Dr. K. DHANDBALAN
Assistant professor of physics
T.J. College of Arts & Science(D)
pudukkottai.

Session plan (June 2022 - Nov 2022)

Hr / Day	1	2	3	4	5
D1	-	I-PG	-	-	I-PG
D2	← II-PG Lab →			-	I-PG
D3	I-UG	-	-	I-UG	-
D4	I-PG	-	← II-PG →		
D5	I-PG	-	-	-	II-PG
D6	-	II-PG	-	-	I-PG

1. Numerical methods and Computational physics (P1A1PHEC1)
2. Atomic and Molecular Spectroscopy (P3A1PHCC11)
3. Properties of Matter and Sound (U1B2PHCC1)

Paper: numerical methods and computational physiy

Sub. Code: P1R1PHEC1

Unit: I Errors and measurements:

General formula for errors - Errors of observation and measurement - Empirical formula graphical method - methods of arrays - Least square fitting - curve fitting - parabola - exponential

Unit: II Numerical Solution of algebraic and transcendental Equations:

The Iteration method - the method of false position - N-R method - Convergence and rate of convergence - C-program for finding roots using newton - Raphson method. Solution of simultaneous linear algebraic eqns - Cramers - elimination method - Jordan's modification - Crauss - seidal method of Iteration - C progr for Solution of linear eqns.

10/11/22 D1, 2nd

Solve the eqs by Gs-S method of iterations

$8x - 3y + 2z = 20$; $4x + 11y - z = 33$; $6x + 3y + 12z = 35$

Solution

The given eqs are

$$8x - 3y + 2z = 20$$
$$4x + 11y - z = 33$$
$$6x + 3y + 12z = 35$$

$\therefore x = 1/8 (20 + 3y - 2z)$

$y = 1/11 (33 - 4x + z)$

$z = 1/12 (35 - 6x - 3y)$

The values are

$x = 3.00834$

$y = 1.98654$

$z = 0.99169$

Dr. M.N. MURALI, M.Sc., M.Phil., Ph.D.
HEAD AND ASSISTANT PROFESSOR
AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU).
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI 622 422.

Dr.J.PARASURAMAN, M.A., M.B.A., M.C.A., M.Phil., B.Ed., Ph.D.
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

R. Shanthi
Assistant Professor
Department of Physics
J.J. College of Arts & Sci.
Pudukkottai.

	1	2	3	4	5
D_1	II Maths & Che		I PG		II UG
D_2		I PG	← II UG →		
D_3	II UG		II Maths & Che		I PG
D_4	← Allied →				II UG
D_5	II maths & che			II UG	
D_6	II Maths & Che		II UG	← I UG →	

Course code:

Allied Physics - I U3RIP1AC4

Unit I - Mechanics

Centre of Gravity - C.G of solid hemisphere - holloco hemisphere and cone - Stability of floating bodies - Metacentre - height of a ship - Determination of metacentric height

unit II - Sound

S.H.M - composition of S.H.M - Lissajou's figure and their applications. Acoustics of buildings - Reverberation - Reverberation time - Sabine's formula - Decibel - Phon.

unit III - Properties of matter

Diffusion - Fick's law - Coefficient of diffusion - Experimental Determination of Co-efficient of Diffusion - Application - osmosis - Laws of osmotic Pressure - Berkely and Hartley method - Elevation of Boiling Point

unit IV - Thermal Physics

Newton's law of cooling - verification - Specific heat capacity of a liquid by cooling Bomb calorimeter. Conduction: Coefficient of thermal conductivity - Good and bad conductor Stefan's law of radiation - Solar constant - Angstrom's pyroheliometer - Temperature of the sun.

iii) Rotational and vibrational energy of the molecules can be studied using Raman effect. From this the molecular structure and the binding energy of atoms can be studied.

