C24_CURRICULUM

DIPLOMA IN

ELECTRONICS AND COMMUNICATION ENGINEERING

Offered By

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING

TELANGANA HYDERABAD

IV SEMESTER

S. NO	Course		Teaching Scheme					Examination Scheme						
			Instruction Periods per week			Total Periods per semester	Credits	Continuous Internal Evaluation (CIE)			Semester End Examination (SEE)			
	Code	Course Name	L	T	P			Mid Sem 1	Mid Sem 2	Internal Evaluation	Max marks	Min marks	Total Marks	Min marks for passing including internal
1	SC-401	Advanced Engineering Mathematics	4	1	0	75	2.5	20	20	20	40	14	100	35
2	EC-402	Microprocessors & Microcontrollers	4	1	0	75	2.5	20	20	20	40	14	100	35
3	CS-403	Python Programming	4	1	0	75	2.5	20	20	20	40	14	100	35
4	EC-404	Data Communication & Computer Networks	4	1	0	75	2.5	20	20	20	40	14	100	35
5	EC-405	Microwave Communication	4	1	0	75	2.5	20	20	20	40	14	100	35
6	EC-406	Semiconductor Technology	4	1	0	75	2.5	20	20	20	40	14	100	35
7	EC-407	Microcontrollers Lab	1	0	2	45	1.25	20	20	20	40	20	100	50
8	CS-408	Python Programming Lab	1	0	2	45	1.25	20	20	20	40	20	100	50
9	EC-409	Computer Hardware & Networking Lab	1	0	2	45	1.25	20	20	20	40	20	100	50
10	HU-410	Employability Skills Lab	1	0	2	45	1.25	20	20	20	40	20	100	50
			28	6	8	630	20	200	200	200	400	164	1000	410

SC-401 - ADVANCED ENGINEERING MATHEMATICS

Course Title	Advanced Engineering Mathematics	Course Code	SC-401
Semester	IV	Course Group	Foundation
Teaching Scheme in Periods (L : T : P)	4:1:0	Credits	2.5
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites:

This course requires the knowledge of Engineering Mathematics at Diploma first year level and Applied Engineering Mathematics at Diploma 3rd Semester level.

Course Outcomes (Cos):

At the end of the course, the student will have the ability to:

CO 1	Solve Differential Equations of first order and first degree with appropriate method
CO 2	Solve the higher order Homogeneous Linear Differential Equations with constant coefficients.
CO 3	Solve the Higher order Non-Homogeneous Linear Differential Equations with constant coefficients.
CO 4	Expand given functions as a Fourier Series in the given intervals.
CO 5	Find the Laplace Transforms of simple functions using its properties.
CO 6	Solve Linear Differential Equations with constant coefficient by using Laplace and inverse Laplace Transformations.

Course Contents:

Unit – I **Duration: 15 Periods (L:12 – T:3)**

Differential Equations of First Order and First Degree:

Definition of a Differential Equation - Order and Degree of a Differential Equations-Formation of Differential Equations - Solutions of Ordinary Differential Equations of first order and first degree: Variable Separable Method, Homogeneous Differential Equations, Exact Differential Equations, Linear

Differential Equations and Bernoulli's Equation-Problems leading to engineering applications by using above methods.

Unit – II **Duration: 10 Periods (L: 8– T:2)**

Higher order Homogeneous Linear Differential Equations with constant coefficients:

Homogenous Linear Differential Equations with constant coefficients of second and higher order- - Problems leading to engineering applications.

Unit-III **Duration: 12 Periods (L: 10 – T: 2)**

Higher order Non-Homogeneous Linear Differential Equations with constant coefficients:

Complimentary Function (C.F), Particular Integral (P.I) and General Solution (G.S) of Non-Homogeneous Linear Differential Equations with constant coefficients- Second and Higher order Non-Homogenous Linear Differential Equations with constant coefficients of the form $f(D)y = X$, where $f(D)$ is a polynomial in D and X is in the form k(a constant), e^{ax}, Sin (ax), Cos ax, x^n $(n= 1,2,3)$- Related engineering problems with emphasis on second order Non-Homogeneous Linear Differential Equations.

Unit – IV

Fourier Series: **Duration: 13 Periods (L:10 – T:3)**

Periodic functions - Orthogonality Property of Trigonometric functions - Representation of a function as Fourier series over the interval $(c, c + 2\pi)$ - Euler's formulae - Sufficient conditions for existence of Fourier series for a function $f(x)$ - Fourier series of functions over the interval $(0, 2\pi)$ and $(-\pi, \pi)$ - Fourier series of odd and even functions in the interval $(-\pi, \pi)$.

Unit – V

Laplace Transformations: **Duration: 12 Periods (L: 10 – T: 2)**

Definition of Laplace Transform -Sufficient conditions for Existence of Laplace Transform, Laplace Transform of some elementary functions -Linearity Property -First Shifting Theorem - Laplace Transforms of Derivatives - Laplace Transforms of Integrals - Multiplication t^n -Division by t - Related problems.

Unit – VI **Duration: 13 Periods (L:10 – T:3)**

Inverse Laplace transforms and Applications of Laplace Transformations:

Definition of Inverse Laplace Transform- Inverse Laplace Transform of elementary functions – Linearity Property – First Shifting Theorem - Inverse Laplace Transforms by using Partial fractions - Inverse Laplace Transform of Derivatives - Inverse Laplace Transform of Integrals - Multiplication by s^n Division by *s*-Definition of Convolution of two functions –Convolution Theorem (without proof) and its Applications -Applications of Laplace Transforms in solving Second order Linear Differential Equations with constant coefficients under the Initial conditions-Problems leading to engineering applications.

Reference Books:

1. Advanced Engineering Mathematics-Erwin Kreyszig, John Wiley Publications.
2. Advanced Engineering Mathematics- R.K. Jain and S.R.K. Iyengar, Narosa Publications.
3. Higher Engineering Mathematics-B.S.Grewal, Khanna Publications.
4. Laplace Transforms - Murray R. Spigel, Schaum's Outline Series, McGRAW-HILL.
5. Integral Transforms – A.R. Vasishtha and R. K. Gupta,Krishnan Prakashan Publications.

Suggested E-Learning references:

1. https://www.khanacademy.org/
2. https://www.wolframalpha.com/
3. https://onlinecourses.swayam2.ac.in/
4. http://tutorial.math.lamar.edu/

Suggested Learning Outcomes:

At the end of the course, the student will have the ability to:

1.0 Solve Differential Equations in engineering problems

1.1 Explain the concept of Differential Equations.

1.2 Classify the Differential Equations.

1.3 Find the order and degree of Differential Equations.

1.4 Form a Differential Equation by eliminating arbitrary constants.

1.5 Solve the first order first degree Differential Equations by using Variables Separable Method.

1.6 Solve the first order first degree Homogeneous Differential Equations.

1.7 Solve the first order first degree Exact Differential Equations

1.8 Solve the first order Linear Differential Equation of the form $\frac{dy}{dx} + \text{Py} = \text{Q}$,where P and Q are functions in *x* alone or constants.

1.9 Solve the first order Bernoulli's equations of the form $\frac{dy}{dx} + \text{Py} = \text{Q}y^n$,where P and Q are Functions of *x* alone or constants.

1.10 Solve the problems leading to engineering applications by using above methods.

2.0. Solve the Higher order Homogeneous Linear Differential Equations with constant coefficients.

2.1 Solve Differential Equations of the type:$a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = 0$,where *a*, *b* and *c* are constants, when the roots of the Auxiliary Equation are real & distinct.

2.2. Solve Differential Equations of the type:$a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = 0$,where *a*, *b* and *c* are constants, when the roots of the Auxiliary Equation are real & equal.

2.3 Solve Differential Equations of the type: $a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = 0$,where *a*, *b* and *c* are constants, when the roots of the Auxiliary Equation are complex conjugate pair.

2.4 Solve the Higher order Homogeneous Linear Differential Equations with constant coefficients.

3.0. Solve the Higher order Non-Homogeneous Linear Differential Equations with constant coefficients.

3.1 Explain the concept of Complementary Function and Particular Integral to get General Solution of Non-Homogeneous Linear Differential Equation with constant coefficients.

3.2 Solve the Higher order Non-Homogeneous Linear Differential Equations of the type *f*(*D*) *y* = *X*, where *f*(D)is a polynomial in*D*and *X* is a function of the form: *k* (constant) and e^{ax}.

3.3 Solve the Higher order Non-Homogeneous Linear Differential Equations of the type *f*(*D*) *y* = *X*, where *f*(D) is a polynomial in *D* and *X* is a function of the form: Sin *ax* and Cos *ax.*

3.4 Solve the Higher order Non-Homogeneous Linear Differential Equations of the type *f*(*D*) *y* = *X*, where *f*(D) is a polynomial in*D*and *X* is a function of the form x^n (*n* = 1, 2, 3).

3.5 Solve engineering problems with emphasis on second order Non-Homogeneous Linear Differential Equations by using above methods.

4.0 Expand given functions as a Fourier Series in the given intervals.

4.1 Define Periodic function with examples

4.2 Explain the Orthogonality Property of functions in an interval.

4.3 Define the Fourier series of a function in the interval $(c, c+2\pi)$ and state Euler's Formulae for determining the Fourier coefficients.

4.4 Write the sufficient conditions for the existence of Fourier series for a function.

4.5 Expand Fourier series of functions in the range $(0, 2\pi)$ and $(-\pi, \pi)$.

4.6 Expand Fourier series for even and odd functions in the interval $(-\pi, \pi)$.

5.0. Laplace Transforms:

5.1 Define Laplace Transform.

5.2 Explain sufficient conditions for existence of Laplace Transform.

5.3 Obtain Laplace Transforms of some elementary functions.

5.4 State the Linearity Property of Laplace transforms.

5.5 State the First Shifting Theorem on Laplace Transforms.

5.6 Explain the Laplace transform of $f'(t)$and $f^{(n)}(t)$in terms of Laplace transform of *f*(t).

5.7 Explain the Laplace transform of $\int_0^t f(u)du$ in terms of Laplace transform of *f*(t).

5.8 Explain the Laplace transform of $t^n f(t)$in terms of Laplace transform of *f*(t).

5.9 Explain the Laplace transform of $\frac{f(t)}{t}$ in terms of Laplace transform of *f*(t).

5.10 Solve problems on above methods.

6.0 Inverse Laplace transforms:

6.1 Define Inverse Laplace Transform and write Inverse Laplace Transforms of standard functions.

6.2 State the Linearity Property of Inverse Laplace transforms.

6.3 State the First Shifting Theorem on Inverse Laplace Transforms.

6.4 Solve problems on Inverse Laplace transforms using Partial fractions.

6.5 Explain Inverse Laplace transforms of the functions: $s^n f(s), \frac{f(s)}{s}, f^{(n)}(s), \int_s^\infty f(u)du.$

6.6 Solve the problems on 6.2, 6.3, 6.4 and 6.5.

6.7 Acquire the knowledge of convolution of two functions and state the convolution theorem.

6.8 Evaluate Inverse Laplace transforms of simple functions using Convolution Theorem.

6.9 Use Laplace and Inverse Laplace Transforms to solve second order Linear Differential Equations

with constant coefficients under the initial conditions.

6.10 Solve the problems leading to engineering applications.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2.Quiz.
3. Group discussion.
4. Group Tests.
5. Surprise tests.
6. Seminars.
7. Home Assignments.
8. Mathematics for preparing competitive exams and solving old question papers on Arithmetical ability.

CO-PO Mapping Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	Mapped POs
CO1	3	2	1				3	1,2,3, 7
CO2	3	2					3	1,2, 7
CO3	3	2					3	1,2, 7
CO4	3	2	1				3	1,2, 3,7
CO5	3	2	1				3	1,2, 3,7
CO6	3	2	1				3	1,2,3,7

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

Semester End Examination

Unit No	Questions to be set for SEE				
	R			U	A
I	4	1		9(a)	13(a)
II					
III		2		10(a)	14(a)
IV					
V		3	5,6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)
VI			7,8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)
Total Questions	8			8	8

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS (C - 24)
SC-401
SEMESTER IV, MID –I EXAM, MODEL PAPER
ADVANCED ENGINEERING MATHEMATICS
(Open Book System)

Duration : 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions. 04 × 01 = 04

2 Each question carries **ONE** mark.

1. Find the order and degree of the differential Equation $\left(\frac{d^3y}{dx^3}\right)^4 + 3\left(\frac{d^2y}{dx^2}\right)^3 - 5\frac{dy}{dx} + y = 0.$
2. Find the Integrating Factor of $(1+x^2)\frac{dy}{dx} + 2xy = \frac{1}{1+x^2}.$
3. Find the roots of auxiliary equation of the differential equation $(2D^2 + 5D - 3)y = 0.$
4. Write the auxiliary equation of the differential equation $a_3\frac{d^3y}{dx^3} + a_2\frac{d^2y}{dx^2} + a_1\frac{dy}{dx} + a_0y = 0.$

PART-B

Instructions: 1. Answer **ALL**questions. 02 × 03 = 06

2. Each question carries **THREE** marks.

5(a) Form the differential equation by eliminating arbitrary constants A and B in the family of curves $y = Acos\,mx + Bsin\,mx$, where *m* is a constant.

