACKS, QUEUES**	**9**

Stack ADT – Operations - Applications - Evaluating arithmetic expressions- Conversion of Infix to postfix expression - Queue ADT – Operations - Circular Queue – deQueue.

UNIT-III	**NON LINEAR DATA STRUCTURES – TREES**	**9**

Tree ADT – tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT – AVL Trees – B-Tree - Heap – Applications of heap.

UNIT-IV	**NON LINEAR DATA STRUCTURES - GRAPHS**	**9**

Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.

UNIT-V	**SEARCHING, SORTING AND HASHING TECHNIQUES**	**9**

Searching- Linear Search - Binary Search. Sorting - Bubble sort - Selection sort - Insertion sort – Merge sort - Radix sort. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

	Total hours	**45**

TEXT BOOK :	
1	Mark Allen Weiss, ―Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education,1997.
2	ReemaThareja, ―Data Structures Using C, Second Edition , Oxford University Press, 2011
REFERENCES:	
1	Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, ―Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
2	Aho, Hopcroft and Ullman, ―Data Structures and Algorithms, Pearson Education,1983
3	Stephen G. Kochan, ―Programming in C, 3rd edition, Pearson Education.
4	Ellis Horowitz, SartajSahni, Susan Anderson-Freed, ―Fundamentals of Data Structures in C,Second Edition, University Press, 2008
5	Nptel course, Data Structures and Algorithms, https://nptel.ac.in/courses/106102064/

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MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus					R 2024
DEPARTMENT:	**SCIENCE & HUMANITIES**		**Programme Code & Name**		**CY & CHEMISTRY**
SEMESTER – I (For Non Circuit Branches & ECE) & SEMESTER – II (For Circuit Branches (Except ECE))					

COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
24CY22001	**CHEMISTRY LABORATORY (Any eight experiments to be conducted)**	**L**	**T**	**P**	**C**	**100**
		0	0	3	1.5	

Objectives	▪ To inculcate experimental skills to test basic understanding of water quality parameters, such as, alkalinity, hardness, DO and chloride. ▪ To induce the students to familiarize with electro analytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions. ▪ To design and plan the experimental procedure and to record and process the results.
Outcomes	On completion of this course, students will have the knowledge in ▪ Explain the essential principles and their analysis of water quality parameters, like hardness, alkalinity, DO, and chloride. ▪ Experiment with different types of instruments for analysis of materials using small quantities involved for quick and accurate results. ▪ Analyze the normality of different types of materials such as PVA and Ferrous ion.
1.	Determination of Total, Temporary & Permanent hardness of water using EDTA method.
2.	Determination of the Alkalinity level of a water sample.
3.	Determination of Chloride content of water sample by Argentometry.
4.	Determination of DO content of water sample using Winkler's method.
5.	Determination of molecular weight of polyvinyl alcohol using Viscometry.
6.	Estimation of Iron content of the given solution using Potentiometry.
7.	Determination of strength of given hydrochloric acid using pH meter.
8.	Conductometric titration of strong acid vs strong base.
9.	Determination of strength of acids in a mixture using Conductometry.
10.	Estimation of sulphate in a solution using Conductometry (precipitation).

TEXT BOOK	
1.	Chemistry lab Manual, Department of Chemistry, Mahendra Engineering College, Mallasamudram, 2022.
2.	Chemistry lab Manual, Department of Chemistry, Mahendra Engineering College, Mallasamudram, 2020.

REFERENCES	
1.	Applied chemistry theory and practice by O. P. Vermani and A. K. Narula, second edition.
2.	J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis (2009).
3.	Kolthoff I.M. and Sandell E.B. et al. Quantitative chemical analysis, Mcmillan, Madras 1980

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MAHENDRA ENGINEERING COLLEGE

Syllabus

Department	Computer Science and Engineering	Programme Code		1041

II Semester					

Course Code	Course Name	Hours/Week			Credit	Maximum marks
		L	T	P	C	
24CS23201	**DATA STRUCTURES LAB**	0	0	3	1.5	100

Objective(s)	The student should be made to: ● To Understand the concept of ADTs ● To Learn to implement linear data structures and its applications ● To Understand the applications of tree and implement its types ● To Learn the techniques for graph structure ● To Understand the basics of sorting, searching and hashing algorithms
Outcome(s)	Upon completion of this course , students will be able to ● Implement abstract data types for linear data structures ● Implement different linear and non-linear data structures to its applications ● Develop programs for applications of tree and its types ● Develop programs for graph traversal ● Implement various sorting, searching and hash algorithms

LIST OF EXERCISES

1	Array implementation of List ADTs
2	Linked list implementation of List ADTs
3	Array implementation of Stack ADTs
4	Array implementation of Queue ADTs
5	Applications of Stack and Queue ADTs
6	Implementation of Binary Tree Traversal
7	Implementation of Binary Search Trees
8	Implementation of AVL Trees
9	Graph representation and Traversal algorithms
10	Applications of Graphs
11	Implementation of searching algorithms
12	Implementation of sorting algorithms
13	Implementation of hashing functions
	Total hours 30

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MAHENDRA ENGINEERING COLLEGE (Autonomous)-

Syllabus - Regulation 2024	
Department	**English**

<div align="center">

Semester I – Non-Circuit Branches
Semester II – Circuit Branches
(Common to all B.E./ B.Tech. Programmes)

</div>

Course code	Course Name	Hours/week				Credit	Maximum marks
24HS21001	**Personality Development Practice**	**L**	**T**	**P**	**C**		**100**
		0	0	2	1		