Dr. ... MURALI, M.Sc., M.Phil., Ph.D
... AND ASSISTANT PROFESSOR.
PG AND ... RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU),
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

Dr.J.PARASURAMAN, M.A., M.B.A., M.C..., M.Phil., B.Ed., Ph.D
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

P. Parameswari,
Assistent professor,
Department of physics,
J.J. college of Arts and Science (A),
Pudukkottai.

1. Allied physics I – II Bsc chemistry.
(U3R1PHAC4)

2. Electricity and magnetism – II Bsc physics.
(U3R1PHCC5)

3. optics (U5R1PHCC8) – III Bsc physics.

4. classical mechanics – I Msc physics.
(P1R2PHCC2)

	1	2	3	4	5
D_1		II phy	III phy		II phy
D_2	← II CS lab →			III phy	
D_3	← III phy General lab →			I Msc phy	
D_4		III phy		II phy	III phy
D_5			← III phy electronics lab →		II phy
D_6	II phy	III phy		I Msc phy	

Allied physics I

(U3R1PHAC4)

Unit - I : mechanics

Centre of Gravity - centre of Gravity of solid hemisphere - hollow hemisphere and solid cone. stability of floating bodies : metacentre - Determination of a metacentric height of a ship.

Unit - II : Sound

Simple Harmonic motion - Composition of two simple harmonic motion (1) along a straight line and (2) at right angle to each other - Lissajou's figure and their applications. Acoustics of buildings. Reverberation - Reverberation time - Sabine's formula - Conditions for good acoustics. Decibel - phon - Intensity measurement by hotwire phone method.

⇒ High dispersive power refers to wide separation of the spectral lines whereas high show nearby spectral lines as separate ones.

Resolving power of a prism:-

$$\Rightarrow \cos\left(\frac{A+\delta}{2}\right) = \frac{\alpha}{l}$$

$$\sin\frac{A}{2} = \frac{t}{2l}$$

In the case of a prism

$$\mu = \frac{\sin\left(\frac{A+\delta}{2}\right)}{\sin\left(\frac{A}{2}\right)}$$

$$\Rightarrow \frac{1}{2}\cos\left(\frac{A+\delta}{2}\right)\frac{d\delta}{d\lambda} = \frac{d\mu}{d\lambda}\left(\sin\frac{A}{2}\right)$$

$$\Rightarrow \frac{1}{2}\left(\frac{a}{l}\right)\frac{d\delta}{d\lambda} = \frac{d\mu}{d\lambda}\left(\frac{t}{2l}\right)$$

$$\frac{\lambda}{d\lambda} = t \cdot \frac{d\mu}{d\lambda}$$

⇒ The expression $\frac{\lambda}{d\lambda}$ is the resolving power of a prism.

Senthilkumar. G
Assistant Professor
Department of Physics.
TJC- Pudukkottai

hr / Day order	1	2	3	4	5
D1			II BSc CS'-B	III BSc Physics	
D2	II BSc CS'-B			II BSc CS-B	
D3			II BSc CS-B		IV BSc Physics.
D4	I CS-BSc-B Lab.				II BSc CS-B
D5	III BSc -Physics.		III BSc - Physics Lab.		
D6	II BSc CS B'		III BSc -Physics	III BSc Physics.	

Digital Electronics Credit : 05

Unit-1 Number System & logic Gates.

Introduction decimal, binary, octal, hexadecimal number Systems - Inter conversions - 1's & 2's Complements - Simple binary arithmetic operations - Addition - Subtraction & multiplication - Binary Subtraction using 1's & 2's Complements - positive & negative logic - Basic derived logic Gates, Symbols & truth tables - AND, OR, NOT, NAND, NOR, XOR & XNOR

Unit-2: Boolean Algebra & Simplification of logic Expressions.

Boolean Algebra - Basic laws of Boolean Algebra - De-morgan's theorem Reducing Boolean Expressions using Boolean laws - Sop & Pos forms of expressions minterm & maxterms - K-map (2 & 3 variables).