OR

5(b) Solve $\frac{dy}{dx} - ytanx = 0.$

6(a) Solve $6\frac{d^2x}{dt^2} - \frac{dx}{dt} - 2x = 0.$

OR

6(b) Solve $(D^2-4)^2y = 0.$

PART- C

Instructions: 1. Answer **ALL** questions 02 × 05 = 10

2. Each question carries **FIVE** marks

7(a) Solve $xy^3dy = (x^4 + y^4)dx.$

OR

7(b) Solve $(x^4 - 2xy^2 + y^4)dx - (2x^2y - 4xy^3 + siny)dy = 0.$

8(a) Solve $(D^3 + 3D^2 - 4)y = 0.$

OR

8 b) Solve $(D^3 - 8)y$ =0.

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DIPLOMA EXAMINATIONS (C - 24)
SC-401
SEMESTER IV, MID –II EXAM, MODEL PAPER
ADVANCED ENGINEERING MATHEMATICS
(Open Book System)

Duration: 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions. 04 × 01 = 04

2. Each question carries **ONE** mark.

1. Find the Particular Integral of $(D^2 - 5D + 6)y = e^{-x}$.
2. Find the Complementary Function of $2\frac{d^2y}{dx^2} + 3\frac{dy}{dx} - 5y$ = 6 sin 2x.
3. Find a_0 for f(x) = x Cos x in $-\pi < x < \pi$.
4. Find b_1 for f(x) =x in $0< x < 2\pi$.

PART-B

Instructions: 1. Answer **ALL** questions. 02 × 03 = 06

2. Each question carries **THREE** marks.

5(a) Find Particular Integral of $(D^2 - D - 6)y = e^x cosh 3x$.

OR

5(b) Solve $(D^2 + 2025)y = \sin 45x$.

6(a) Calculate a_1 in the Fourier series expansion of f(x) = x sin x in the interval (– π, π).

OR

6(b) Find the value of b_n in the expansion of Fourier series for the function f(x) = e^{3x}, where 0 <x< 2 π.

PART- C

Instructions: 1. Answer **ALL** questions 02 × 05 = 10

2. Each question carries **FIVE** marks

7(a) Solve $(D^2 - 3D + 2)y = e^x$ if y = 3 and $\frac{dy}{dx} = 3$, when x = 0.

OR

7 (b) Solve $y'' + y = x, y(0) = y'(0) = 1$.

8(a) Obtain Fourier series expansion of $|x^3|$ in the interval $(-\pi, \pi)$.

OR

8(b) Obtain Fourier series expansion of $f(x) = \begin{cases} x \ if \ 0 < x < \pi \\ 2 \ if \ \pi < x < 2\pi \end{cases}$.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS (C - 24)
SC-401
SEMESTER IV, SEMESTER END EXAM, MODEL PAPER
ADVANCED ENGINEERING MATHEMATICS

(Open Book System)

Duration: 2: 00 Hours **Max. Marks: 40**

PART-A

Instructions: 1. Answer **ALL** questions. 08 × 01 = 08
2 Each question carries **ONE** mark.

1. Find the order and degree of the Differential Equation $2y''' - 3y' = y$.
2. Find the Particular Integral of $(D^2 + 1)y = e^{\frac{x}{2}}$
3. Find $L(e^{-5t} + 7)$.
4. Verify the differential equation $(x + 2y - 2025)dy - (2x - y + 2024)dx = 0$ is homogeneous or not.
5. Find $L(5\cos 3t + 7\sinh 2t)$.
6. Find $L(te^{\omega t})$.
7. Find $L^{-1}\left(\frac{s}{s^2+81}\right)$.
8. Find $L^{-1}\left(\frac{3}{(s-3)^2}\right)$.

PART-B

Instructions: 1. Answer **ALL** questions. 04 × 03 = 12
2. Each question carries **THREE** marks.

9(a) Solve $(9D^2 - 24D + 16)y = 0$.

OR

9(b) Evaluate $L(2\cos^2 3t)$.

10(a) Solve $(D^2 + D - 2)y = 16$.

OR

10(b) Evaluate $L^{-1}\left(\frac{6}{s^2-4s+7}\right)$.

11(a) Evaluate $L(2\cos^2 3t)$.

OR

11(b) Evaluate $L(5e^{3t}\cosh 2t)$.

12(a) Evaluate $L^{-1}\left(\log\left(\frac{s-2}{s+3}\right)\right)$.

OR

12(b) Evaluate $L^{-1}\left(\frac{1}{s^2(16+s^2)}\right)$.

PART- C

Instructions: 1. Answer **ALL** questions. 04 × 05 = 20

2. Each question carries **FIVE** marks.

13(a) Solve: $x\log x\frac{dy}{dx} + y = \frac{\log x}{x}$.

OR

13(b) Evaluate $L\left[e^{2t}\left(\frac{1-\cos 3t}{t}\right)\right]$.

14(a) Obtain the Fourier series expansion of the function f(x) = $|\sin x|$ in $(-\pi, \pi)$.

OR

14(b) Evaluate $L^{-1}\left(\frac{s}{(s+1)^2(s^2+1)}\right)$.

15(a) Evaluate $L(f(t))$, where $f(t) = \begin{cases} t & if\ 0 \le t < 2 \\ 3 & if\ t \ge 2 \end{cases}$.

OR

15(b) Evaluate $L\left((t^2 + 2t + 3)\sin 2t\right)$.

16(a) Evaluate $L^{-1}\left(\frac{1}{(s+1)(s+3)}\right)$ using Convolution Theorem.

OR

16(b) Solve the Differential Equation $\frac{d^2x}{dt^2} + 4x = 0$, when $y(0) = y'(0) = 1$ by using Laplace Transform method.

EC-402: MICROPROCESSORS & MICROCONTROLLERS

Course Title	Microprocessors & Microcontrollers	Course Code	EC-402
Semester	IV	Course Group	Core
Teaching Scheme in Hrs (L:T:P)	4:1:0	Credits	2.5
Methodology	Lecture + Assignments	Total Contact Hours	75
CIE	60 Marks	SEE	40 Marks

Prerequisites: This course requires the basic knowledge of Digital Electronics

Course Outcomes: Upon completion of the course the student shall be able to

CO	**Course Outcome**
CO1	Comprehend the Architecture of 8085
CO2	Comprehend the Architecture of 8051
CO3	Learn addressing modes and instruction set of 8051
CO4	Use 8051 microcontroller instruction set to write Assembly Programs
CO5	Use of various Interfacing devices
CO6	Use 8051 in various applications

<table>
<tr><td rowspan="2">Unit No</td><td rowspan="2">Unit Name</td><td rowspan="2">Periods</td><td colspan="4">Questions to be set for SEE</td></tr>
<tr><td colspan="3">R</td><td>U</td><td>A</td></tr>
<tr><td>I</td><td>Architecture of 8085 Microprocessor</td><td>12</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td><td>Architecture of 8051 Microcontroller</td><td>17</td></tr>
<tr><td>III</td><td>Addressing modes and Instructionsetof8051</td><td>12</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td><td>Programmingof 8051</td><td>12</td></tr>
<tr><td>V</td><td>Interfacing Devices</td><td>12</td><td rowspan="2">Q3</td><td>Q5, Q6</td><td>Q9(b),Q11(a), Q11(b)</td><td>Q13(b),Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Applications of 8051 Microcontroller</td><td>10</td><td>Q7, Q8</td><td>Q10(b),Q12(a), Q12(b)</td><td>Q14(b),Q16(a), Q16(b)</td></tr>
<tr><td></td><td>Total</td><td>75</td><td colspan="3">8</td><td>8</td><td>8</td></tr>
</table>

Course content and Blue Print of marks for Semester End Examination (SEE)

Course content:

UNIT –1: Architecture of 8085 Microprocessor

Duration: 10 Periods (L: 8 T:2)

Block Diagram of Microcomputer and functions of various blocks – Functional block diagram of 8085 Microprocessor and its working- Different types of buses in microprocessor system – Demultiplexing of Address/ Data Bus- Fetch Cycle, Execution Cycle, Instruction Cycle, Machine Cycle – Fetching and execution of an instruction

UNIT – 2:Architecture of 8051 Microcontroller

Duration: 15 Periods (L: 12 T:3)

Differences between Microprocessors and Microcontrollers -Features of 8051 Microcontroller – Functional block diagram of 8051 Microcontroller and its working – Organization of Program and Data memories – Operation of Timers, Serial Ports – Interrupt system of 8051 – Pin diagram of 8051 and function of each pin

UNIT– 3: Addressing modes and Instruction set of 8051

Duration: 12 Periods (L: 10 T:2)

Types of Computer Languages, High Level and Low Level – Machine Language and Assembly Language – Various addressing modes of 8051 – Assembly Instruction Format – Opcode and Operand – Instruction set of 8051- Data Transfer, Arithmetic, Logical, Boolean, Branch Group Instructions – Instruction size – How various instructions affect flags

UNIT – 4: Programming of 8051

Duration: 13 Periods (L: 9 T:3)

Flowcharts – Simple programs for 8051 involving addition, subtraction, multiplication, division, logical, boolean operations – Finding largest, smallest numbers in a series – programs using counter technique – Subroutine and it use – Types of subroutines – How 8051 handles subroutines – Various types of Debugging

UNIT – 5: Interfacing Devices

Duration: 12 Periods (L: 10 T:2)

Meaning and need for Interfacing – Non-Programmable and Programmable interfacing devices – Parallel Communication - Working of 8255 PPI – Serial Communication – Working of 8251 USART – DMA Concept – Working of 8257 DMA Controller – Need for interrupts

UNIT – 6: Applications of 8051 Microcontroller

Duration: 13 Periods (L: 7 T:3)

Interfacing various devices like Push Buttons, LEDs, Relays, 4X4 matrix Key Board, 7 Segment display unit, LCD

Recommended books

1. Microprocessor Architecture, Programming and Applications with 8085 By Ramesh S Gaonkar (Prentice Hall Publications)
2. Introduction to Microprocessors by A.P.Mathur
3. Fundamentals of Microprocessors and Microcontrollers by B.Ram
4. The 8051 Microcontroller and Embedded systems by Muhammad Ali Mazidi, JaniceGillispie Mazidi, Rolin D. Mc Kinlay (Pearson Publications)
5. The8051 Microcontroller by KennethJ. Ayala (Thomson Delmar Publications)
6. 8051 Microcontroller – Internals, Instructions, Programming & Interfacing by Subrata Ghoshal
7. 8051 Microcontroller Architecture, Programming and Applications by M.Mahalakshmi (Mahalakshmi Publications)

Suggested-learning resources

1. www.nptel.com
2. www.electronics4u.com
3. www.guvi.in/courses/robotics/micro-controllers-and-micro-processors/
4. www.electronics-tutorials.ws

Suggested Learning Outcomes

CO1: Comprehend the Architecture of 8085 Microprocessor

1.1 Draw the Block Diagram of a Microcomputer and explain the function of each block.

1.2 Define Microprocessor and know the evolution of various Microprocessors (Intel, Motorola, Zilog, AMD etc)

1.3 Define the terms Address Bus, Data Bus, Control Bus and knowmeaning of System Bus

1.4 Draw the functional Block Diagram of 8085 Microprocessor

1.5 Explain the functions of various units of 8085 µp (Data Registers, Program Counter, ALU, PSW/ Flag Register, Instruction Register, Instruction Decoder, Timing & Control Unit, Interrupt Control, Serial I/O Control)

1.6 Explain the purpose of Stack in a µp based system and use of Stack Pointer

1.7 Illustrate De-multiplexing of Address / Data Bus using a Latch

1.8 Understand the terms Fetch Cycle, Execution Cycle, Instruction Cycle, Machine Cycle, Bus Cycle

1.9 Explain the process of fetching and executing a program by 8085 µp

CO:2 Comprehend the Architecture of 8051 microcontroller

2.1 Differentiate Microprocessors and Microcontrollers.

2.2 Compare various Intel Microcontrollers.

2.3 List features of 8051 Microcontroller.

2.4 Draw the functional Block Diagram of 8051 Microcontroller

2.5 Explain functions of various units of 8051 Microcontroller (General Purpose Registers, Oscillator, ALU, PSW, Instruction Register, Timing and C ontrol Unit, Internal ROM & RAM, Program Counter, Stack Pointer, Data Pointer, Parallel Ports, Serial Port)