Objectives	• To develop listening and speaking skills of students for a variety of purposes like making presentations, attending interviews and participating in discussions • To enhance the non-verbal and social interaction skills of students for becoming effective communicators • To enable learners to hone their linguistic (LSRW) skills with the help of Technology
Outcomes	**At the end of the course, the students will be able to** • Understand the language proficiency and its techniques • Prepare the resume with organized details • Develop soft skills to excel in their career

<div align="center">

LIST OF EXERCISES

</div>

1.	Importance of Communication Skills
2.	Building Vocabulary (Basic level)
3.	Stage Dynamics (Group PPT Presentation)
4.	Predicting the Content of a Given Article (Newspaper, Magazine, etc.,)
5.	Common Errors in English
6.	Interview Skills
7.	Presentation skills
8.	Group Discussion
9.	Soft Skills (Self-Confidence, Team Work, Time Management, Adaptability, Openness to Criticism)
10.	Creative Writing – Any Essay type (Descriptive, Narrative etc.)
	Total Hrs : 15

REFERENCE BOOKS:
1. Joshi, Manmohan, *Soft Skills*, 1st Edition. Bookboon, 2017
2. Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice,*
Ed.III, Oxford University Press, New Delhi. 2015

Online Websites:
https:// www.ted.com/talks

https://quizziz.com
www.pdfdrive.com
https://www.calameo.com/read/00072308558ed20d410e7/

Activity:
Worksheets for relevant topics

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Regulations 2024

III Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Cate-gory
		THEORY					
1	24MA12302	Probability and Statistics	3	1	0	4	BS
2	24CS13301	Computer Architecture and Organization	3	0	0	3	PC
3	24CS14303	Operating Systems	3	0	0	3	PC
4	24CS14303	Python Programming	3	0	0	3	PC
5	24MA12304	Open Elective-I	2	1	0	3	OE
6	24HS11006	Universal Human Values	3	0	0	3	HS
		PRACTICAL					
7	24CS24301	Python Programming Lab	0	0	3	1.5	PC
8	24CS24302	Operating Systems Lab	0	0	3	1.5	PC
		TOTAL	**17**	**2**	**6**	**22**	

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MAHENDRA ENGINEERING COLLEGE
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Syllabus					Regulations 2024
Department	**MATHEMATICS**		**Programme Code**		

III Semester

Course code	Course Name	Hours/week			Credit	Maximum marks
24MA12302	**PROBABILITY AND STATISTICS (AI&DS, CSE, CYBER & IT)**	**L**	**T**	**P**	**C**	**100**
		3	1	0	4	

Objective(s)	To enable the students to, • Gain knowledge of random variables and various standard distributions and their properties. • Familiarizes the students with two dimensional discrete and continuous random variables, correlation and regression analysis. • Learn about bivariate distributions, the basic ideas of measures of central tendency, moments, skewness, kurtosis and curve fitting. • Study the types of large samples tests. • Study the type's small samples tests.
Outcome(s)	At the end of the course the students will be able to, • Apply the ideas of probability and random variables and various discrete and continuous probability distributions and their properties which can describe real life phenomena. • Solve the problems involving more than one random variable. • Apply the ideas of bivariate distributions, the basic ideas of measures of central tendency, moments, skewness, kurtosis and curve fitting. • Analyze testing of hypothesis of large samples. • Analyze testing of hypothesis of small samples.

UNIT-I	**ONE DIMENSIONAL RANDOM VARIABLE**	**9+3**

Δισχρετε ανδ χοντινυουσ ρανδομ ϖαριαβλεσ ▢ Ματηεματιχαλ Εξπεχτατιον – Μομεντσ – Μομεντ γενερατινγ φυνχτιονσ ανδ τηειρ προπερτιεσ. Βινομιαλ, Ποισσον, Υνιφορμ, Εξπονεντιαλ διστριβυτιον ανδ Νορμαλ διστριβυτιονσ.

UNIT-II	**TWO - DIMENSIONAL RANDOM VARIABLES**	**9+3**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Central limit theorem (for independent and identically distributed random variables).

UNIT-III	**BIVARIATE DISTRIBUTION AND CURVE FITTING**	**9+3**

Bivariate distributions and their properties, Measures of Central tendency: Moments, skewness and Kurtosis : Curve fitting by the method of least squares- fitting of straight lines, and second degree parabolas.

UNIT-IV	**LARGE SAMPLES**	**9+3**

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means and difference of standard deviations.

UNIT-V	SMALL SAMPLES	9+3
Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.		
	Total hours to be taught	**(L:45+T:15): 60 PERIODS**

TEXT BOOK :	
1	Veerarajan T., Probability and Statistics, Random Processes and Queueing Theory Tata McGraw-Hill, New Delhi, 2018.
2	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
REFERENCES:	
1	Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 2010.
2	Richard A. Johnson, Irwin Miller, John E. Freund, "Introduction to Probability and Statistics for Engineers" , Pearson Prentice Hall, 2004.
3	Shelton M. Ross, A First Course in Probability, Pearson Prentice Hall, 2020.