Unit-3: Combinational Digital Systems:

Hall & full adder - Binary address - Half & Full Subtractor - Binary Subtractor 2's Complement adder/ subtracter circuits - Encoder & Decoder (basic ideas only) - multiplier (4:1) - Demultiplier (1:4)

PLA (Programmable logic array)

A programmable logic array (PLA) is a kind of programmable logic device used to implement Combinational logic Circuits.

Rom.

RAM

(i) Temporary Storage

Permenant Storage.

(ii) Store data in MBs

Store data in GBs.

(iii) volatile

non-volatile.

(iv) normal operating

Startup Process.

(v) faster

Slower.

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
PG. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU).
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

Dr.J.PARASURAMAN, M.A., M.B.A., M.C.A., M.Phil., B.Ed., Ph.D
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

SOLID STATE PHYSICS
II

Mr. S. Dhanachayan
Asst. Prof. of physics
JJ.C

	1	2	3	4	5
D1			CP		SSP
D2	SSP				
D3	CP		←	Lab	→
D4	←	Lab → CS B		SSP	
D5		SSP			
D6	←	Lab → CS C			SSP

* Heat treatment of Power compacts in a furnace under a controlled atmosphere at temperature just below the melting point of the metal is called sintering.

$$\text{Porosity} = \left(1 - \frac{\text{Apparent density}}{\text{Theoretical density}}\right) \times 100$$

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
RESEARCH DEPARTMENT OF PHYSICS
COLLEGE OF ARTS AND SCIENCE (AU),
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

Dr.J.PARASURAMAN, M.A., M.B.A., M.C.A., M.Phil., B.E.L., Ph.D
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

4/07/2022

Mr. S. SASIKUMAR
Assistant professor
Department of physics
J.J. College of Arts & Science
pudukkottai - 622 422

Time Table :

Day / Hours	I	II	III	IV	V
D1	II PG	–	II CS	–	–
D2	–	III / V PG	–	II CS	II PG
D3	–	II CS	II PG	–	II CS
D4	← II CS 'B' Lab →		III UG	II CS	–
D5	II CS	II PG	–	–	II PG
D6	← II CS 'C' Lab →			II PG	–

Biomedical Instrumentation:- Sub code: U5R

Unit - I :- Bioelectric potentials:

Resting and action potentials - propagation o
action potentials - Bioelectric potentials: The
electro cardiogram (ECG) - The electroencephalogr
The electromyogram (EMG) - other bioelectric poten

Unit - II :- Biopotential Electrodes:

Electrode theory - microelectrodes - Body surface elect
Needle electrodes - reference electrodes - pH electrod
Blood gas electrode - specific ion electrode.

Unit - III :- Cardiovascular measurements:

Electrocardiography - ECG Amplifiers - Electrodes & l
ECG Recorder principles - Measurement of Blood pres
Indirect measurement - measurement of Blood fl
and cardiac output.

Unit - IV :- Nervous measurements:

Anatomy - Neuronal communication - Neuronal
Receptors - Measurements from the nervous Systen
Neuronal firing measurements - EMG measurem
computerized Axial Tomography.

Unit - V :- Ultrasonic and X-ray measurements:

Basic modes of transmission - Ultrasonic Imagi
Ultrasonic diagnosis - ultrasonic transducers -
Ophthalmic Scans - Instrumentation for diagn
X-rays - Special techniques.

Books for Study:-

1. Bio-medical Instrumentation. Dr. M. Arumugam, Anura
agencies publishers. Vidayal karuppur. kumbakona
Rms - 612606.

Books for Study:-

1. Biomedical Instrumentation and measurements by
Leslie cromwell, Fred. J. Weibell, Erich A. Pfeiffer,
Prentice Hall India, Second Edition - 1990

* Ultrasonic waves are directional and the ultrasonic beams can be obtained with little spreading. In other words, focussing of ultrasonic waves will be simple.
* It can be used where audible frequency can not be used.