2.6 List various Special Function Registers (SFRs) and explain their purpose

2.7 Organization of Program Memory, Data Memory of 8051

2.8 Illustrate Demultiplexing of Address Bus/ Data Bus in 8051

2.9 List Timers of 8051 and explain their operating modes.

2.10 Explain Serial Port modes of operation.

2.11 Explain Interrupt system of 8051.

2.12 Draw the pin Diagram of 8051 Microcontroller.

2.13 List functions various pins of 8051.

CO3: Learn addressing modes and instruction set of 8051

3.1 Define High Level and Low-Level Languages and differentiate them.

3.2 Define the 2 types of Low-Level Languages (Machine Language and Assembly Language)

3.3 Define the term Addressing Mode.

3.4 List and explain various addressing modes of 8051 with examples

3.5 Write the instruction format of 8051

3.6 Define the terms Opcode, Operand

3.7 Define Instruction set and list various groups in the Instruction set of 8051

3.8 Explain Data Transfer Instructions used in 8051

3.9 Explain Arithmetic Instructions used in 8051

3.10 Explain Logical Instructions used in 8051

3.11 Explain Boolean Instructions used in 8051

3.12 Explain Branch Instructions used in 8051

3.13 Classify instructions of 8051 based on their size (1-byte, 2-bye, 3-bye instructions)

3.14 Describe how various instructions affect the Flags in 8051

CO4: Use 8051 microcontroller instruction set to write Assembly Programs

4.1 Write Assembly Language programs for 8051 like

i) Addition of Two 8-bit numbers (with various operands): Sum 8/ 16 bits

ii) Subtraction of Two 8-bit numbers (with various operands): Difference 8/ 16 bits

iii) Multiplication/ Division of Two 8-bit numbers

iv) AND/ OR/ XOR/ Complement operations on 8-bit data

v) Boolean operations

vi) Sum of a series of numbers

vii) Double byte/ multibyte addition/ subtraction

viii) Sum of 1^{st} 'n' natural numbers

ix) To find Largest/ Smallest number in a series

x) Setting up time delay using counter technique

4.2 What is a Subroutine and write its need

4.3 Use of LCALL/ ACALL and RET instructions

4.4 Describe the sequence of things that happen when a subroutine is called and executed

4.5 Concept of Nesting, Multiple ending in subroutines

4.6 What is debugging of a program?

4.7 Explain about single step, break point debugging techniques

CO5 : Use of various Interfacing devices

5.1 Define interfacing

5.2 State the need for interfacing devices

5.3 Classify various interfacing devices (Non-programmable and Programmable Interfacing devices)

5.4 Detail about Parallel Communication

5.5 Draw the Block Diagram of 8255 PPI and explain its working

5.6 Draw the control word format of 8255 and explain various modes of operation

5.7 Know the importance of serial communication and its types (Synchronous and Asynchronous)

5.8 Know RS 232 standard and function of various pins on 9 pin RS 232 connector.

5.9 Draw the Block Diagram of 8251 USART and explain its operation

5.10 What is Direct Memory Access (DMA) data transfer and its importance?

5.11 Draw the Block Diagram of 8257 DMA Controller and explain its operation

5.12 What is Interrupt and how it is handled by Microprocessor/ Microcontroller?

CO6: Use 8051 in various applications

6.1 Interface pushbutton switches to 8051

6.2 Interface LEDs to 8051

6.3 Interface relay to 8051

6.4 List the functions of various pins of LCD

6.5 Write command codes for programming an LCD

6.6 Interface LCD to 8051

6.7 Know key press and detect mechanism

6.8 Define Key bounce and Key de-bounce effect

6.9 List Key de-bounce techniques

6.10 Explain Key de-bounce techniques – Hardware and Software techniques

6.11 Interface 4X4 matrix keyboard to 8051

6.12 Interface 7-segment display to 8051

6.13 Write programs for above

Suggested student Activities:

1. Find out latest Microprocessors and Microcontrollers
2. Identify various architectural advancements in latest Microprocessors and Microcontrollers
3. Interface various I/O Devices to Microprocessor/ Microcontroller

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Practices for Society, Sustainability and nvironment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2		1					1, 3
CO2	2		2					1, 3
CO3	1	1	2	1				1, 2, 3, 4
CO4	1	3	1	2		2		1, 2, 3, 4, 6
CO5	2		2	2				1, 3, 4
CO6	2	2	2	3		1	1	1, 2, 3, 4, 6, 7

MODEL QUESTION PAPERS

STATE BOARD OF TECHNICAL EDUCATION & TRAINING HYDERABD

EC-402:MICROPROCESSORS AND MICROCONTROLLERS
IV SEMESTER MID-I MODEL PAPER

Time: 1 hour **Max. Marks:20**

PART-A

Answer <u>All</u> questions. Each carry 1 marks. 4X1=04 Marks

1. What is a Microprocessor?
2. Define the terms Fetch Cycle and Execution Cycle.
3. List any 2 features of 8051 Microcontroller.
4. List the interrupts of 8051 Microcontroller.

PART-B

Answer any <u>TWO</u> questions. Each carry 3marks.
2X3=06Marks

5a) Draw the structure of Flag Register and mention purpose of each flag.

OR

5b) Write the purpose of Address Bus, Data Bus and Control Bus.

6a) Write any 3 differences between Microprocessors and Microcontrollers

OR

6b) List any 3 Special Function Registers of 8051 and write their purpose.

PART-C

Answer <u>TWO</u> questions. Each carry 5marks. 2X5=10Marks

7a) Draw the block diagram of 8085 Microprocessor and explain the function of each Block.

OR

7b) Explain De-multiplexing of Address/ Data Bus in 8085 system.

8a) Draw the block diagram of 8051 Microcontroller and explain the function of each Block.

OR

8b) Explain the various modes of operation of Timers of 8051.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

24EC-402- MICROPROCESSORS AND MICROCONTROLLERS
IV SEMESTER MID -II MODEL PAPER

Time: 1 hour **Max. Marks:20**

PART-A

Answer <u>All</u> questions. Each carry 1 mark. 4X1=04 Marks

1. Define Machine Language and Assembly Language.
2. Define the term Addressing mode.
3. What is a Subroutine and write its need.
4. What is meant by Debugging a program.

PART-B

Answer any <u>TWO</u> questions. Each carry 3 Marks2X3=6 Marks

5a) Differentiate High Level and Low-Level Languages.

OR

5 b) Define the terms Opcode and Operand.

6a) How a counter is implemented in 8051.

OR

6b) Write about Single step and Break point debugging techniques.

PART-C

Answer any <u>TWO</u> questions. Each carry 5 marks.
2X5=10Marks

7a) Explain various Addressing Modes of 8051 with 1 example for each.

OR

7b) Classify the Instruction Set of 8051 and explain them with 1 example for each.

8a) Write a program for 8051 to find largest number in a series.

OR

8b) Explain the sequence of things that happen when a subroutine is called and executed.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

SEMESTER END EXAMINATION MODEL QUESTION PAPER

24EC-402- MICROPROCESSORS AND MICROCONTROLLERS

Time: 2 hours **Max. Marks:40**

PART-A

Answer All questions. Each carry 2 marks. 1X8=08 Marks

1. List any 4 Microprocessor ICs.
2. List the flags that are affected by ADD A, R1 instruction.
3. What is meant by interfacing?
4. What is meant by nested subroutine?
5. What is the need for interrupt?
6. List various types of interfacing devices.
7. How key press is detected in a keyboard?
8. List Key De-bounce techniques?

PART-B

Answer All questions. Each questions carry 3 marks 2X3=6Marks

9. a)What is the purpose of stack in a computer system?

OR

9. b) What is Serial communication and list its types.

10. a) Write the instruction format and indicate the purpose of each part.

OR

10 b) List the functions of various pins of LCD

11 a) What is meant by Parallel Communication?

OR

11 b) What is meant by DMA?

12 a) Write command codes for programming an LCD.

OR

12 b) What is a 7-Segment Display?

PART-C

ANSWER ALL QUESTIONS. EACH QUESTION CARRIES 5 MARKS. 5x4 = 20 M

13a)Draw the block diagram of 8051 Microcontroller and explain the function of each Block

OR

13b)Draw the Block Diagram of 8255 PPI and explain its working.

14a) Write a program for 8051 to find sum of Two 32-bit numbers in internal RAM.

OR

14b) Explain interfacing of 4X4 matrix keyboard to 8051.

15a)Draw the Block Diagram of 8251 USART and explain its operation.

OR

15b) Explain how an Interrupt is handled in a Microntroller?

16a)Interface 2 switches and 2 LEDs to 8051 and write a program to reflect status of switches on LEDs.

OR

16b) Explain de-bouncing techniques?

CS-403 PYTHON PROGRAMMING

Course Title:	**Python programming**	Course Code	**CS-403**
Semester	**IV Semester**	Course Group	**Core**
Teaching Scheme in Periods (L:T:P)	**60:15:0**	Credits	**2.5**
Methodology	**Lecture+Tutorials**	Total Contact Periods	**75**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

Basic understand of computer hardware and object oriented programming.

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	To learn, read and write simple Python programs.
CO2	Use data types, operators and control structures to write simple python problems
CO3	Use Functions, Strings and Data structures in python.
CO4	Develop classes, modules and packages
CO5	Develop Multithread applications and handles runtime exceptions
CO6	Process files, design GUI, database operations, regular expressions, installation of modules and packages

Course Content and Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>I</td><td>Introduction & Basics of Python</td><td>15</td><td rowspan="6">Q4</td><td rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td><td>Conditionals and Loops</td><td>10</td></tr>
<tr><td>III</td><td>Functions,Strings and Data Structures</td><td>15</td><td rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td><td>Classes, Modules and Packages</td><td>10</td></tr>
<tr><td>V</td><td>Exception handling and Multithreading</td><td>10</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),Q11(a), Q11(b)</td><td>Q13(b),Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>File Processing,Design GUI, Connect to Database, regular expressionsand working with</td><td>15</td><td>Q7,Q8</td><td>Q10(b),Q12(a), Q12(b)</td><td>Q14(b),Q16(a), Q16(b)</td></tr>
</table>

	packages						
	Total	75	8			8	8

Course Contents

UNIT1: Introduction & Basics of Python

Duration: 12 Periods (L: 10 – T:2)

Introduction:

Introduction to python programming language,versions of python,Python IDE.

Basics of Python:

Variable declaration and initialization,comments,Indentation,Expressions,Assignment Statement, Arithmetic Operators, Operator Precedence, Boolean Expression, Interacting with Python Programs.

UNIT2: Conditionals and Loops

Duration: 13 Periods(L:10 – T:3)

Conditionals: Conditional statement in Python (if-else statement, its working and execution), Nested-if statement and Elif statement in Python, Expression Evaluation & Float Representation.

Loops: Purpose and working of loops,while loop including its working, For Loop, Nested Loops, Break and Continue

UNIT3: Functions,Strings and Data Structures

Duration: 15 Periods(L:13 – T:2)

Functions: Parts of A Function, Defining & Calling a function, passing arguments to functions– Mutable & Immutable Data Types, Different types of arguments, Recursion, Scope of variables

Strings: Length of the string and perform Concatenation and Repeat operations in it. Indexing and Slicing of Strings.

Python Data Structure: Tuples, Lists, Sets, Dictionaries

UNIT4: Classes and Packages

Duration: 10 Periods (L:8– T:2)

Define Class- data member, methods, and constructors and create an instance of class- different types of Inheritance- Python Identity Operator- Creating and importing **Modules** and **Packages-** scope of variables-virtual environment for python application- Installing packages- math and datetime package

UNIT5: Exception handling and Multithreading

Duration: 10 Periods(L:8– T:2)

Different Types of errors- Exception handling- Multithreading- ways of creating threads - Methods in the Thread module -Thread Synchronization

UNIT6: File Processing,Design GUI, Connect to Database, Regular expressions, and working with packages

Duration: 15 Periods(L:12 – T:3)

Working with files and folders,working with database and connectivity, Design a graphical interface-Discuss Geometry Managers-Regular expressions - Familiarize with package installation and functions of numpy,pandas,matplotlib,sklearn.

Reference Books

1. James Payne, Beginning Python using Python 2.6 and Python 3, Wrox publishing
2. Paul Gries, Practical Programming: An Introduction to Computer Science using python 3,The Pragmatic Bookshelf, 2nd edition (4 Oct. 2013)
3. Charles Dierach, Introduction to Computer Science using Python
4. Introduction to Computation and Programming Using Python. John V. Guttag, theMIT Press.
5. Raspberry Pi Cookbook 2014 by Simon Monk
6. Core Python Programming 2018 by R. Nageswara Rao
7. Python: For Beginners: by Timothy C. Needham
8. Sams Teach Yourself Python Programming for Raspberry Pi in 24 Hours Second Edition, Sams publication by Christine Bresnahan, Richard Blum
9. Python Programming Fundamentals- A Beginner's Handbook 2018 by Nischay kumar Hegde.

Suggested E-learning references

1. https://www.python.org/about/gettingstarted/
2. https://www.w3schools.com/python/
3. https://www.programiz.com/python-programming
4. https://www.tutorialspoint.com/python/index.htm
5. https://realpython.com/start-here/
6. https://www.codecademy.com/learn/learn-python
7. https://www.dataquest.io/blog/learn-python-the-right-way/

Suggested Learning Outcomes

For Achieving the Course outcomes, the following learning outcomes must be achieved.

CO1: To learn, read and write simple Python programs

1.1 Familiarize to python programming language

1.2 List different versions of pythons

1.3 Compare Python programming language with Java Programming language
1.4 Lists features of Python programming.
1.5 Sets the execution environment for Python.
1.6 Execute Python Script (Command Prompt, Script and IDE) in different ways
1.7 Declare and initialize variables
1.8 Use Comments, Indentation in programs
1.9 Discuss Data Types Booleans, Numbers
1.10 Assignment and arithematic Operators, Operator Precedence

CO2: **Use data types, operators and control structures to write simple python problems**

2.1 Use Decision Making Statements to solve different problems.
2.2 Discuss about if-else statement, its working and execution
2.3 Define Nested-if statement and execution.
2.4 Define Elif statement and its execution
2.5 Expression Evaluation & Float Representation.
2.6 List Various Loop Statements with example to solve problems which are iterative
2.7 While loop and its working
2.8 For loop and its working
2.9 Nested loop and its working
2.10 Break and continue statements.