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Syllabus							
Department	Computer Science and Engineering		Programme Code			1041	
III Semester							
Course code	Course Name		Hours/week			Credit	Maximum marks
24CS14301	COMPUTER ARCHITECTURE AND ORGANIZATION		L	T	P	C	100
			3	0	0	3	
Objective(s)	To enable the students to, ● Understand the basic components and its interaction in a computer system ● Learn fundamental in building a basic computer. ● Know the working principle of ALU unit ● Familiarize the students with hierarchical memory system ● Learn the different ways of communicating with I/O devices						
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Explain the digital computers and their fundamental architecture. ● Describe the working principle of ALU unit ● Explore functionalities and organization of processor units and their types. ● Evaluate performance of Memory systems ● Distinguish types of I/O devices and Interfacing circuits						
UNIT I	BASIC STRUCTURE OF COMPUTERS						9
Operational concepts - Bus structures - Arithmetic operations - Memory operations - Addressing modes - Basic I/O operations – Performance-RISC – CISC.							
UNIT II	DIGITAL SYSTEMS & ARITHMETIC UNIT						9
Digital Systems – Number systems and base conversions – Representation of signed Binary Numbers – Binary codes – Logic gates. Addition and Subtraction – Multiplication – Division – Floating Point Representation - Binary Multiplication: Booth's algorithm - Floating point operations.							
UNIT III	PIPELINING AND VECTOR PROCESSING:						9
Control unit – Building a Data path – Control Implementation Scheme -Pipelining – Pipelined datapath and control – Handling Data Hazards & Control Hazards							
UNIT IV	MEMORY SYSTEM ORGANIZAION & ARCHITECTURE						9
Memory System Hierarchy, Characteristics, Byte storage methods, Conceptual view of memory cell – Design of Scalable memory using RAM's – ROM's chips – construction of larger size memories – memory Interleaving – Memory interface address map - Cache Memory: Principles, Cache memory management techniques, types of caches, cache misses, Mean Memory access time evaluation of cache.							
UNIT V	I/O ORGANIZATION AND LOGIC CIRCUITS						9
Peripheral devices and their characteristics: Input-output subsystems, I/O transfers - program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes - role of interrupts in process state transitions.							
						Total hours	45

TEXT BOOK :	
1	C.Hamacher, Z.Vranesic, S.Zaky, "Computer Organization", Fifth Edition McGraw Hill, 2011
REFERENCES:	
1	W.Stallings, "Computer Organization and Architecture", Ninth Edition, Pearson education, 2013
2	David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Fourth edition, Elsevier 2011.
3	Digital Logic and Computer Design by M. Moris Mano, 4th Edition.
5	NPTEL course, Computer Organization, https://nptel.ac.in/courses/106106092/

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Syllabus

Department	Computer Science and Engineering	Programme Code		1041	

III Semester

Course code	Course Name	Hours/week			Credit	Maximum marks
24CS14302	OPERATING SYSTEMS	L	T	P	C	100
		3	0	0	3	

Objective(s)	The student should be made to: ● Understand the structure and functions of OS. ● Learn about Processes and Threads ● Understand the principles of concurrency Scheduling algorithms and Deadlocks and Implement them ● Learn the different memory management schemes ● Be familiar with the basics of Linux system and Mobile OS
Outcome(s)	The students will be able to: ● Compare the different Operating Systems Structures ● Express the concepts of Processes and Threads ● Implement the principles of concurrency Scheduling algorithms and Deadlocks and Implement them ● Illustrate the principles of different memory management schemes ● Compare iOS and Android Operating Systems

UNIT-I	INTRODUCTION AND OPERATING SYSTEM STRUCTURES	9

Operating System Overview – Classification of Operating Systems – Mainframe Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real time systems – Hardware Protection – System Components, Operating System Services – System Calls – System Programs – System Structure

UNIT-II	PROCESSES	9

Definition of process and Process Control Block, Process States- Inter-process Communication. Processes Description and Process Control. Processes and Threads, Types of Threads, Windows 10 - Thread and SMP Management.

UNIT-III	CONCURRENCY AND SCHEDULING	9

Principles of Concurrency - Mutual Exclusion, Semaphores, Monitors, Readers/Writers problem. Principles of Deadlock, Deadlocks - prevention- avoidance - detection, Scheduling- Types of Scheduling, Scheduling algorithms.

UNIT-IV	MEMORY	9

Memory management requirements, Partitioning, Paging and Segmentation, Page Replacement, Allocation, Thrashing. Virtual memory - Hardware and control structures, operating system software, Windows memory management.

UNIT-V	CASE STUDY	9

Linux System - Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS - iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System

	Total hours	45

	TEXT BOOK :
1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, ―Operating System Concepts, 11th Edition, John Wiley and Sons Inc., 2021

	REFERENCES:
1	William Stallings, "Operating Systems – Internals and Design Principles", 9th Edition, Prentice Hall, 2018.
2	Andrew S. Tanenbaum, "Modern Operating Systems", Fifth Edition, Addison Wesley, 2018
3	D M Dhamdhere, "Operating Systems: A Concept-Based Approach", Third Edition, Tata McGraw-Hill Education, 2017
4	NPTEL course, Introduction to Operating systems, http://nptel.ac.in/courses/106106144/