X-ray Special techniques:-

⇒ Bucky Diaphragm or Grid
⇒ Contrast media
⇒ Angiography
⇒ Cardiac catheterization
⇒ Three - dimensional visualization

Ophthalmic scans:-

* A-Scan, or amplitude Scan, is one method used for ocular assessment via ultrasound.
* Eye length in the axial dimension can also be obtained by measuring the distance between specific spikes.
* The gain, or input sensitivity, of an A-scan alters the size of the resultant spikes.

TSW2

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
P.G. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU)
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

Dr.J.PARASURAMAN, M.A., M.Phil.,
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

Dr. K. Dhanabalan
Asst. Professor.
Dept. of. physics.

Lession plan

December 2022 - APRIL 2023

Hr / Day	1	2	3	4	5
D1	-	I-PG	-	III-UG	-
D2	I-UG	I-PG	III-UG	-	-
D3	I-UG	III-UG	II-PG	-	I-UG
D4	II-PG	I-PG	III-UG	-	-
D5	-	-	I-PG	← I-PG C-Lab →	
D6	←	I-PG	C-Lab →	-	III-UG

1. Thermodynamics and Statistical mechanics (P2B2PHCC7)

2. Mechanics (U2B2PHCC3)

3. Elements of theritical physics (U6R1PHCC13)

paper : Thermodynamics and statistical Mechanics

Code : P2A2PHCC7

Unit-I : Thermodynamics, Microstates and Macrostates:

Basic postulates of thermodynamics - phase-space and ensembles - Fundamental relations and definition of intensive variables - Intensive variables in the extensive formulation - Equation of states - Euler relation, Gibbs-Gibbs-Duhem relation for entropy - Thermodynamic potential - Maxwell relations - Thermodynamic relations - Microstates and macrostates - Ideal gas - Microstate and macro states in classical system - Micro state and macro state in quantum systems - Density of states and volume occupied by a quantum state.

Unit II : Micro canonical, canonical and Grand canonical ensembles

Microcanonical distribution function - Two level system in microcanonical ensembles - Gibbs paradox and correct formula for entropy - The canonical distribution function - contact with thermodynamics - partition function and free energy of an ideal gas - The grand partition function - Relation b/t grand canonical and canonical partition function - One-Orbital partition function.

Unit-III : Bose-Einstein, Fermi-Dirac and Maxwell-Boltzmann distribution

Bose-Einstein and Fermi-Dirac distribution - Thermodynamic quantities - non-interacting Bose gas

21/03/2023

D2, 2nd Year

* The average no.of particles is given through the grand potential $\phi = -PV$

$$N = -\left(\frac{\partial \phi}{\partial \mu}\right)_{V,T}$$

$$= \frac{\alpha V e^{\beta\mu}}{\beta^{s-1}} \quad \text{——— (11)}$$

Using the formula of Eqn (9), we then obtain

$$\sigma_N^2 = \frac{\alpha V e^{\beta\mu}}{\beta^{s-1}} \quad \text{——— (12)}$$

Thus, $\sigma_N^2 = N$.

This gives

$$\frac{\sigma_N}{N} = \frac{1}{\sqrt{N}} \quad \text{——— (13)}$$

Thus, for macroscopic systems with $N \gtrsim 10^{20}$, the standard deviation in the no.of particles is less than 10^{-10} times the mean number.

* For all practical purposes then, we can say that the no.of particles is fixed.

* There is no ponderable difference with a micro canonical ensembles.