CO3:Use Functions, Strings and Data structures in python

3.1 Parts of a Function
3.2 Defining & Calling a function
3.3 Passing arguments to functions
3.4 List different types of arguments
3.5 Discuss about Mutable & Immutable Data Types
3.6 DemonstrateRecursion(Solve problems by using recursive method of problem solving)
3.7 Scope of variables
3.8 Process strings using operators and built-in functions
3.9 Explain Indexing and Slicing of Strings.
3.10 Perform operation on Lists, Tuples, Sets, and Dictionaries
3.11

CO4:Develop classes, modules and packages

4.1 Define class with its members and create instances of class
4.2 Implement different types of Inheritance.
4.3 Use super to call methods of a super class
4.4 Use Python Identity Operator

4.5 Create and import Modules and Packages

4.6 Use local and global variables

4.7 Sets up the virtual environment for python application

4.8 Install packages

4.9 Use datetime package in python application

4.10 Write programs using standard Mathematical function sqrt, cos, sine, pow, degrees, and fabs

CO5:Develop Multithread applications and handles runtime exceptions

5.1 Difference between compile time errors, runtime errors and logical errors

5.2 List common compile time errors and runtime errors

5.3 Using try/except, finally and else block to handle exceptions

5.4 Usage of raise statement.

5.5 Create User defined exception classes

5.6 Define Multithreading

5.7 List pros and cons of Multithreading.

5.8 Create threads using Threading module

5.9 Create Multiple Threads which perform different tasks

5.10 Design threads using, start, join, isAlive, getName, setName, activeCount and currentThread methods.

CO6:Process files, design GUI, database operations,regular expressions, installation of modules and packages

6.1 open, close, read, write, append data to files using programs

6.2 List modes of opening a file

6.3 Delete files and folders

6.4 Connect to MySql database

6.5 Perform creation of table, insert a row in a table, update an entry in a table and execute stored procedures

6.6 Store images using blob data type

6.7 Design a Graphical User Interface using TKinter library

6.8 Design GUI using different Geometry Managers

6.9 Use various Widgets in TKinter library

6.10 List attributes of widgets

6.11 Handle Events generated by various widgets

6.12 Create patterns to use regular expressions

6.13 Validate data using regular expressions

6.14 Demonstrate the installation of numpy,pandas,matplotlib,sklearn

Suggested Student Activities

Note:

1. Student activity like mini-project, quizzes, etc. should be done in group of 3-5 students.
2. Each group should do any one of the following type of activity or any other similar activity related to the course with prior approval from the course coordinator and programme coordinator concerned.
3. Each group should conduct different activity and no repetition should occur.
4. Design a simple project that automates a task
5. Study the impact of recent technologies on health and environment; prepare a report that addresses the issues and solution to them.
6. Study Recent Technologies like Data Mining, Data Analysis, and Data Scientist; and write a report that distinguishes these technologies.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	1						1
CO2	2	1						1
CO3	2	1	1	1				1,2,3,4
CO4	2	1	1					1,2,3
CO5	3	2	2				1	1,2,3,7
CO6	3	2	2				2	1,2,37

State Board of Technical Education

Python Programming (C-24)

CS-403---IV Semester

Mid SEM -I Model Paper

Time: 1 hour **Marks: 20**

PART-A

Instructions: *4*1 =4 marks*

Answer all questions

Each question carries 1 mark

1. List any two operators in python
2. List the features of python programming language.
3. Write the purpose of Indentation.
4. Write the syntax to declare Dictionary.

NOTE: 1. Answer any one question from 5 and 6. *2*3=6 marks*

2. Each question carries three marks.

5(a). Write about operator precedence in python

OR

5(b). Write the differences between Python and Java

6(a). Write any five string processing functions.

OR

6(b). Write the differences between implementing function using loops and recursion.

PART-C

NOTE: 1. Answer any one question from 7 and 8. *2*5=10 marks*

2. Each question carries three marks.

7(a). Explain in detail about the operators in python?

OR

7(b). Explain the different ways of executing a python program

8(a). Develop a python program to demonstrate the use of ELIF statement

OR

8(b). Develop a python program to find the next prime number of a given prime number

State Board of Technical Education

Python Programming (C-24)

CS-403---IV Semester

Mid SEM -II Model Paper

Time: 1 hour **Marks: 20**

PART-A

Instructions: *4 *1 =4 marks*

Answer all questions

Each question carries 1 mark

1. What is the user of super keyword?
2. Define module.
3. List any two data types in python?
4. Write with syntax the use of Lists in python?

PART-B

NOTE: 1. Answer any one question from 5 and 6. *2*3=6 marks*

2. Each question carries three marks.

5(a). Discuss different types of inheritance with a diagram.

OR

5(b). Write any five string functions?

6(a). Write about Tuples in python with example?

OR

6(b). Discuss about scope of variable in python?

PART-C

NOTE: 1. Answer any one question from 7 and 8. *2*5=10 marks*

2. Each question carries three marks.

7(a). Write the steps to steps to create virtual environment for python application.

OR

7(b). Write an application to create a module and import the same to other module.

8(a). Write a python program for recursive function.

OR

8(b). Write a python program to demonstrate any two inheritance concepts.

State Board of Technical Education, Telangana State

C24-Semester End Examination (SEE)

Model Paper- CS-403

(Python Programming)

Time: 2 Hours **Total Marks: 40**

PART – A

Instructions: ***8 X1 M = 08 Marks***

Answer all the following questions:

Each question carries 1 mark

1. Write the syntax to create a dictionary type variable.
2. Write the use of raise statement.
3. List any four widgets for developing a GUI.
4. Define Multithreading.
5. What is the purpose of Geometry Managers?
6. Define regular expression.
7. Write the syntax to open a file.
8. Write any two widgets tkinker standard options.

PART- B

NOTE: 1. Answer any one question from 9, 10, 11 and 12. ***MARKS: 4 X 3=12***

2. Each question carries three marks.

9(a) Explain the different ways of executing a python program

OR

9(b) Discuss search, replace and match function for regular expression.

10(a) List different types of inheritance with diagram.

OR

10(b) Write how to calculate the resistance of a resistor by using color codes.

11(a) Discuss basic attributes of widgets.

OR

11(b) Write different geometry managers.

12(a) Discuss the function to open, write and close a file.

OR

12(b) Write the process to connect MySql database.

PART-C

NOTE: 1. Answer any one question from 13, 14, 15 and 16 MARKS: 4 X 5=20

2. Each question carries five marks

13(a)Write a python program to print multiplication tables from 1 to 10.

OR

13(b)Design a window application that displays number of times a user clicks a button.

14(a)Write a python script thatdeniesaccess to multiple threads to critical section.

OR

14(b)Write a python program to delete record from a table.

15(a)Create regular expression to validate email-id, and phone number.

OR

15(b)Write a python application to handle list box events.

16(a)Write a python program to copy one file into another file and delete the original file.

OR

16(b) Write in details about various widgets option in Tkinker.

EC-404 DATA COMMUNICATIONS & COMPUTER NETWORKS

Course Title	**Data Communications & Computer Networks**	Course Code	**EC-404**
Semester	**IV**	Course Group	**Core**
Teaching Scheme in Periods(L:T:P)	**4:1:0**	Credits	**2.5**
Methodology	**Lecture + Assignments**	Total Contact Hours :	**75 Periods**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites:

This course requires the Basic concepts of analog and digital communication, digital electronics and computers

Course outcomes:

Upon completion of the course the students should be able to

CO1 :	Select network topology with the basics of Data communication.
CO2 :	Choose the physical transmission media and access them without conflict.
CO3 :	Design robust network architectures with the help of network and transport layer protocols.
CO4 :	Use the suitable application layer protocols for the internet communication and services.
CO5 :	Differentiate the various wireless LAN technologies.
CO6 :	Design the secure network.

Course content and blue print of marks for SEE

<table>
<tr><td rowspan="2">Unit No</td><td rowspan="2">Unit Name</td><td rowspan="2">Periods</td><td colspan="4">Questions to be set for SEE</td></tr>
<tr><td colspan="2">R</td><td>U</td><td>A</td></tr>
<tr><td>I</td><td>Basic data Communication and networking.</td><td>10</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td><td>Physical and Data link layer protocols</td><td>15</td></tr>
<tr><td>III</td><td>Network and Transport layer protocols</td><td>15</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td><td>Application layer protocols</td><td>10</td></tr>
<tr><td>V</td><td>Wireless LAN protocols</td><td>10</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),Q11(a), Q11(b)</td><td>Q13(b),Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Network security</td><td>15</td><td>Q7,Q8</td><td>Q10(b),Q12(a), Q12(b)</td><td>Q14(b),Q16(a), Q16(b)</td></tr>
<tr><td></td><td>Total</td><td>75</td><td colspan="3">8</td><td>8</td><td>8</td></tr>
</table>

COURSE CONTENT

CO1–Basics of Data communication & OSI Layer 10 Periods (L: 9– T:1)

Introduction-Data communication-characteristics - Components involved- Data representation- Simplex, half-duplex and full-duplex communication-Computer network-Network topology-Bus, Star, Ring- Comparison-Network categories - ISO: OSI reference model

CO2: Physical and Data link layer protocols 15 Periods (L: 13– T:2)

Physical media-UTP, STP, Coaxial and Fiber optic- Switching techniques - Hub/Repeaters-Bridges-Routers-Need for protocols- Framing- CSMA/CD-CSMA/CA--Ethernet frame format (IEEE 802.3)

CO3: Network and transport layer protocols 15 Periods (L: 12– T:3)

Internet and Intranet-Protocols used in Network layer -IPv4 addressing-IPv6 addressing-Packets routing-TCP/IP reference model-features-compare OSI7 and TCP/IP-UDP-Gateway

CO4: Application layer protocols **10 Periods (L: 8– T:2)**

DNS server- protocols used in Application layer-email transfer-POP server-SMTP server-FTP- Web server-HTTP commands-Web browser- Remote login

CO5: Wireless protocols **10 Periods (L: 8– T:2)**

Wireless LAN-Topology-IEEE 802.11 Frame format-Bluetooth-WAP applications-compare IEEE 802.11n and IEEE 802.11b-Low WPAN-Zigbee-LoRaWAN

CO6: Network security. **15 Periods (L: 12– T:3)**

Network security- security services. Key management-Digital signature-Firewalls-Security threats-Measures-Cyber security-Necessity of cyber security.

Recommended Books

1 Data Communication and Networking: Behrouz Forouzan 3rd edition. TMH
2 Data Communication and Networking by Achyut S. Godbole and Atul Kahate
3 Computer Networks (4th Edition) by Andrew S. Tanenbaum
4 Data and Computer Communications: William Stallings 7th edition. PHI
5 Network communication Technology by Ata Elahi Thomson

Suggested E-Learning Resources

1. http://electrical4u.com/
2. www.electronics-tutorials.ws
3. www.nptel.ac.in
4. www.youtube.com

Suggested Student Activities

1. Report on Network Components in Computer Lab, Browsing Centers, or Cellular Network Stations

2. Report on ISDN or Web Applications

3. Hand-Written Report on Internet Device Applications in Surroundings

4. Report on Standards Organizations in Data Communication and Networking

5. Wi-Fi Site Survey and Troubleshooting Report

6. Participation in Quiz

7. Participation in Group Discussion

8. Attendance at Seminars

8. Industrial Visit Report

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3	2	2					1,2,3
CO2	3	3	1					1,2,3
CO3	2	2	3					1,2,3
CO4	2	2	2	2				1,2,3,4
CO5	3	3	1		1		1	1,2,3,5,7
CO6	3	2	1	1	1	1	2	1,2,3,4,5,6,7

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

C01: Select network topology with the basics of Data communication.

1.1 Define data communication.

1.2 State the characteristics of data communication.

1.3 List the component sin volved in data communication.

1.4 Demonstrate data representation of numbers, text, images, audio and video.

1.5 Define the different modes of data flow (simplex, halfduplex and full duplex).

1.6 Define computer network and state its need.

1.7 Define network topology and list the different network topologies.

1.8 Detail Bus, Star, and Ring network topologies.

1.9 Compare the performance of Bus, Star, and Ring network topologies.

1.10 Categorize the Network.

1.11 Draw ISO: OSI reference model and mention the functions of each layer.

CO2: Choose the physical transmission media and access them without conflict.

2.1 List the different types of physical transmission media used in networking.

2.2 Detail the cross-sectional diagrams of UTP, STP, Coaxial and Fiber optic cables and their use in networking.

2.3 List the types of switching techniques used in networking.

2.4 Distinguish circuit switching and packet switching.

2.5 Compare virtual circuit and datagram approaches in packet switching.

2.6 State the use of different networking devices such as repeater/ hub, switch, bridge in constructing networks.

2.7 State the need for protocols in computer networks.

2.8 State the need for framing in Data link layer.

2.9 Detail CSMA/CD, CSMA/CA.

2.10 Detail the frame format for Ethernet (IEEE 802.3) and state the different fields in it.

CO3: Designrobust network architectures with the help of network and transport layer protocols.

3.1 Define the terms Internet and Intranet.

3.2 Demonstrate Internet Protocol Version (IPv4).

3.3 Demonstrate Internet Protocol Version (IPv6).

3.4 Analyze the concept of routers and routing packets in computer networks.

3.5 List various protocols used in the Network layer.

3.6 Draw TCP/IP reference model and state the functions of each layer.

3.7 List the features of Transmission Control Protocol (TCP).

3.8 Compare ISO: OSI7-layer model with TCP/IP reference model.

3.9 Detail the features of User Datagram Protocol (UDP).

3.10 Compare the features of TCP and UDP.

3.11 State the use of Gateway.

CO4: Use the suitable application layer protocols for the internet communication and services.