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Syllabus					
Department	Computer Science and Engineering	Programme Code		1041	
III Semester					
Course code	Course Name	Hours/week		Credit	Maximum marks
24CS14303	**PYTHON PROGRAMMING**	L T P		C	100
		3 0 0		3	
Objective(s)	The student should be made to: ● Learn basics of Python Programming ● Gain knowledge of python data structures – lists, tuples, dictionaries. ● Understand the concepts of strings and functions. ● Familiarize with the concepts of files and exceptions. ● Know the modules and packages.				
Outcome(s)	The students will be able to: ● Explain the basics of Python Programming ● Summarize python data structures – lists, tuples, dictionaries ● Discuss the python strings and functions. ● Describe the files and exceptions. ● Apply the modules and packages.				
UNIT-I	**BASICS OF PYTHON PROGRAMMING**				9
Introduction to Python -Demo of Interactive and script mode- Tokens in Python – Variables - Keywords - Data types – Indentation - Operators - Selective statements –Iterative statements.					
UNIT-II	**LISTS, TUPLES, DICTIONARIES**				9
List: Create- Access- Slicing- Negative Indices- List Methods-comprehensions. Tuples: Create- Indexing and Slicing- Operations on tuples. Dictionary: Create- add and replace values- operations on dictionaries.					
UNIT-III	**STRINGS AND FUNCTIONS**				9
Strings: Formatting-Comparison-Slicing-Splitting-Stripping.Functions:Types-parameters-arguments: positional arguments- keyword arguments .Scope of variables: Local and global scope-Recursion and Lambda functions.					
UNIT-IV	**FILES AND EXCEPTIONS**				9
Files: Open, Read- Write- Append and Close-Tell and seek methods. Errors and Exceptions: Syntax Errors-Exceptions-Handling Exceptions-Raising Exceptions-Exception Chaining-User-defined Exceptions.					
UNIT-V	**MODULES AND PACKAGES**				9
Built-in modules - User-Defined Modules. Packages: Introduction-Installing a Packages - Overview of Numpy and Pandas packages- Pycharm: Overview-Important tools and features of pycharm.					
		Total hours		**45**	

TEXT BOOK :	
1	Allen B. Downey, "Think Python : How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016
REFERENCES:	
1	Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2	John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data'', Third Edition, MIT Press 2021
3	Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
4	Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill,2018

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Syllabus							
Department	**Computer Science and Engineering**		**Programme Code**			**1041**	
III Semester							
Course Code	**Course Name**	**Hours/Week**			**Credit**	**Maximum marks**	
		L	**T**	**P**	**C**		
24CS24301	**PYTHON PROGRAMMING LAB**	**0**	**0**	**3**	**1.5**	**100**	

Objective(s):	The student should be made to: • Learn python programs with conditionals and loops. • Understand compound data using Python lists, tuples, dictionaries • Know python programs with functions. • Learn files and exceptions in Python. • Be familiar with modules in Python
Outcome(s):	Upon completion of this course, the Learners will be able to : • Implement Python programs with conditionals and loops. • Implement Python lists, tuples, dictionaries for representing compound data. • Develop Python programs functions. • Implement programs to files and exceptions in Python. • Develop modules in Python

LIST OF EXERCISES	
1	Print the below triangle using for loop in python. 5 4 4 3 3 3 2 2 2 2 1 1 1 1 1
2	Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder)
3	Write a python program to print the fibonacci sequence using while loop
4	Write a program to create, append and remove lists in python
5	Write a program to demonstrate working with tuples in python
6	Write a program to to add,change and remove elements in Dictionary
7	Write a python program for basic calculator operations using functions
8	Write a python program to find factorial of a number using recursion
9	Write a function called palindrome that takes a string argument and returns True if it is a palindrome and False otherwise.

10	Write a python program to read the file contents and do the following operations:
	i) Print each word of a file in reverse order.
	ii) Print each line of a file in reverse order.
	Sample Input: Python Programming
	Sample Output: Programming Python
	iii) Display the content without whitespaces
	Sample Output: Python Programming
11	Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)
12	Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)
13	Implementing programs using written modules and Python Standard Libraries (pandas, numpy.
14	Write a Python program to find the substrings within a string using re module
	Total hours	**30**

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MAHENDRA ENGINEERING COLLEGE
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Syllabus

Department	Computer Science and Engineering	Programme Code	1041

Semester-III

Course Code	Course Name	Hours/Week			Credit	Maximum marks
		L	T	P	C	
24CS24302	OPERATING SYSTEMS LAB	0	0	3	1.5	100

Objective(s)	The student should be made to: ● Learn Unix commands and shell programming ● Implement various CPU Scheduling Algorithms ● Learn the implementation of Deadlock avoidance ● Familiar with the page replacement algorithms ● Implement File Allocation and Memory Allocation Strategies
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Simulate the basic UNIX commands and implement shell program using shell script ● Compare the performance of various CPU Scheduling Algorithms ● Implement the inter process communication and Deadlock avoidance ● Analyze the performance of the various Page Replacement Algorithms ● Implement File Allocation and Memory Allocation Strategies

LISTOF EXPERIMENTS

1	Basics of UNIX commands
2	Shell Programming
3	Write C programs to implement the various CPU Scheduling Algorithms
4	Programs using the system calls for Process.
5	Programs using the system calls for File management and I/O system.
6	Implement Bankers Algorithm for Deadlock Avoidance
7	Implementation of the following Memory Allocation Methods for fixed partition a) First Fit b) Worst Fit c) Best Fit
8	Implementation of the following Page Replacement Algorithms a) FIFO b) LRU c) LFU
9	Implementation of the following File allocation strategies a) Sequential b) Indexed c) Linked
	Total hours **30**