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
PG. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU)
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI 622 422

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) PUDU

Dr.J.PARASURAMAN, M.A., M.B.A., M.C.A., M.Phil., B.Ed., Ph.D
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

P. parameswari
Assistant professor
Department of physics
J.J. College of Arts
and science (A)
Pudukkottai

1. Quantum mechanics – I Msc physics
(P2R2PHCC6)

2. Nano – science – III Bsc physics
(U6R1PHMBE3)

3. Laser and spectroscopy – II Bsc physics
(U4R1PHSBE1)

	1	2	3	4	5
D_1			I msc phy		II phy
D_2	← II cs 'A'		lab →		
D_3		I msc phy	II phy		
D_4	← II cs 'B'		lab →	I msc phy	
D_5	II phy	II phy		III phy	
D_6	← II cs 'C'		lab →		III phy

Quantum mechanics - P2R2PHCC6

Unit - I : The Schrodinger Equation and operator formulation

matter waves - Equation of motion - Schrodinger equation for the free particle - physical interpretation of wave function - normalised and orthogonal wave functions - expansion theorem - admissibility conditions - stationary state solution of Schrodinger wave equation - expectation values - probability current density - Ehrenferts theorem (1 day)

operation Formulation :

Linear operator - Adjoint and self adjoint operators - completeness - physical Interpretation of eigen value and eigen function - commutator - simultaneous eigen function - Heisenberg uncertainty relation.

Unit - II : Exactly soluble Eigen value problems.

=> Insulating nanowire.

17/3/23 D6 5-

properties of Nanowire:-

=> Typical nanowires exhibit aspect ratios (length to width ratio) of 1000 or more.

=> As such they are often referred to as 1 dimensional materials.

Application of Nanowire:-

=> There are many applications where nanowires may become important in electronic, opto-electronic and nanoelectromechanical devices,

* as additives in advanced composi-tes

* as field-emittors.

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU),
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

Dr.J.PARASURAMAN, M.A., M.B.A., M.C.A
M.Phil., B.Ed., Ph.D
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
Pudukkottai - 622 422

R. Shanthi
Asst. Prof. of Physics
J.J. College of Arts & Sci(A)
Pudukkottai

	1	2	3	4	5
D_1	← III CS →		Allied		I PG
D_2	Allied			I UG	
D_3	Allied	I UG			
D_4	← Allied →			I UG	
D_5	I PG		Allied		
D_6		Allied	← II UG →		

Unit I : Laws of motion

Laws of conservation of energy, linear momentum and angular momentum - work energy theorem - work done by gravitational force - work done by spring force - Potential energy - conservative and non conservative forces - potential energy curve collision - Elastic and inelastic collision - (Fundamental laws of impact) - Newton's law of impact - Coefficient of restitution - Impact of a smooth sphere on a fixed plane - Direct impact between two spheres - oblique impact between two smooth spheres - calculation of final velocities of the spheres - Loss of K.E due to impact.

Unit II : Dynamics of Rigid Body

Moment of inertia - Theorems of Perpendicular and Parallel axes - M.I of a circular ring, disc, solid sphere,

Date : 07/03/23 Dayorder : 5 Hour :

Thermal Conduction

Heat transfers from one po
to another by three modes

(i) conduction (ii) convection (iii) Radiat

Thermal conduction states that th
rate at which heat is transferred
through a material is proportiona
to the negative of the temperature
gradient and is also proportiona
to the area through which the
heat flows

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
PG. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU)
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

Dr.J.PARASURAMAN, M.A., M.B.A., M.C.
M.Phil., B.Ed., Ph.
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

G. SENTHIL KUMAR,
Asst. Professor.
Dept. of physics.
JJ College of arts and Science

Lesson PLAN NOTE-

hr / Day order	1	2	3	4	5
D1	III BSc Physics → Microprocessor Lab. ←			II BSc Physics.	
D2	III BSc Physics			II BSc Physics.	
D3		II BSc Physics	C-Lab. → III BSc Physics. ←		
D4	I MSc Physics.	III BSc Physics		II BSc Physics.	
D5	III BSc - CS (C) Microprocessor → Lab. ←			II BSc Physics.	
D6.	II MSc Physics	III BSc Physics.			I MSc Physics

$$\frac{\partial^2\psi}{\partial x^2} + \frac{\partial^2\psi}{\partial y^2} + \frac{\partial^2\psi}{\partial z^2} + \frac{2m}{\hbar^2}(E-V)\psi = 0 \quad (1)$$

$$H\psi = E\psi.$$

$$E_n = \frac{-me^4}{32\pi^2\varepsilon_0^2\hbar^2} \left\} \frac{E_1}{n^2}, \quad n = 1/2. \right.$$

06/03/2023.