4.1 Identify the role of DNS server.

4.2 Enumerate the protocols utilized in the application layer.

4.3 Illustrate examples of popular applications and services employing these protocols.

4.4 Detail the process of email transmission.

4.5 Differentiate POP and SMTP server.

4.6 Demonstrate the procedure of file transfer operation using FTP.

4.7 Demonstrate the working of Web server.

4.8 What is a web browser? List any six-web browsers.

4.9 List HTTP commands.

4.10 Detail the web browser architecture and its working.

4.11 Interpret the concept of remote login.

CO5:Differentiate the various wireless LAN technologies.

5.1 Define the term Wireless LAN.

5.2 List the advantages of Wireless LAN.

5.3 Detail the topology of wireless LAN.

5.4 Demonstrate the frame format of wireless LAN (IEEE 802.11).

5.5 Name the different IEEE 802.11 standards.

5.6 Demonstrate the Bluetooth technology.

5.7 Compare the features of IEEE 802.11n and IEEE 802.11b.

5.8 State the necessity of Low-rate WPAN (IEEE 802.15.4).

5.9 Explore the featuresofZigbeeTechnology.

5.10 Explore the futures of LoRaWAN.

CO6:**Design the secure network.**

6.1 State the need for network security.

6.2 List various security services.

6.3 Define message confidentiality and message integrity.

6.4 Define message authenticity and entity authenticity.

6.5 Demonstrate key management.

6.6 Use digital signature concept.

6.7 Use firewalls in securing the networks.

6.8 State various security threats of network.

6.9 List security Measures for threats.

6.10 List any six popular Anti-Virus Softwares.

6.11 Define the term Cyber Security.

6.12 State the necessity of Cyber Security.

STATE BOARD DIPLOMA EXAMINATIONS, (C-24)

DECE IV SEMESTER MID SEMESTER EXAMINATION – I

MODEL PAPER

EC-404 DATA COMMUNICATIONS AND COMPUTER NETWORKS

Time: 1 hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer<u>ALL</u> questions. **4X1=4 Marks**

2.Each question carries ONE mark.

1. Define data communication.
2. List different network topologies.
3. Define a protocol.
4. List different types of transmission media.

PART-B

Instructions: 1. Answer any TWO **questions.** **2X3=6 Marks**

2. Each question carries THREE marks.

5(a). List the characteristics of data communication.

OR

5(b). State the need of computer network.

6(a). Differentiate between repeater, switch and bridges.

OR

6(b). State the need for framing in Data link layer.

PART-C

Instructions: 1. Answer any TWO **questions.** **2X5=10 Marks**

2.Each question carries FIVE marks.

7(a). Draw the ISO: OSI 7-layer architecture and explain the function of each layer

OR

7(b). compare Bus, star and ring network topologies.

8(a). Explain circuit switching, packet switching and message switching.

OR

8(b) Explain the Ethernet frame format.

STATE BOARD DIPLOMA EXAMINATIONS, (C-24)

DECE IV SEMESTER MID SEMESTER EXAMINATION – II

MODEL PAPER

EC-404 DATA COMMUNICATIONS AND COMPUTER NETWORKS

Time: 1 hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer ALL questions. **4X1=4MARKS**

2. Each question carries ONE mark.

1.Define the terms Intranet

2. Define internet

3. List any 2 protocols used in application layer.

4. what is a DNS server.

PART-B

Instructions: 1. Answerany TWO **questions.** **2X3=6 Marks**

2.Each question carries THREE marks.

5(a). compare the features of TCP and UDP.

OR

5(b). Detail how a packet is routed in a computer network.

6(a). Differentiate POP and SMTP.

OR

6(b). What is a web browser and list any 4 web browsers.

PART-C

Instructions: 1. Answerany TWO **questions.** **2X5=10 Marks**

2.Each question carries FIVE marks.

7(a). Explain classful addressing in IPv4

OR

7(b). Draw TCP/IP protocol suit and state the futures of each layer.

8(a). Explain the working of a web server.

OR

8(b). Explain remote login.

BOARD DIPLOMA EXAMINATIONS, (C-24)
DECE IV SEMESTER EXAMINATION
MODEL PAPER
EC-404 DATA COMMUNICATIONS AND COMPUTER NETWORKS

Time: 2 hours **Max. Marks: 40**

PART-A

8X1=8

Marks

Instructions: 1. Answer<u>ALL</u> questions.

2.Each question carries ONE mark.

1. State the need for data communication networking.
2. Classify the two types of IP addressing.
3. List the advantages of WLAN.
4. Write the role of DNS server.
5. Name the different standards in WLAN.
6. State any 4 applications of WAP.
7. Define message authentication and entity authentication.
8. State Need for Cyber security.

PART-B

4X3=12Marks

Instructions: 1. Answer any FOUR questions.
2.Each question carries THREE marks.

9(a) Define simplex, half-duplex and full-duplex communication

OR

9(b)Explain the Bluetooth technology.

10(a)Explain the features of TCP.

OR

10(b)list any 6-antivirus software available in market.

11(a) Explain the features of Bluetooth technology.

OR

11(b) Explain the features of Zigbee technology.

12(a)List various security threats of network.

OR

12(b) List the security measures for threats.

PART-C

4X5=20 Marks

Instructions: 1. Answer<u>any FOUR</u> questions.

2.Each question carries FIVE mark.

13(a).Draw the ISO: OSI 7-layer architecture and explain the function of each layer

OR

13(b) Explain the frame format of 802.11

14(a)Explain the web browser architecture.

OR

14(b) Explain the key management in network security.

15(a) Explain the topology of WLAN.

OR

15(b) Compare the features of IEEE 802.11n and 802.11b

16(a) Explain digital signature concept.

OR

16(b) Explain the use of firewalls in securing the networks.

EC-405 MICROWAVE COMMUNICATION

Course Title:	**Microwave Communication**	Course Code	**EC-405**
Semester	**IV Semester**	Course Group	**Core**
Teaching Scheme in Periods (L:T:P)	**4:1:0**	Credits	**2.5**
Methodology	**Lecture+Tutorials**	Total Contact Periods	**75**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the basic knowledge of networks analysis, and Analog Communication.

Course Outcomes

Upon completion of thiscourse, the student shall be able to

CO1	Apply the Basic Concepts of transmission lines.
CO2	Comprehend the working Principle of antennas
CO3	Use the methods of wave propagation
CO4	Use the Microwave components
CO5	Analyse working of microwave tubes and solid state devices.
CO6	Apply the basics of Colour Television and use digital TV.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
I	Transmission Lines	12	Q4	Q1		Q9(a)	Q13(a)
II	Antennas	13					
III	Wave Propagation	12		Q2		Q10(a)	Q14(a)
IV	Microwave Components	13					
V	Microwave tubes and solid state devices	13		Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
VI	Colour television and Digital TV	12			Q7,Q8	Q10(b),Q12(a), Q12(b)	Q14(b),Q16(a), Q16(b)
	Total	75	8			8	8

<table>
<tr><td rowspan="2">Unit No</td><td colspan="3">Questions to be set for SEE</td></tr>
<tr><td colspan="2">R</td><td>U</td><td>A</td></tr>
<tr><td>I</td><td rowspan="8">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td></tr>
<tr><td>III</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td></tr>
<tr><td>V</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),
Q11(a), Q11(b)</td><td>Q13(b),
Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Q7,Q8</td><td>Q10(b),
Q12(a), Q12(b)</td><td>Q14(b),
Q16(a), Q16(b)</td></tr>
<tr><td>Total Questions</td><td colspan="2">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

UNIT - 1: Transmission Lines **Duration: 12 Periods (L: 10 – T:2)**

Types of Transmission Lines- Electrical equivalent circuit of a Transmission line- Primary and Secondary constants of a Transmission line -Expressions for attenuation and phase constants-Group and phase velocities in transmission lines- Lossless Line-Types of distortions in transmission lines- Condition for distortion less line- Reflection coefficient and SWR-Relation between Reflection Coefficient &Standing wave ratio

UNIT - 2:Antennas **Duration: 13 Periods (L:11 – T:2)**

Principle of an antenna- radiation pattern- isotropic antenna - radiation pattern elementary doublet- half wave dipole and give its radiation pattern- Directive gain ,power gain, directivity, beam width, radiation resistance- and front to back ratio of an antenna- antenna impedance and polarization- need for folded dipole- Need for an antenna array-working of broadside and end fire arrays- working of Yagi- Uda antenna-principle of parabolic reflector-different feed arrangements- applications of dish antenna.

UNIT - 3: Wave Propagation **Duration: 12Periods (L:10 – T:2)**

Properties of electromagnetic waves (Absorption, reflection, refraction, diffraction)-polarization of EM waves- vertical and horizontal polarization- characteristic impedance of free space- types of wave propagation methods ground wave propagation- sky wave propagation- different layers in ionosphere critical frequency, MUF, skip distance and virtual

height in sky wave propagation - space wave propagation- define line of sight - expression for line of sight - fading- methods of diversity to reduce fading effects.

UNIT – 4: Microwave Components Duration: 13 Periods (L:12– T:1)

Use of microwave frequencies-Various bands in microwave frequency range-Types of waveguides- Modes of operation of radio waves in waveguides- Dominant mode and cut-off wavelength in rectangular waveguide-Derivation of cut-off frequency, cut-off wavelength, guide wavelength, phase velocity, group velocity and characteristic impedance in rectangular waveguide-Need for microwave bends, corners, twists and directional coupler- T-Junctions Working of E-Plane Tee and H-Plane Tee- Working of Magic Tee-Need for isolators and circulators

UNIT - 5: Microwave Tubes and Solid-State Devices Duration: 13Periods (L:11– T:2)

Limitations of conventional tubes - Types of microwave tubes- working of two cavity klystron amplifier and applications of Multi cavity Klystron amplifier- working and applications of Reflex Klystron oscillator - Working of TWT and its applications- need for microwave semiconductor devices- Distinguish between ordinary semiconductor devices and microwave semiconductor devices- Gunn Effect- Working and applications of GUNN diode- Working and applications of IMPATT diode- Need for Microwave integrated circuits (MIC's)

UNIT - 6: Colour Television and Digital TV Duration: 12 Periods (L:11 – T:1)

Scanning - Types of scanning- Progressive Scanning- Interlaced Scanning -Differences between progressive and interlaced scanning- Need for Composite video signal -Different signals of Composite video signal -Need for front porch, back porch & line sync.- Need for vertical synchronizing pulse – Half- Line discrepancy in vertical sync.- Need for pre-equalizing & post - equalizing pulses -Main characteristic of human eye with regard to perception of colors - Define hue, saturation, luminance & chrominance of color signal - additive mixing and subtractive mixing – Standards of Color transmission system - Block diagram of a Color TV transmitter-Block diagram of a Color TV receiver - Need of satellite for TV broad casting- Block diagram of Direct to Home-Need for Set Top Box - Features of HDTV- Features of SMART TV.

Reference Books

i. Electronic communication system by George Kennedy,TMH
ii. Electronic communications systems by Roy Blake, ThomsonDelmar,2002.
iii. Microwave Integrated circuits by Samuel Leo3 ed.-Prentice Hall
iv. Transmission lines Umesh Sinha.

Suggested E-learning references

i. www.nptel.ac.in

ii. https://archive.nptel.ac.in/courses/108/106/108106157/

iii. https://archive.nptel.ac.in/courses/108/101/108101092/

iv. https://archive.nptel.ac.in/courses/108/103/108103141/

v. https://archive.nptel.ac.in/courses/108/104/108104130/

Suggested Learning Outcomes

Upon completion of thiscourse, the student shall be able to

CO1: Apply the basic concepts of Transmission Lines

1.1 List different types of Transmission Lines

1.2 Draw the Electrical equivalent circuit of a Transmission line

1.3 Define Primary and Secondary constants of a Transmission line

1.4 Derive the expressions for attenuation and phase constants

1.5 Define group and phase velocities in transmission lines

1.6 Define lossless Line

1.7 List types of distortions in transmission lines

1.8 Derive the condition for distortion less line

1.9 Define reflection coefficient

1.10 Define standing wave ratio

1.11 Derive the relation between reflection coefficient and SWR

CO2: Comprehend the working principle of Antennas

2.1 Illustrate the principle of an antenna

2.2 Define radiation pattern of an antenna

2.3 Define isotropic antenna and draw its radiation pattern

2.4 How an elementary doublet is used as reference antenna & draw the radiation pattern

2.5 Show the expression for electric field intensity of an elementary doublet

2.6 Sketch half wave dipole and draw its radiation pattern

2.7 Outline the principle of working of half wave dipole

2.8 Define the terms Directive gain, power gain, directivity, beam width, radiation resistance and front to back ratio of an antenna