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Regulations 2024

IV Semester

Sl. No.	Course Code	Course Title	L	T	P	C	Category
	THEORY						
1	24MA12401	Discrete Mathematics and Graph Theory	3	1	0	4	BS
2	24CS14401	Database Management Systems	3	0	0	3	PC
3	24CS14402	Design and Analysis of Algorithms	3	0	0	3	PC
4	24CS14403	Java Programming	3	0	0	3	PC
5	24CS14404	Computer Networks	3	0	0	3	PC
6		Open Elective-II	3	0	0	3	OE
7	24CY11001	Environmental Science & Sustainability	2	0	0	2	HS
	PRACTICAL						
8	24CS24401	Database Management Systems Lab	0	0	3	1.5	PC
9	24CS24402	Java and Network Programming Lab	0	0	3	1.5	PC
10	24HS21002	Professional Communication Skills	0	1	2	2	EEC
		TOTAL	**21**	**2**	**8**	**26**	

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Syllabus				Regulations 2024	
Department	**MATHEMATICS**		**Programme Code**		

IV Semester

Course code	Course Name	Hours/week			Credit	Maximum marks
	DISCRETE MATHEMATICS AND GRAPH THEORY (AI&DS, CSE, CYBER & IT)	**L**	**T**	**P**	**C**	
24MA12401		3	1	0	4	**100**

Objective(s)	To enable the students to: • Create simple mathematical proofs using positions and connectives and doing truth table analysis. • Learn about quantifiers and the theory of inference. • Gain knowledge of set theory, relations, partial ordering and posets. • Learn about the concepts of algebraic structures and groups. • Study various types of graphs including Euler graphs and Hamiltonian graphs.
Outcome(s)	At the end of the course the students will be able to: • Explain the concepts of connectives and truth table analysis. • Construct and correct mathematical arguments. • Describe the basic concepts of set theory, relations, partial ordering and posets. • Classify the algebraic structure of a given a mathematical problem. • Develop the given problem as graph terminology and solve with techniques of graph theory.

MODULE-I	**PROPOSITIONAL CALCULUS**	**9+3**

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference.

MODULE-II	**PREDICATE CALCULUS**	**9+3**

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

MODULE-III	**SET THEORY**	**9+3**

Basic Concepts- Notations- Subset – Algebra of sets- The power set- Ordered pairs and Cartesian product – Relations on sets- Types of relations and their properties- Relational matrix and the graph of a relation – Partitions- Equivalence relations – Partial ordering- Poset – Hasse-Diagram.

MODULE-IV	GROUPS	9+3
Algebraic systems – Definitions – Examples- Properties- Semigroups - Monoids- Homomorphism- Sub semigroups and submonoids - Cosets and Lagrange's theorem- Normal subgroups.		

MODULE-V	GRAPHS	9+3
Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism -connectivity-Euler and Hamilton paths.		

	Total hours to be taught	(L:45+T:15): 60 PERIODS

TEXT BOOK :	
1	Veerarajan T., Discrete Mathematics with Grapy Theory and Combinatorics, Tata McGraw-Hill, New Delhi, 2017.
2	J. P. Tremblay and R. P. Manohar, Discrete Mathematics with Applications to Computer Science, Tata McGraw-Hill ,New Delhi 2008.
REFERENCES:	
1	Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications, 2006.
2	Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", , Pearson Education Pvt Ltd., New Delhi, 2003.
3	K. H. Rosen, Discrete Mathematics and its Applications, Tata McGraw-Hill, 2014.

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Syllabus					
Department	**Computer Science and Engineering**	**Programme Code**		**1041**	
IV Semester					
Course code	**Course Name**	**Hours/week**		**Credit**	**Maximum marks**
24CS14401	**DATABASE MANAGEMENT SYSTEMS**	L	T	P	C	**100**
		3	0	0	3	

Objective(s)

The student should be made to:
- Learn the fundamentals of data models and to represent a database system using ER diagrams.
- Study SQL and relational database design.
- Understand the fundamentals of transaction processing and query processing
- Familiarize with different types of indexing and database security.
- Understand the special databases

Outcome(s)

Upon completion of this course, the Learners will be able to :
- Describe basic concepts of database system and Map ER model to Relational model
- Apply SQL for business related problems to perform database design effectively
- Express the fundamentals of transaction processing and query processing
- Implement different types indexing and database security techniques
- Appraise how advanced databases differ from traditional databases.

UNIT I	INTRODUCTION	9

Introduction to Database – Data Abstraction, DBMS Architecture – Data Independence – Data Models - Entity-relationship model, network model, relational and object oriented data models, Data Modeling using Entity-relationship model.

UNIT II	RELATIONAL MODEL	9

Relational Algebra – SQL – Data Definition Language (DDL), Data Manipulation Language (DML) Data Control Language (DCL) – Views – Constraints - Functional Dependencies – Normal Forms – 1NF – 2NF- 3NF- BCNF - Join Dependencies and Fifth Normal Form.

UNIT III	TRANSACTION PROCESSING	9

Transaction Processing – ACID property,- Serializability – Locking Techniques – Time Stamp Ordering - Recovery Concepts – Shadow Paging – Log Based Recovery – Database Security Issues.

UNIT IV	DATABASE SECURITY	9

Storage strategies: Indexing- B-trees, Hashing. Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection

UNIT V	SPECIAL DATABASES	9

Distributed Databases: Architecture - Object oriented and object relational databases,- Temporal Databases – Mobile Databases, Data warehousing data mining.