Application of hydrogen atom.

(i) rigid rotator.

(ii) Linear harmonic oscillator.

(iii) used in derivative theory.

(iv) Used in angular Eqns

07/03/2023 Revision:

Unit: 01

Unit: 02

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
P.G. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU)
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

Dr.J.PARASURAMAN, M.A.,M.B.A.,M.C.A.,
M.Phil.,B.Ed.,Ph.D
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

S.DHANACHAYAN

III

Microprocessor and it is Application

1. Microprocessor and it is Application

III UG Physics code:- U5R1PH3E1

2. Electrical Home Appliances

III . B.Sc Physics code:- U5R1PH5BE3

	1	2	3	4	5
D1	← III	µP Lab →			III UG
D2		III UG		III UG	
D3		EVS	← III CS Lab →		
D4	I PH	EVS		III UG	
D5	← III CS "C" →				III UG
D6		← II CS C →			I PG

5/3/23 Address space partitioning:

* In memory mapped I/o scheme there is only one address space. Address memories and Input/output devices. Using 16-bit wide address bus it can access 2^{16} = 64 K bytes of memory and Input/output devices.

* The 64K address are to be assigned to memories and Input/output devices for their addressing there are two schemes for the allocation of address to memories and I/O devices.

⇒ Memory mapped I/o scheme

⇒ I/o mapped I/o scheme

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
P.G. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (A.U.),
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *

Dr.J.PARASURAMAN, M.A., M.B.A., M.C
M.Phil., B.Ed., P
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

Dr. S. Sivasakthi
Assistant professor
Dept. of physics.
JJ College of Arts & Science

1) ALLIED - APPLIED PHYSICS - III

2) ELECTRO MAGNETIC THEORY.

	1	2	3	4	5
D_1	I - P.G	–	Allied	–	–
D_2	–	Allied	–	I. PG	–
D_3	–	Allied	–	I - PG	–
D_4	← Allied Lab II - CS 'B' →			–	–
D_5	Allied	–	← I. P.G C Lab →		
D_6	← II - B.Sc (CS) Lab c) Section →			–	Allied

SEMESTER - IV

ALLIED APPLIED PHYSICS : III

Course code : U4RIAPHAC3 II B.Sc Computer Science

Unit : I : Semiconductor PHYSICS

Intrinsic and extrinsic semiconductor - P, N type semiconductors - PN junction diode - V-I characteristics of junction diode - Zener diode - VI characteristics of zener diode - zener diode as the voltage regulator.

Unit : II : Transistor

PNP and NPN transistors - DC characteristics of CE and CB configuration - Hybrid parameters Functions of transistors as an amplifier - FET - V-I characteristics of FET - Comparison between FET and BJT

Unit : III Lasers and Masers :

Basic concepts of stimulated emission - Population inversion and metastable state - Ammonia maser - Ruby laser and He-Ne laser production - advantages.

Unit : IV Optoelectronic devices :

LED Construction - VI characteristics - LED photo diode - photo transistor - electronic watches - seven segment displays - LCD - Laser diode photo multiplier.

Unit : V Operational amplifiers :

The basic operational amplifier - Inverting and non-inverting operational amplifier - Differential operational amplifier - CMRR - operational amplifier applications - a srign and scale changer, adder, subtractor, integrator and differentiator.

Books for study :

1. Functional Electronics - Ramanan - TMH - 1994
2. A. Sundaravelusamy - Applied Physics II - Priya Publications - 2018

Books for reference :

1. Mehta. V.K Principles of electronics S. chand & Company Ltd 2015
2. Pulse and Digital electronics - G.K Mithal Vanvasi - Khanna Publicatron Delhi - 2012.
3. Electronic devices & circuits - Millman & Halkias - TMH 1991

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photo multiplier tube

A photomultiplier is a device that convats incident photons into an electrical signal kinds of photomultiplier include photo multiplier tube, a vacuum tube converting incident photons into an electric signal

A photomultiplier tube (PMT) convats a light pulse into an electrical signal of measurable magnitude.