2.9 Define antenna impedance and polarization of an antenna

2.10 What is the use of folded dipole

2.11 Need for an antenna array

2.12 Show an antenna array

2.13 Construct broadside array &explain its principle of working

2.14 Construct an end fire array &explain its principle of working

2.15 Construct Yagi- uda antenna & explain working of Yagi- uda antenna

2.16 Explain principle of parabolic reflector

2.17 Develop different feeding arrangements for parabolic reflector and explain

2.18 List the applications of dish antenna

CO3: Use the methods of Wave Propagation

3.1 Define the properties of electromagnetic waves like Absorption, reflection, refraction, and diffraction

3.2 Define polarization of electromagnetic waves (EM waves)

3.3 Illustrate vertical and horizontal polarization

3.4 Define the characteristic impedance of free space

3.5 List types of wave propagation methods

3.6 Explain ground wave propagation

3.7 Explain the mechanism of bending of radio wave in sky wave propagation

3.8 Show the different layers in ionosphere

3.9 Define the terms critical frequency, MUF, skip distance and virtual height in sky wave propagation

3.10 Explain space wave propagation

3.11 Define the term line of sight in space wave propagation

3.12 Give the expression for LOS

3.13 Define fading

3.14 List the methods of diversity to reduce fading effects

CO4: Use of Microwave Components

4.1 Find the use of microwave frequencies

4.2 Show the various bands of microwave frequency range

4.3 List the types of waveguides

4.4 Define the modes of operation of radio waves in waveguide

4.5 Define dominant mode and cut-off wavelength of rectangular waveguide

4.6 Demonstrate the dominant mode of operation of waves in rectangular waveguide

4.7 Calculate the cut-off frequency, cut-off wavelength, guide wavelength, phase velocity, group velocity and characteristic impedance of rectangular waveguide

4.8 Outline the use of microwave bends, corners and twists

4.9 What is the use of directional coupler

4.10 List the types of T-Junctions

4.11 Show E-Plane Tee as power splitter as well as power combiner

4.12 Show H-Plane Tee as power splitter as well as power combiner

4.13 Construct Magic Tee and explain the working of Magic Tee

4.14 Outline the use of isolators and circulators

CO5: Analyze working of Microwave Tubes and Solid-State Devices

5.1 List the limitations of Conventional tubes

5.2 List the various microwave tubes

5.3 Draw two cavity Klystron amplifier and explain its working

5.4 List the applications of Multi cavity Klystron amplifier

5.5 Draw Reflex Klystron Oscillator and explain its working

5.6 List the applications of Reflex Klystron oscillator

5.7 Draw Travelling wave tube and explain its working

5.8 List the applications of travelling wave tube applications

5.9 Interpret the requirement of microwave semiconductor devices

5.10 Compare ordinary semiconductor devices and microwave semiconductor devices

5.11 Define Gunn Effect

5.12 Explain the working of GUNN diode

5.13 List the applications of GUNN diode

5.14 Explain the working of IMPATT diode

5.15 List the applications of IMPATT diode

5.16 What is the use of microwave integrated circuits (MICs)

CO6: Apply the basics of Color Television and use digital TV

6.1 Define Scanning and show the scanning sequence used in TV

6.2 show List different types of scanning adopted in TV

6.3 Show the Progressive scanning and explain the scanning sequence

6.4 Show the interlace scanning & explain the scanning sequence

6.5 Compare progressive and interlaced scanning

6.6 Find the need for composite video signal

6.7 Examine the different signals marked on the Composite video signal

6.8 Show the Horizontal Synchronizing pulse used in TV

6.9 Explain the need for front porch, back porch and line Sync. of horizontal Synchronizing pulse

6.10 Show the vertical Synchronizing pulse used in TV

6.11 Examine the half- line discrepancy in vertical Synchronizing pulse

6.12 Explain the need for pre- equalizing pulse and post equalizing pulses

6.13 Outline the main characteristic of human eye with regard toper ception of colors

6.14 Define hue, saturation, luminance and chrominance of color TV

6.15 Outline additive mixing & subtractive mixing of colors

6.16 List standards of Color transmission system

6.17 Draw the block diagram of a Color TV transmitter and explain each block

6.18 Draw the block diagram of a Color TV receiver and explaineach block

6.19 State the need of satellite for TV broad casting over wide area

6.20 Draw the block diagram of direct to Home (DTH)system & explain each block

6.21 State the need for Set Top Box in TV

6.22 List the features of High Definition Television (HD TV)

6.23 List the features of SMARTTV

Suggested Student Activities

1. Visit the Institute's Library / internet center and list the books/journals/ e-books and any other resources available on the topics suggested by the teacher.
2. Prepare a chart showing the functionality of various microwave devices.
3. Prepare a PPT identifying the need for these microwave devices and their use in electronic industry.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	1				1	2		1,5
CO2	3	2	1		1	1	1	1,2,3,5,6,7
CO3	1				1			1,5
CO4	2		2	2		1		1,3,4
CO5	1				1			1,5
CO6	1				1	2		1,5,6

Model Question paper

DECE IV semester

Mid Semester-I Examination

Course Code:EC-405 **Duration:1 hour**

Course Name: MICROWAVE COMMUNICATION **Max.Marks:20 Marks**

PART-A

Answer **all**questions, Each Question carries **ONE**-mark **4x1 = 4 Marks**

1. List types of transmission lines
2. Define lossless line
3. Define directivity of an antenna
4. List two applications of dish antenna

PART-B

Answer **TWO** questions. Each question carries **THREE** marks **2x3 = 6 Marks**

5(a). Draw the electrical equivalent circuit of a transmission line

(OR)

5(b). Define reflection coefficient and standing wave ratio

6(a). Draw the radiation pattern of half wave dipole

(OR)

6(b). List the different feeding arrangements in a parabolic reflector

PART-C

Answer **TWO** questions. Each question carries **FIVE** marks **2x5= 10 Marks**

7(a). Derive the expressions for attenuation and phase constants

(OR)

7(b). Derive the condition for distortion less line

8(a). Explain the working of end fire array

(OR)

8(b) Explain the working of parabolic reflector

Model Question paper
DECE IV semester
Mid Semester-II Examination

Course Code:EC-405 **Duration:1 hour**
Course Name: MICROWAVE COMMUNICATION **Max.Marks:20 Marks**

PART-A

Answer **ALL** questions, Each Question carries **ONE**-mark **4x1 = 4 Marks**

1. List types of wave propagation methods
2. Define fading
3. List the types of T-Junctions
4. State the need for isolator

PART-B

Answer TWO questions. Each question carries **THREE** marks. **2x3 = 6 Marks**

5(a). Define the terms critical frequency, MUF and skip distance

(OR)

5(b). List the methods of diversity to reduce fading effects

6(a). List various bands of microwave frequency range

(OR)

6(b). State the need for microwave bends, corners and twists

PART-C

Answer TWO questions. Each question carries **FIVE**marks **2x5 = 10 Marks**

7(a). Explain ground wave propagation

(OR)

7(b). Explain sky wave propagation

8(a). Explain dominant mode of operation of waves in rectangular waveguide

(OR)

8(b). Explain the working of E-plane & H-plane Tee with a neat diagram

State Board of Technical Education and Training, Telangana

Model Question paper

DECE IV semester

I Semester End Examination

Course Code:EC-405 **Duration:2 hours**

Course Name: MICROWAVE COMMUNICATION **Max.Marks: 40 Marks**

PART-A

Answer **all** questions. Each Question carries one-mark **8x1 = 8 Marks**

1. Define directivity of an antenna
2. List types of wave propagation methods
3. Write any two applications of multi cavity klystron amplifier
4. Define fading
5. List the types of microwave tubes
6. Write any two applications of GUNN diode
7. Define luminance
8. Write any 2 standards of color transmission system

PART-B

Answer FOUR questions. Each question carries **three** marks. **4 x 3 = 12 Marks**

9(a). Draw the electrical equivalent circuit of a transmission line

(OR)

9(b). Draw the neat sketch of two cavity klystron amplifier

10(a). List various bands of microwave frequency range

(OR)

10(b). Write any three differences between progressive and interlaced scanning

11(a). State the need of microwave semiconductor devices

(OR)

11(b). Define GUNN effect

12(a). Draw the block diagram of Direct to Home

(OR)

12(b). List any three features of SMART TV

PART-C

Answer FOUR questions. Each Question carries **FIVE** marks **4 x 5 = 20 Marks**

13(a) Explain the working of parabolic reflector

(OR)

13(b) Explain the working of reflex klystron oscillator with a neat diagram

14(a) Explain space wave propagation

(OR)

14(b) Explain vertical & horizontal synchronization

15(a) Explain the working of IMPATT diode

(OR)

15(b) Explain the working of Travelling wave tube

16(a) Draw and explain the block diagram of color TV Transmitter

(OR)

16(b) Draw and explain the block diagram of color TV Receiver

EC-406 SEMICONDUCTOR TECHNOLOGY

Course Title:	**Semiconductor Technology**	Course Code	**EC-406**
Semester	**IV Semester**	Course Group	**Core**
Teaching Scheme in Periods (L:T:P)	**4:1:0**	Credits	**2.5**
Methodology	**Lecture + Tutorials**	Total Contact Periods	**75**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

Basic knowledge on Semiconductor Devices

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Compare Various MOS Fabrication Technologies
CO2	Analyse the Characteristics of MOS Transistor
CO3	Detail various Semiconductor Technologies
CO4	Calculate resistance, capacitance, time delay of MOS circuits
CO5	Categorize various design rules in VLSI
CO6	Construct various circuits using CMOS

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
				R	U	A
I	Introduction to MOS Transistor	10	Q4	Q1	Q9(a)	Q13(a)
II	Basic Electrical Properties of MOS Transistor	15				
III	CMOS and BiCMOS inverters	15		Q2	Q10(a)	Q14(a)

IV	Basic circuit concepts	10					
V	Design Rules of MOS Circuits	10		Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
VI	Logic gate design	15			Q7,Q8	Q10(b),Q12(a), Q12(b)	Q14(b),Q16(a), Q16(b)
	Total	75	8			8	8

Course Contents

UNIT - 1: Introduction to MOS Transistor Duration: 10 Periods (L: 8 – T:2)

Evolution of Integrated circuit technology, Moore's Law, Metal Oxide Semiconductor (MOS) and VLSI Technology, Basic MOS transistor, Enhancement mode transistor, Depletion mode transistor, IC fabrication Process, nMOS fabrication process, CMOS fabrication – the p-well process, the n-well process, the Twin tube process.

UNIT - 2:Basic Electrical Properties of MOS Transistor

Duration: 15 Periods(L:12 – T:3)

Drain to source current Ids versus voltage Vds relationships in saturation region and non-saturation region, MOS transistor threshold voltage, MOS transistor transconductance gm and output conductance gds, MOS transistor figure of merit ω0, The pass transistor, The nMOS inverter, nMOS inverter pull-up to pull-down ratio (Zp.u./Zp.d.) for an nMOS inverter driven by another nMOS inverter, Pull-up to pull-down ratio for an nMOS inverter driven through one or more pass transistors, alternative forms of Pull-up.

UNIT - 3: CMOS and BiCMOS inverters Duration: 15 Periods(L:13 – T:2)

CMOS inverter – five regions of operation, MOS transistor circuit model, BiCMOS Technology, BiCMOS inverters, latch-up in CMOS circuits, Remedies to avoid Latch-up in CMOS, BiCMOS latch-up suceptabillity, Advantages of CMOS technology, Comparative aspects of key parameters of CMOS and Bipolar transistors, FinFET Technology, Full-custom and semi-custom design.

UNIT – 4: Basic circuit concepts Duration: 10 Periods (L:9– T:1)

Sheet resistance Rs, Inverter resistance, Area capacitances of layers, Standard unit of capacitance Cg, some area capacitance calculations, delay unit (ĩ), Inverter delays, estimations of CMOS inverter delays, Driving large capacitive loads-Cascaded inverters as drivers, nMOS super buffer, Propagation delays – cascaded pass transistors, Long polysilicon wires, wiring capacitances

UNIT - 5:Design Rules of MOS Circuits **Duration: 10Periods(L:8– T:2)**

MOS layers, Stick diagrams, Layout diagram, Rules related to stick diagram, nMOS design style and CMOS design style, Lambda based design rules, various Contact cuts, design rules for contact cuts, Double metal MOS process rules.

UNIT - 6:Logic gate design **Duration: 15 Periods(L:13 – T:2)**

CMO Sinverter, CMOS NAND gate, CMOS NOR gate, CMOS AND gate, CMOS OR gate, CMOS circuits for compound gates—$\overline{A + BC}$,$\overline{AB + CD}$ etc.,

stick diagram and layout diagram--- CMOS Inverter, 2 input CMOS NAND gate, 2 input CMOS NOR gate, 2 input CMOS AND gate, 2 input OR gate

Reference Books

1. Pucknell & Eshraghian: Basic Vlsi Design, Phi, (3/E), 1996
2. E.Weste & Eshraghian: Principles Of CMOS VlSI Design, Addition Wesley, 1994
3. M.Conway: Introduction to VlSI Systems, Addition Wesley, 1980
4. A.Mukherjie: Introduction To NMOSand CMOS System Design, Phi,1986
5. Samir Palnitkar: Verilog HDL: A Guide to Digital Design and Synthesis, 2nd Ed.

Suggested E-learning references

1. http://www.vlsi-expert.com
2. www.nptel.ac.in
3. http://electrical4u.com/
4. www.electronics-tutorials.ws

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1: Compare various MOS fabrication technologies

1.1 Categorize the evolution of Integrated Circuit Technology
1.2 Define Moore's law
1.3 Draw Basic MOS transistor

1.4 Identify different MOS transistor circuit symbols
1.5 Detail IC fabrication steps in VLSI.
1.6 Detail nMOS fabrication process.
1.7 List different approaches of CMOS fabrication
1.8 Summarize steps in CMOS fabrication–the p-well process.
1.9 Summarize steps in CMOS fabrication–the n-well process.
1.10 Summarize steps in CMOS fabrication–Twin tube process.