	Total hours	**45**

TEXT BOOK :	
1	Silberschatz, A., Korth, H. F., and Sudarshan, S. Database System Concepts, McGraw-Hill, 7th Edition. 2019
REFERENCES:	
1	Elmasri, R., &Navathe, S. B. Fundamentals of database systems, 4th Edition, Addison Wesley Publishing Edition, 2017
2	Berson, A., & Smith, S. J. Data warehousing, data mining, and OLAP. McGraw-Hill, Inc., 2017
3	Stallings William "Computer Security: Principles and Practice" Fourth Edition, Pearson Education, 2018
4	David Ferraiolo, D. Richard Kuhn, Ramaswamy Chandramouli, "Role-based Access Control", Artech House, 2003
5	Introduction to Database Systems - nptel online courses By Prof. Sreenivasa Kumar, IIT Madras

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<table>
<tr><td colspan="7" align="center">**MAHENDRA ENGINEERING COLLEGE**
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<tr><td colspan="7" align="center">**Syllabus**</td></tr>
<tr><td>**Department**</td><td colspan="2">**Computer Science and Engineering**</td><td colspan="2">**Programme Code**</td><td colspan="2">**1041**</td></tr>
<tr><td colspan="7" align="center">**IV Semester**</td></tr>
<tr><td>**Course code**</td><td colspan="2">**Course Name**</td><td colspan="2">**Hours/week**</td><td>**Credit**</td><td>**Maximum marks**</td></tr>
<tr><td rowspan="2">**24CS14402**</td><td colspan="2" rowspan="2">**DESIGN AND ANALYSIS OF ALGORITHMS**</td><td>**L**</td><td>**T**</td><td>**P**</td><td>**C**</td><td rowspan="2">**100**</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>**Objective(s)**</td><td colspan="6">The student should be made to:
●   Learn basic knowledge of algorithmic fundamentals
● Be Familiar with the different algorithm design techniques
● Understand the basic problems arise in many applications such as sorting, searching, assignment problems
● Be familiar with iterative improvement techniques
● Understand the limitations of Algorithm power</td></tr>
<tr><td>**Outcome(s)**</td><td colspan="6">Upon completion of this course, students will be able to
● Interpret the fundamental needs of algorithms in problem solving
● Classify the different algorithm design techniques for problem solving
● Develop algorithms for various computing problems
● Analyze the time and space complexity of various algorithms
●   Discover the limitations of algorithms in problem solving</td></tr>
<tr><td>**UNIT-I**</td><td colspan="5">**INTRODUCTION**</td><td>**9**</td></tr>
<tr><td colspan="7">Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its Properties – Mathematical Analysis for Recursive and Non-Recursive Algorithms.</td></tr>
<tr><td>**UNIT-II**</td><td colspan="5">**BRUTE FORCE AND DIVIDE-AND-CONQUER**</td><td>**9**</td></tr>
<tr><td colspan="7">Brute Force - Closest-Pair - Exhaustive Search - Traveling Salesman Problem - Knapsack Problem - Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search.</td></tr>
<tr><td>**UNIT-III**</td><td colspan="5">**GREEDY TECHNIQUE AND DYNAMIC PROGRAMMING**</td><td>**9**</td></tr>
<tr><td colspan="7">Greedy Algorithm – Introduction to the method, Fractional Knapsack problem, Task Scheduling Problem, Dynamic Programming: Introduction to the method, Fibonacci numbers, 0-1 Knapsack problem, Matrix chain multiplication problem. Backtracking, Branch and Bound 0-1 Knapsack.</td></tr>
<tr><td>**UNIT-IV**</td><td colspan="5">**GRAPH ALGORITHMS AND COMPLEXITY CLASSES**</td><td>**9**</td></tr>
<tr><td colspan="7">All pair shortest path – Floyd-Warshall Algorithm. Network Flows - Flow Networks, Maximum Flows – Ford-Fulkerson Algorithm, Push Re-label Algorithm, Minimum Cost Flows – Cycle Cancelling Algorithm- Complexity Classes: The Class P, The Class NP, Reducibility and NP-completeness.</td></tr>
</table>

UNIT-V	APPROXIMATION AND RANDOMIZED ALGORITHMS	9
Approximation Algorithms - The set-covering problem – Vertex cover, K-center clustering-Randomized Algorithms - The hiring problem, Finding the global Minimum Cut		
	Total hours	**45**

	TEXT BOOK :
1	Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms , Third edition, MIT Press, 2009.

	REFERENCES:
1	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007.
2	Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
3	Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, ―Data Structures and Algorithms, Pearson Education, Reprint 2006.
4	Harsh Bhasin, ―Algorithms Design and Analysis, Oxford university press, 2016.
5	Jon Kleinberg, ÉvaTardos ,Algorithm Design, Pearson education, 2014
6	https://nptel.ac.in/courses/106106131

BoS Chairman

MAHENDRA ENGINEERING COLLEGE
(Autonomous)
Syllabus

Department	Computer Science and Engineering	Programme Code		1041

IV Semester

Course code	Course Name	Hours/week				Credit	Maximum marks
24CS14403	**JAVA PROGRAMMING**	**L**	**T**	**P**		**C**	**100**
		3	0	0		3	

Objective(s)	The student should be made to: ● Understand Object Oriented Programming concepts and basics of Java programming language ● Know the principles of packages, inheritance and interfaces ● Learn java application with threads and generics classes ● Define exceptions and use I/O streams ● Be Familiar in Graphical User Interface Application using JAVAFX
Outcome(s)	Upon completion of this course , students will be able to: ● Apply the concepts of classes and objects to solve simple problems ● Develop programs using inheritance, packages and interfaces ● Demonstrate exception handling mechanisms and multithreaded model to solve real world problems ● Build Java applications with I/O packages, string classes, Collections and generics concepts ● Design the concepts of event handling and JavaFX components and controls for developing GUI based applications