The working principle of the photomultiplier tube is that photo will dislodge electrons by striking the photo cathode. These electron will then strike a chain of dynod which dislodges more electrons. Increasing the electric signal that is proportional to the initial

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
PG. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU),
J.J. NAGAR, SIVAPURAM

Dr. J. PARAS... M.Phil., B.E.
PRINCIPAL

2022-2023

Date

12/12/2022

Assistant professor
J.J. college of Arts & science
pudukkottai-622 422

Time Table

Day / Hour	I	II	III	IV	V
D1	—	II CS 'C'	—	I PG	III UG
D2	I PG	—	I PG	—	II CS 'C'
D3	II CS 'C'	III CS 'B' Lab		—	—
D4	—	EVS	—	III UG	I PG
D5	—	I PG	II CS 'C'	—	—
D6	II CS 'C' Lab			—	II CS 'C'

Crystal Growth and Thin Films

Sub code: P2RIPHEC2

Unit-I : Nucleation and crystal Growth

Nucleation - Different kinds of nucleation - Concept of formation of Critical nucleus - Classical theory of nucleation - spherical and Cylindrical nucleus - Low temperature Solution growth : Solution - Solubility and super solubility - Expression of super saturation - Miers T - C diagram - Growth kinetics of Thin Films - Thin Film structure - crystal system and symmetry.

Unit-II : Gel and solution Growth Techniques

constant temperature bath and Crystallizer - Seed preparation and mounting - Slow cooling and solvent evaporation methods - principle - Various types - structure of gel - Importance of gel - Experimental procedure - chemical reaction method - Single and double diffusion method - Chemical reduction method - complex and decomplexion method - Advantages of gel method.

Unit-III : Melt and Vapour Growth Techniques

Melt technique:

Bridgman technique - Basic process - Various Crucibles design - Thermal consideration - Vertical Bridgman technique - Czochralski technique - Experimental arrangement - Growth process.

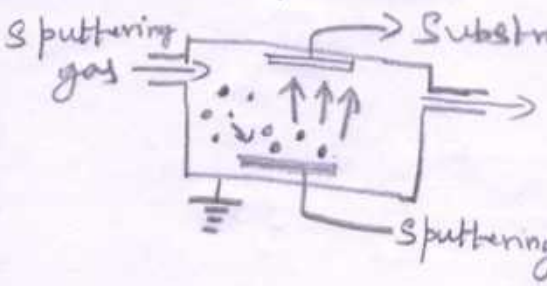
Vapour technique:

Physical vapour deposition - Chemical Vapour deposition (CVD) - chemical Vapour transport.

Thin film:

* A thin film is a layer of material ranging from fractions of a nanometer (monolayer) to several micrometers in thickness.
* The controlled synthesis of materials as thin films (a process referred to as deposition) is a fundamental step in many applications.

Reactive Sputtering:



* Reactive sputtering is a process that allows compounds to be deposited by introducing a reactive gas into the plasma which is typically formed by an inert gas such as argon.

Dr. M.K. MURALI, M.Sc., M.Phil., Ph.D
HEAD AND ASSISTANT PROFESSOR,
PG. AND RESEARCH DEPARTMENT OF PHYSICS
J.J. COLLEGE OF ARTS AND SCIENCE (AU),
J.J. NAGAR, SIVAPURAM,
PUDUKKOTTAI - 622 422.

Dr.J.PARASURAMAN, M.A., M.B.A., M.C.A., M.Phil., B.Ed., Ph.D.
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422

J.J. COLLEGE OF ARTS AND SCIENCE (Autonomous) * PUDUKKOTTAI *