CO2: Analyze Properties of MOS Transistor

2.1 Derive drain to source current I_{ds} versus voltage V_{ds} relationships in Non-saturated Region and Saturated Region
2.2 Define MOS transistor threshold voltage.
2.3 Evaluate MOS transistor trans conductance
2.4 Define MOS transistor output conductance.
2.5 Define MOS transistor figure of merit.
2.6 Importance of MOS transistor figure of merit.
2.7 Demonstrate the pass transistor logic.
2.8 Detail the nMOS inverter
2.9 Determine pull-up to pull-down ratio(Zp.u./Zp.d.) for an nMOS inverter driven by another nMOS inverter.
2.10 Determine Pull-up to pull-down ratio for an nMOS inverter driven through one or more pass transistors.
2.11 Differentiate alternative forms of Pull-up circuit.

CO3: Detail Semiconductor technologies

3.1 Discuss the CMOS inverter –five regions of operation.
3.2 Draw MOS transistor circuit model.
3.3 Detail BiCMOS technology.
3.4 Draw various BiCMOS inverters.
3.5 Examine latch-up in CMOS circuits.
3.6 List the Remedies to avoid latch-up in CMOS circuits
3.7 Summarize BiCmos latch-up susceptability
3.8 List the advantages of CMOS technology
3.9 Compare CMOS and Bipolar technologies.
3.10 Illustrate FinFET technology
3.11 Compare Full-custom and semi-custom design

CO4: Calculate resistance, capacitance, time delay of C MOS

4.1 Define Sheet resistance Rs
4.2 Calculate Inverter resistance.
4.3 Explain Area capacitances of layers.
4.4 Define Standard unit of capacitance □Cg
4.5 Calculate area capacitance.
4.6 Define the delay unit (ĩ)
4.7 Detail nMOS Inverter delay.

4.8 Estimate Rise-time and fall-time of CMOS inverter.
4.9 Detail Cascaded inverters as drivers.
4.10Detail various nMOS super buffers.
4.11Explain Propagation delays – cascaded pass transistors.
4.12Describe long poly-silicon wires.
4.13Detail Wiring capacitances.

CO5:Categorize various Design Rules in VLSI

5.1 Illustrate MOS layers.
5.2 What is Stick diagram
5.3 Why stick diagram
5.4 What is Layout Diagram
5.5 Comprehend the rules related to stick diagram.
5.6 Describe nMOS design style.
5.7 Describe CMOS design style.
5.8 Detail Lambda-based design rules.
5.9 List various contact cuts
5.10 Illustrate the design rules for various Contact cuts.
5.11 Why Double metal MOS process rules.

CO6: Construct Logic gates using CMOS

6.1 Draw the CMOS circuits for inverter, NAND gate, NOR gate, AND gate and OR gate.
6.2 Draw the CMOS circuits for compound gates—$\overline{A + BC}$,$\overline{AB + CD}$ etc.,
6.3 Draw the stick diagram and layout diagram for CMOS Inverter
6.4 Draw the stick diagram and layout diagram for 2 input CMOS nand gate
6.5 Draw the stick diagram and layout diagram for 2 input CMOS nor gate
6.6 Draw the stick diagram and layout diagram for 2 input CMOS and gate
6.7 Draw the stick diagram and layout diagram for 2 input OR gate

Suggested Student Activities

1. Visit the Institute's Library / internet center and list the books/journals/ e-books and any other resources available on the topics suggested by the teacher.
2. Prepare a chart showing the symbols and names of various semiconductor devices.
3. Prepare a PPT identifying the need for these semiconductor devices and their use in electronic industry.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2							1,
CO2	2	1	1			1		1,2,3,6
CO3	2		1					1,3
CO4	2	3	2			1		1,2,3,6
CO5	2		2		1	1	1	1,3,4,6,7
CO6		3	3			2		2,3,6,7

<table>
<tr><td rowspan="2">Unit No</td><td colspan="4">Questions to be set for SEE</td></tr>
<tr><td colspan="3">R</td><td>U</td><td>A</td></tr>
<tr><td>I</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td></tr>
<tr><td>III</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td></tr>
<tr><td>V</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),
Q11(a), Q11(b)</td><td>Q13(b),
Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Q7,Q8</td><td>Q10(b),
Q12(a), Q12(b)</td><td>Q14(b),
Q16(a), Q16(b)</td></tr>
<tr><td>Total Questions</td><td colspan="3">8</td><td>8</td><td>8</td></tr>
</table>

State Board of Technical Education and Training,Telangana

Model Question paper

DECE IV semester

Mid Semester-I Examination

Course Code: EC-406 **Duration:1 hour**

Course Name: SEMICONDUCTOR TECHNOLOGY **Max.Marks:20 Marks**

PART-A

Answer **all** questions, Each Question carries **ONE** mark **4x1 = 4 Marks**

1. Define Moore's law
2. Draw nMOS enhancement mode transistor
3. Define MOS transistor output conductance.
4. Define MOS transistor figure of merit.

PART-B

Answer **TWO** questions. Each question carries **THREE** marks **2x3 = 6 Marks**

5(a).List different types of CMOS fabrication

(OR)

5(b). Draw Basic MOS transistor

6(a). List different types of pull-up network

(OR)

6(b). Draw nMOS inverter

PART-C

Answer **TWO** questions. Each question carries **FIVE** marks **2x5= 10 Marks**

7(a). Explain IC fabrication steps in VLSI.

(OR)

7(b) Explain nMOS fabrication process.

8(a) Derive the relation between I_{ds} vsV_{ds}in Non-saturated Region.

(OR)

8(b) Derive the expression for MOS transistor trans conductance.

State Board of Technical Education and Training,Telangana
Model Question paper
DECE IV semester
Mid Semester-II Examination

Course Code:EC-406 **Duration:1 hour**
Course Name: SEMICONDUCTOR TECHNOLOGY **Max.Marks:20 Marks**

PART-A

Answer **ALL** questions, Each Question carries **ONE** mark **4x1 = 4 Marks**

1. List five regions of operation of CMOS Inverter.
2. Expand BiCMOS.
3.Define Sheet resistance.
4.Define the delay unit

PART-B

Answer **TWO** questions. Each question carries **THREE** marks. **2x3 = 6 Marks**

5(a) List the Remedies to avoid latch-up in CMOS circuits

(OR)

5(b).List the advantages of CMOS technology

6(a).What is meant by wiring capacitance?

(OR)

6(b). What is meant rise time and fall time of CMOS inverter.

PART-C

Answer **TWO** questions. Each question carries **FIVE**marks **2x5 = 10 Marks**

7(a).Compare Full-custom and semi-custom design.

(OR)

7(b). Explain BiCMOS technology

8(a). Explain propogation delay with cascaded pass transistor.

(OR)

8(b). Explain cascaded inverter as drivers

State Board of Technical Education and Training,Telangana

Model Question paper

DECE IV semester

IV Semester End Examination

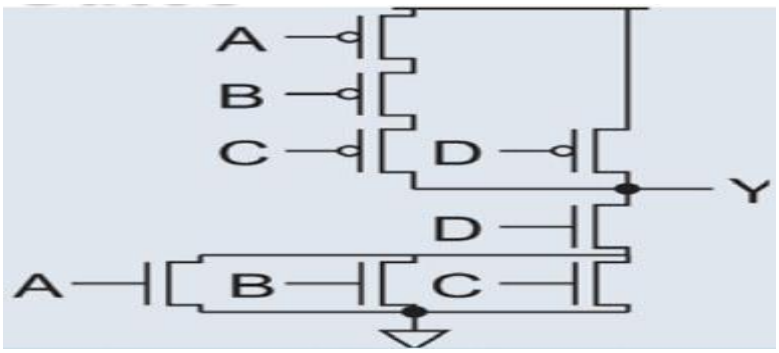
Course Code:EC-406 **Duration:2 hours**

Course Name: SEMICONDUCTOR TECHNOLOGY **Max.Marks: 40 Marks**

PART-A

Answer **all** questions. Each Question carries one mark **8x1 = 8 Marks**

1. List different methods of CMOS fabrication?
2. What is full custom design.
3. List different MOS layers
4. Write the equation for I_{ds} vs V_{ds} in non saturated region.
5. What is Stick diagram?
6. What is the need for Double metal MOS process rules?
7. How many nMOS transistors are required to draw CMOS 2-input 'AND' gate.
8. Write the output equation for below CMOS circuit.



PART-B

Answer **FOUR**questions.Each question carries **three** marks. **4 x 3 = 12 Marks**

9(a).Explain pass transistor logic

(OR)

9(b).State the rules to draw a stick diagram.

10(a). Draw nMOS transistor.

(OR)

10(b). Draw the CMOS circuit for the expression Y=$\overline{A + BC}$.

11(a). List various Contact cuts.

(OR)

11(b). Explain CMOS design style.

12(a). Draw CMOS Inverter circuit.

(OR)

12(b). Draw CMOS 3 input NAND gate.

PART-C

Answer **FOUR** questions. Each Question carries **FIVE** marks **4 x 5 = 20 Marks**

13(a) Derive pull-up to pull-down ratio(Zp.u./Zp.d.) for an nMOS inverter driven by another nMOS inverter.

(OR)

13(b) Explain Lambda-based design rules.

14(a) Compare CMOS and Bipolar technologies.

(OR)

14(b) Draw the circuit diagram of CMOS NOR gate and OR gate.

15(a) Explain the design rules for contact cuts.

(OR)

15(b) Explain nMOS design style.

16(a) Draw stick diagram and layout diagram for CMOS Inverter.

(OR)

16(b) Draw the circuit diagram and stick diagram for 2-input CMOS AND gate .

EC-407: MICROCONTROLLERS LAB

Course Title	Microcontrollers Lab	Course Code	EC-407
Semester	IV	Course Group	Practical
Teaching Scheme in Hrs (L: T:P)	1:0:2	Credits	1.25
Methodology	Lecture + Practical	Total Contact Hours	45
CIE	60 Marks	SEE	40 Marks

Prerequisites: This course requires the basic knowledge of Digital Electronics

Course Outcomes: Upon completion of the course the student shall be able to

CO	**Course Outcome**
CO1:	Write Programs for 8051 to perform various arithmetic, logical operations
CO2:	Write Programs for 8051 using counter techniques
CO3:	Interfacing of various devices to 8051

Course content and Blue Print of marks for Semester End Examination (SEE)

Unit No	Unit Name	Periods	Questions to be set for SEE		
			R	U	A
1	Write Programs for 8051 to perform various arithmetic, logical operations	20	1	1	
2	Write Programs for 8051 using counter techniques	15	1	1	
3	Interfacing of various devicesto 8051	10			2
Total		45			

Recommended books

8. The 8051 Microcontroller and Embedded systems by Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay (Pearson Publications)
9. 8051 Microcontroller – Internals, Instructions, Programming & Interfacing by Subrata Ghoshal
10. 8051 Microcontroller Architecture, Programming and Applications by M.Mahalakshmi (Mahalakshmi Publications)

Suggested e-learning resources

1. www.nptel.com
2. www.electronics4u.com
3. www.guvi.in/courses/robotics/micro-controllers-and-micro-processors/
4. www.electronics-tutorials.ws

Suggested Learning Outcomes:

Upon completion of the course, the student shall be able to

1. Add Two 8-bit numbers: Sum 8-bits
2. Add Two 8-bit numbers: Sum 16-bits (including carry)
3. Subtract Two 8-bit numbers: Difference 8-bits
4. Subtract Two 8-bit numbers: Difference 16-bits (including borrow)
5. Multiply Two 8-bit numbers
6. Divide Two 8-bit numbers
7. Complement an 8-bit/ 16-bit number
8. Perform AND/ OR/ XOR operations on Two 8-bit numbers
9. Perform Boolean Operations of individual bits (Setting/ Clearing a bit, Moving a bit)
10. To find sum of a series of numbers.
11. Perform Double Byte/ Multi byte addition/ subtraction
12. Find sum of first ‘n’ natural numbers
13. Find largest number in a series of numbers
14. Find smallest number in a series of numbers
15. Sort the given numbers in Ascending order
16. Sort the given numbers in Descending order
17. Produce required time delay using counter technique
18. Write programs using subroutines
19. Interface LEDs to 8051
20. Interface 7-Segment Display to 8051
21. Interface a matrix keyboard to 8051

Suggested student Activities:

4. Identify various ICs on a Microcontroller kit
5. Familiarize with the edsim51 simulator for 8051 and run programs on it
6. Traffic light simulation using Arduino Board
7. Ultrasonic distance measuring using Arduino Board
8. Theft Alarm system using Arduino Board

9. RFID based access control using Arduino Board

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	EngineeringTools, Experimentation and Testing	Engineering Practices forSociety, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	2	1					1, 2, 3
CO2	2	2	1					1, 2, 3
CO3	3	3	3	3	2			1, 2, 3, 4, 5

CS 408 PYTHON PROGRAMING LAB

Course Title:	**Python Programming Lab**	Course Code :	**CS-408**
Semester:	**IV Semester**	Course Group :	**Practical**
Teaching Scheme in Periods(L:T:P):	**15:0:30**	Credits :	**1.25**
Methodology :	**Lecture+ Practical**	Total Contact Periods :	**45 Periods**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This course requires the basic skills of programming and hardware

Course Outcomes

On completion of the course, the student should be able to;