UNIT-I	**INTRODUCTION TO OOP AND JAVA**	**9**

Overview of OOP – Object oriented programming paradigms – Features of Object Oriented Programming – Java Buzzwords – Overview of Java – Data Types, Variables and Arrays – Operators – Control Statements – Programming Structures in Java – Defining classes in Java – Constructors-Methods -Access specifiers - Static members- Java Doc comments

UNIT-II	**INHERITANCE, PACKAGES AND INTERFACES**	**9**

Overloading Methods – Objects as Parameters – Returning Objects –Static, Nested and Inner Classes. Inheritance: Basics– Types of Inheritance -Super keyword -Method Overriding – Dynamic Method Dispatch –Abstract Classes – final with Inheritance. Packages and Interfaces: Packages – Packages and Member Access –Importing Packages – Interfaces.

UNIT-III	**EXCEPTION HANDLING AND MULTITHREADING**	**9**

Exception handling basics – Multiple catch Clauses – Nested try Statements – Java's Built-in Exceptions – User defined Exception. Multithreaded Programming: Java Thread Model–Creating a Thread and Multiple Threads – Priorities – Synchronization – Inter Thread Communication Suspending –Resuming, and Stopping Threads –Multithreading. Wrappers – Auto boxing.

UNIT-IV	**I/O, STRING HANDLING, DATABASE CONNECTIVITY**	**9**

I/O Basics – Reading and Writing Console I/O – Reading and Writing Files. Strings: Basic String class, methods and String Buffer Class. Database Connectivity: Introduction to JDBC - JDBC Drivers & Architecture- CURD operation Using JDBC- Working with Result Set.

UNIT-V	JAVAFX EVENT HANDLING, CONTROLS AND COMPONENTS	9
JAVAFX Events and Controls: Event Basics – Handling Key and Mouse Events. Controls: Checkbox, ToggleButton – RadioButtons – ListView – ComboBox – ChoiceBox – Text Controls – ScrollPane. Layouts – FlowPane – HBox and VBox – BorderPane – StackPane – GridPane. Menus – Basics – Menu – Menu bars – MenuItem.		
	Total hours	**45**

TEXT BOOK :	
1	Herbert Schildt, "Java: The Complete Reference", 12th Edition, McGraw Hill Education, New Delhi, 2022(Unit I,II, III, IV & V)
2	Herbert Schildt, "Introducing JavaFX 8 Programming", 1 st Edition, McGraw Hill Education, New Delhi, 2015(Unit V)
REFERENCES:	
1	Cay S. Horstmann, "Core Java Fundamentals", Volume 1, 11 th Edition, Prentice Hall, 2018
2	Elliotte Rustry Harold, "Java Network Programming", O'Reilly, 2014.
3	Nptel course, "Programming in Java", https://onlinecourses.nptel.ac.in/noc24_cs43/preview
4	Coursera, Java Programming: Solving Problems with Software, https://www.coursera.org/learn/java-programming

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MAHENDRA ENGINEERING COLLEGE						
(Autonomous)						
Syllabus						
Department	Computer Science and Engineering		Programme Code		1041	
IV Semester						
Course code	Course Name		Hours/week		Credit	Maximum marks
24CS14404	**COMPUTER NETWORKS**		**L** **T** **P**	**C**	100	
			3 0 0	3		

Objective(s)	The student should be made to: ● Understand the fundamental concepts of computer networking, protocols and architectures. ● Know the basics of how data flow from one node to another. ● Learn the various components required to build different networks. ● Familiarize the functions and protocols of the Transport layer. ● Know the working of various application layer protocols
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Describe the different building blocks of Communication network and its architecture. ● Contrast different types of switching networks and analyse the performance of network. ● Design subnetting and analyse the performance of network layer, Construct and examine various routing protocols. ● Explain the functions and protocols of the Transport layer ● Interpret the working of various application layer protocols.

UNIT-I	**INTRODUCTION TO COMPUTER NETWORKS**	9
Introduction: Computer networks and distributed systems - Classifications of computer networks - Preliminaries of layered network structures. Data communication Components: Representation of data and its flow - various connection topology - Protocols and Standards - OSI model, Transmission Media.		

UNIT-II	**DATA-LINK LAYER & MEDIA ACCESS**	9
Introduction Error detection and correction – Hamming code, CRC, Checksum- Flow control mechanism- Media Access Control – LANs: Wired LAN, Wireless LANs - Switches - RFID-Bluetooth Standards		

UNIT-III	**NETWORK LAYER**	9
Network Layer Services – Packet switching – IPV4 Addresses – Forwarding of IP Packets - Network Layer Protocols: IP, ICMP v4 - Link state and Distance vector Routing protocols— IPV6 Addressing – IPV6 Protocol.		

UNIT-IV	**TRANSPORT LAYER**	9
Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol – Transmission Control Protocol – Congestion control – Congestion Avoidance mechanisms.		

UNIT-V	**APPLICATION LAYER**	9
Introduction - HTTP – FTP –Telnet -SMTP–SSH – DNS- SNMP-Firewall.		

	Total hours	45

TEXT BOOK :	
1	Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2017. (Unit 1 to Unit 5)

REFERENCES:	
1	William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
2	Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
3	Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
4	James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.
5	Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.