CO1	Familiarize with python IDE and basics programs of python
CO2	Develop programs for conditionals and loops
CO3	Create programs for functions,strings and data structures
CO4	Build classes, modules and packages
CO5	Develop multithread application and handles runtimes exceptions
CO6	Process files, design GUI, database operations, installation of modules and packages

Course Content and Blue Print of Marks for SEE

Unit No	**Unit name**	**Hours/ Periods**	**Marks for SEE**			**Marks weightage**	**%Weightage**
			Coding	**Execution**	**Viva**		
1	PYTHON LAB	45	20	10	10	40	100
	Total	45	40			40	100

Course Contents

Unit Number	Unit Name	Periods
I	**Introduction & Basics of Python**	**5**
2	**Conditionals and Loops**	**8**
3	**Functions, Strings and Data Structures**	**8**
4	**Classes, Modules and Packages**	**8**
5	**Exception handling and Multithreading**	**8**
6	**File Processing, Design GUI, Connect to Database, and working with packages**	**8**
	Total	**45**

Text Books

1. If used, the __setitem__ index assignment method, The Fundamentals of Python: First Programs, 2011, Cengage Learning.
2. Think Python First Edition, by Allen B. Downey, Orielly publishing

Reference Books

1. James Payne, Beginning Python using Python 2.6 and Python 3, Wrox publishing
2. Paul Gries, Practical Programming: An Introduction to Computer Science using python 3,The Pragmatic Bookshelf, 2nd edition (4 Oct. 2013)
3. Charles Dierach, Introduction to Computer Science using Python
4. Introduction to Computation and Programming Using Python. John V. Guttag, TheMIT Press.
5. Raspberry Pi Cookbook 2014 by Simon Monk
6. Core Python Programming 2018 by R. Nageswara Rao
7. Python: For Beginners: by Timothy C. Needham
8. Sams Teach Yourself Python Programming for Raspberry Pi in 24 Hours Second Edition, Sams publication by Christine Bresnahan, Richard Blum
9. Python Programming Fundamentals- A Beginner's Handbook 2018 by Nischay kumar Hegde

List of Experiments

1. Familiarize with python IDE
2. Exercise on Basic python programs(factorial, Armstrong number, area of the circle, Fibonacci)
3. Write a python programs to perform matrix addition and multiplication
4. Write a python programs on various data structures
5. Exercise programs on Threads
6. Exercise programs on Exceptions
7. Write a python program to achieve thread synchronization in multithreaded environment
8. Design Graphical user interface application using different widgets
9. Design GUI using different Geometry Managers
10. Develop a python program to handle events generated by various widgets
11. Develop a python program to open, close, read, write, and append data into the files
12 Develop a python program to connect to MySql database
13. Develop a python program for creation of table, insert a row in a table, and update an entry in a table
14. Develop a python program to execute stored procedures
15.Demonstrate the installation of various packages and modules numpy,pandas,and matplotlib.

Suggested Student Activities

Student activity like mini-project, quizzes, etc. should be done in group of 3-5 students.

- Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and program co-coordinator.
- Each group should conduct different activity and no repeating should occur.
- Develop programs
- Establishing the connection with the database

CO-PO Mapping Matrix

- Familiarize with the use of shell scripting
- Hands on practice with the available editors
- Develop projects to participate in the tech-fests

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	1	2	2				1	1,2,3,7
CO2	3	1	1	2	2		3	1,2,3,4,5,7
CO3	2	1	1	2	1		3	1,2,3,4,5,7
CO4	3	2	2	2	2		3	1,2,3,4,5,7
CO5	3	2	2	2	2	1	3	1,2,3,4,5,6,7
C06	3	2	2	1	1	1	3	1,2,3,4,5,6,7

EC-409 COMPUTER HARDWARE & NETWORKING LAB

Course Title:	**Computer Hardware & Networking Lab**	Course Code	**EC-409**
Semester	**IV**	Course Group	**Practical**
Teaching Scheme in Periods(L:T:P)	**1:0:2**	Credits	**1.25**
Methodology	**Lecture + Practical**	Total Contact Periods :	**45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Rationale:

With the computer becoming a household item, the need for Computer hardware knowledge need not be stressed. Computer hardware industry is another major area where excellent job opportunities are available. Experiments in Optical fibre communication are also included to give additional practical inputs.

Course outcomes:

On successful completion of the course, the students will be able to attain below Course Outcome

	Course Outcome	CL	Linked PO	Teaching Periods
CO1	**Assemble and disassemble a computer**	R/U/A	1,2,3,4,5,6	**15**
CO2	**Install system software**	R/U/A	1,2,3,4,5,6,7	**15**
CO3	**Design and test the computer network**	R/U/A	1,2,3,4,5,6,7	**15**
				45

Course Content:

1. Familiarize with basic computer hardware components, motherboard features, and connecting expansion cards to internal and external slots.
2. List latest configurations for building a PC/Laptop available in market for below cases:
    a. Entry Level PC/Laptop.

b. Mid Level PC/Laptop.
c. High End PC/Laptop.

3. Assemble and dissemble a PC
4. Assemble and dissemble a laptop.
5. Change the settings of CMOS Setup.
6. Install the Windows/Linux Operating System.
7. Install device driver software.
8. Connect, operate, and maintain printers, scanners, and webcams.
9. Identify and note down the specifications of various networking devices, cables, jacks, connectors, and tools used in local area networks.
10. Prepare the UTP cable for cross and direct connections using a crimping tool.
11. Configure a router to connect to internet and establish LAN.
12. Configure a wireless access point with POE.
13. Practice the technique of splicing Fiber optic cables.
14. Measure the losses in a Fiber optic cable using appropriate testing equipment.
15. Install and Operate a network CC camera using a NVR.

REFERENCE BOOKS

1. PC Upgrading -- Stephen Bigelow (TMH)
2. Computer Hardware -- Manhar Lotia& Others (BPB Publications)
3. Computer Networks, 4th Edition -- Tannenbaum
4. Enhanced Guide to Managing And Maintaining Your PC -- Jean Andrews (Thomson)
5. Basics of Networking -- NIIT PHI publications
6. PC Hardware A Beginners Guide -- Gilster (TMH)
7. Basics of Networking -- NIIT, PHI Publications
8. Networking Essentials with Projects - Palmer, Thomson
9. "Upgrading and Repairing PCs" by Scott Mueller
10. "The Laptop Repair Workbook: An Introduction to Troubleshooting and Repairing Laptop Computers" by Morris Rosenthal
11. "Fiber Optics Installer (FOI) Certification Exam Guide" by Bill Woodward

Suggested E-Learning references

1. Course era
2. edX
3. Udemy
4. Youtube
5. Cisco network academy
6. Khan academy
7. Google IT Support Professional Certificate (offered by Coursera):

CO-PO Matrix:

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	for Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3	2	2	2	1	1		1,2,3,4,5,6
CO2	3	2	2	2	1	1	1	1,2,3,4,5,6,7
CO3	3	2	3	3	1	2	1	1,2,3,4,5,6,7

HU- 410 EMPLOYABILITY SKILLS LAB

Course Title	Employability Skills Lab	Course Code	HU-410
Semester	IV	Course Group	Practical
Teaching Scheme in periods (L:T:P)	15:0:30	Credits	1.25
Methodology	Lecture + Practical	Total Contact Hours	45 (3 periods per week)
CIE	60 Marks	SEE	40 Marks

Rationale:

The course is designed to impart employability skills to make the students of diploma get the initial employment, maintain the employment and get better employment, if they wish.

Prerequisites:

The course requires the basic knowledge of vocabulary, grammar, four language learning skills, viz. listening, speaking, reading and writing and life skills.

Course Contents

Module 1: Presentation Skills: **Duration: 9 Periods (L3 P6)**

a) Significance of presentation

b) What makes a good presentation?

i. Understand, Collect, Organize, Use presentational aids and Practice

c) Tips for an effective presentation.

ii. Good Beginning – Greeting, Confidence, Body Language, Opening Ideas (Funny Videos, Ridicule. Asking Questions, Quote someone/Proverb or telling a story/referring an historical event)

iii. Unveiling – Develop systematically, usage of appropriate linkers or discourse markers. Eye contact and Effective usage of PPTs

iv. Conclusion – Summarize - Giving time to the audience for queries and Time management

d) Guidelines for PPTs

Module 2: JAM **Duration: 6 Periods (L 2 P 4)**

a) What is JAM?

b) Significance of JAM

c) Enhancing Speaking skills, fluency, usage, coherence, spontaneity, voice modulation, eye contact, body language, Creativity, Sense of humor, Confidence and Time management.
d) Learn avoiding hesitation, deviation and repetition

Module 3: Group Discussion **Duration: 9 Periods (L 3 P 6)**

a) Purpose of Group Discussion
b) Types of Group Discussion
c) Different expressions and phases and their effective usage
d) Dos and Don'ts of a Group Discussion
e) Practice.

Module 4: Interview Skills **Duration: 6 Periods (L 2 P 4)**

i. Importance of interview skills
ii. Types of interviews
    a) Face to Face / One to Many,
    b) Telephonic.
iii. Understanding the process of interview.
    a) Before the interview
    b) On the day of the interview
    c) After the interview
iv. FAQs, Common expressions of an interviewer and interviewee
v. Body language,Grooming and Attire.

Module 5: Workplace Awareness and Professional Ethics

Duration: 9 Periods (L 3 P 6)

a) Workplace etiquette
b) Knowledge, skills and attributes useful at workplace
c) Workplace Relationships
d) Gender sensitization
e) Professional Ethics

Module 6: Writing Skills at Workplace: **Duration: 6 Periods (L 2 P 4)**

a)Various writing formats useful at workplace

i) Emails

ii) Notice

iii)Agenda

iv)Minutes of meeting

v)Circular Memo

vi) Press release

Course Outcomes

CO1	Make effective presentation, develop public speaking skills and learn to make visually attractive PPTs.
CO2	Converse fluently and accurately accordingly in JAM sessions.
CO3	Group Discussions will enhance the willingness to take the Initiative, accept adaptability in turn developing leadership qualities and Communication Skills
CO4	Understand purpose and process of interview in turn knowing how to prepare and succeed in interview
CO5	Build strong workplace relationships by learning workplace etiquette, professional ethics and gender sensitization.
CO6	Learn various writing formats useful at workplace and to develop an ability to apply technical information in documentation.

CO-PO Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	Mapping POs
CO1					2	2	2	5,6,7
CO2					2	2	3	5,6,7
CO3					1	3	2	5,6,7
CO4					2	2	3	5,6,7
CO5					2	2	3	5,6,7
CO6					2	3	3	5,6,7

Evaluation Pattern:

I. Continuous Internal Examination:		**60Marks**
a. MidSem- I	20marks	
Syllabus: i. Presentation Skills		
ii. JAM b.MidSem—II	20Marks	
Syllabus: i. Group Discussion		
ii. Interview Skills		
c.**Internalassessment:**	20marks	
i. Seminars:	10marks	
ii. Assignments:	5marks	
iii.Labrecordsubmission:	5marks	
II. Semester End Examination: a.Listening:	10Marks	**40Marks**
*b.*Life Skills topics:	15Marks	
c.VivaVoce	15Marks	

References:

- Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003. Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.
- Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004. Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.
- Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011.

E-Learning Resources:http://www.dailywritingtips.com/

- http://www.englishdaily626.com/c-errors.phphttp://www.owlnet.rice.edu/~cainproj/http://www.thehumorsource.com/
- http://www.indiabix.com/group-discussion/topics-with-answers/http://networketiquette.net/
- https://public.wsu.edu/~brians/errorshttp://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15

BOARD DIPLOMA EXAMINATION (C-24)

MID SEMESTER EXAMINATION – I

HU-410 EMPLOYABILITY SKILLS LAB

Time: One Hour **Total Marks: 20**

Part – A **10 marks**

Instruction: Answer any one of the following questions.

1. Write the guidelines of making a PPT?
2. What are some common mistakes which should be avoided during presentation?
3. How can you use audio -visual aids effectively to enhance your presentation?

Part – B **10 marks**

Instruction: Answer any one of the following questions.

1. What are the tips to be followed to start a JAM session?
2. What are the do's and don'ts of presenting JAM?
3. What is JAM? Write significance of JAM in communication skills.

BOARD DIPLOMA EXAMINATION (C-24)

MID SEMESTER EXAMINATION – II

HU-410 EMPLOYABILITY SKILLS LAB

Time: One Hour **Total Marks: 20**

Part – A **10 marks**

Instruction: Answer any one of the following questions.

1. List the abilities required by a person to succeed in a Group Discussion.
2. Explain how to initiate, continue and conclude a Group Discussion and mention some suitable phrases to be used in each step.
3. Mention the guidelines to be followed in a Group Discussion.

Part – B **10 marks**

Instruction: Answer any one of the following questions.

1. What precautions do you take for a telephonic interview?
2. How do you prepare for an interview?
3. Explain interview process and suitable attire for an interview?

BOARD DIPLOMA EXAMINATION (C-24)

SEMESTER END EXAMINATION

HU-410 EMPLOYABILITY SKILLS LAB

Time: Three Hours **Total Marks: 40**

Part – A **10 marks**

Instruction: Pick any one question from the given lot.

1. Write the guidelines involved in making a good presentation?
2. Describe the steps involved in JAM.
3. Mention different types phrases used in Group Discussion.
4. List few professional ethics useful at workplace.
5. Write a notice, agenda and minutes of meeting on any occasion.

Part – B **15 marks**

6. Interview / Group Discussion

Part – C **15 marks**

7. Viva Voice