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MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	SCIENCE & HUMANITIES			Programme Code & Name		CY& CHEMISTRY
SEMESTER-III (For Non Circuit Branches & Cyber Security) & SEMESTER- IV (For Circuit Branches Except Cyber Security)						
COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
24CY11001	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY	L	T	P	C	100
		2	0	0	0	

Objectives	To make the students familiar with : 1. The importance of Environment and Ecosystem. 2. The basic concepts of biodiversity and emphasize on the biodiversity of India and its conservation. 3. The causes, effects and prevention measures of environmental pollution. 4. The social issues of the environment and National laws for environment protection. 5. The concept of sustainable development goals and appreciate the inter dependence of economic and social aspects of sustainability, recognize and analyze.
Outcomes	At the end of the course the student will be able to 1. Explain the importance of Environment and types of Ecosystem. 2. Classify the biodiversity and measure the variety of animals, plants and microbial species. 3. Identify the different types of Pollution and be familiar with control measures 4. List out the environmental issues and essential legislation on environmental laws. 5. Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

UNIT-I	ENVIRONMENT & ECOSYSTEM	9 Hrs

Definition, Scope and Importance of Environment – Need for public awareness – Ecosystem: concept of an ecosystem – structure and function of an ecosystem – energy flow in the ecosystem - Introduction, types, characteristic features, structure and function of the terrestrial (Forest and Grass land) ecosystem.

UNIT-II	BIODIVERSITY AND ITS CONSERVATION	9 Hrs

Biodiversity: Introduction – definition - genetic, species and ecosystem diversity - Value of biodiversity – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity – Field visit to local area.

UNIT-III	ENVIRONMENTAL POLLUTION	9 Hrs

Definition – causes, effects and control measures of: (a) Air, (b) Water, (c) Soil, (d) Noise pollution– solid waste management: causes, effects and control methods of municipal solid wastes – E-waste and plastic waste:

recycling and reuse **-** role of an individual in prevention of pollution – pollution case studies (vizag gas leakage)			
UNIT-IV	**SOCIAL ISSUES & ENVIRONMENTAL IMPACT ASSESMENT**		9 Hrs
Social issues – Climate change, global warming, acid rain, ozone layer depletion, case studies (Global warming). – EPA: Environment protection act - EIA: EIA structure- methods of baseline data acquisition. Planning and management of impact studies - operational aspects of EIA - methods for impact identification.			
UNIT-V	**SUSTAINABILITY AND MANAGEMENT**		9 Hrs
Development , GDP ,Sustainability- concept, needs and challenges - economic, social and aspects of sustainability - from unsustainability to sustainability - millennium development goals, and protocols- Sustainable Development Goals - targets, indicators and intervention areas.			
		TOTAL	**45 Hrs**
TEXT BOOKS :			
1.	Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press (2015)		
2.	Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2017.		
3.	Dr.A.Ravikrishnan, "Environmental Science and Engineering" , Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2018.		
4.	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.		
REFERENCES			
1.	Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 3nd Edition, Pearson Education, 2023.		
2.	R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.		
3.	Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.		

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MAHENDRA ENGINEERING COLLEGE
(Autonomous)
Syllabus

Department	Computer Science and Engineering	Programme Code	1041

IV Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
24CS24401	DATABASE MANAGEMENT SYSTEMS LAB	0	0	3	1.5	100

Objective(s)	The student should be made to: ● Understand data definitions and data manipulation commands ● Learn the use of nested and join queries ● Understand functions, procedures and procedural extensions of data bases ● Learn XML database using XML Schema. ● Be familiar with the use of a front end tool
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Use typical data definitions and manipulation commands. ● Design applications to test Nested and Join Queries ● Implement simple applications that use Views ● Design XML database using XML Schema ● Implement applications that require a Front-end Tool

LIST OF EXERCISES

1	Creation of a database and writing SQL queries to retrieve information from the database.
2	Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions
3	Database Querying Create complex queries and sub queries
4	Creating an employee database to set various constraints.
5	Query the database tables and explore natural, equi and outer joins.
6	Creation of Procedures and Functions
7	Create View and index for database tables with a large number of records.
8	Write a PL/SQL block that handles all types of exceptions.
9	Creation of database triggers and functions
10	Create an XML database and validate it using XML Schema
11	Database Connectivity with Front End Tools
12	Design and implementation of real life database applications
	Total hours 　**30**

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MAHENDRA ENGINEERING COLLEGE
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Syllabus

Department	Computer Science and Engineering	Programme Code		1041

Semester-IV

Course Code	Course Name	Hours/Week			Credit	Maximum marks
		L	T	P	C	
24CS24402	**JAVA AND NETWORK PROGRAMMING LAB**	0	0	3	1.5	100

Objective(s)	The student should be made to: ● Learn basics of java programming. ● Learn hardware and networking concepts and Error detection & correction ● Know network routing protocols ● Understand how to use TCP and UDP based sockets ● Be familiarize DNS client server algorithm using security protocols
Outcome(s)	Upon completion of this course, the Learners will be able to : ● Explain basics of java programming ● Describe basic networking commands and Error detection & correction ● Interpret basic networking protocols ● Develop programs using different types of sockets ● Implement DNS client server algorithm using security protocols

LISTOF EXERCISES

1	Implementing Java Classes and Interfaces
2	Implementing Java packages
3	Implementing Java Multithreading concept.
4	Demo session of all networking hardware and Functionalities
5	Use of Packet tracer network tool
6	Error detection and correction mechanisms
7	Flow control mechanisms
8	Simulation of unicast routing protocols
9	Socket programming (TCP and UDP) – Multi client chatting
10	Develop a DNS client server to resolve the given host name or IP address

	Total hours	30

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