NORTH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc. (PHYSICS)

Semester-wise distribution of Cources = (w.e.f. June,1983)

Sem. :- I

PHY 101 : Methods of Mathematical Physics

PHY 102 : Quantum Mechanics

PHY 103 : Classical Mechanics

PHY 104 : Electronics (Wave-shaping and Circuit design)

PHY 105 : General Laboratory - I

Sem. :- II

PHY 201 : Statistical Mechanics

PHY 202 : Solid State Physics

PHY 203 : Electrodynamics

PHY 204 : Digital Electronics

PHY 205 : General Laboratory - II

Sem. :- III

PHY 301 : Atomic and Molecular Physics

PHY 302 : Numerical methods and Computer Programming

Any one of the following (Course PHY 303) :-

PHY 303 A : Physics of Semiconductor Devices

PHY 303 B : Microwave Electronics

PHY 303 C : Lasers and their applications

PHY 304 : Special Laboratory - I

PHY 305 : Project

Note : At end of the IIIrd Sem. assessment of PHY 305 Project Course for the first half (out of 20 marks) must be submitted to the University office.

Sem. :- IV

PHY 401 : Nuclear Physics

PHY 402 : Microprocessor

Any one of the following (Course PHY 403) :-

PHY 403 A : Radio communication and T.V. system

PHY 403 B : Vacuum technology and thin film physics

PHY 403 C : Solar energy

PHY 404 : Special Laboratory - II

PHY 405 : Project

NORTH MAHARASHTRA UNIVERSITY, JALGAON

PHY-301 M.Sc. (PHYSICS) PHY 301

Atomic and Molecular Physics

(W.e.f. from June, 1993)

1> Atom model for two valence electrons :

ll coupling, ss coupling, LS coupling, Pauli exclusion principle, coupling schemes for two electrons, factors for LS coupling, Lande interval rule, jj coupling branching rule, selection rule, intensity relations. Magnetic moment of the atom, Zeeman effect, intensity rules, calculation of Zeeman pattern, Paschen back effect LS and jj coupling and Paschen back effect, Breits scheme for derivation of spectral terms, Paulis exclusion principle. (10 Periods. 18 mks)

2> Complex spectra :

Displacement law, alteration law of multiplicities, vector model for three more valence electrons, Lande interval rule, inverted terms, Hund's rule.

Zeeman effect and magnetic quantum numbers in complex spectra magnetic energy and Lande g factor, Paschen back effect in complex spectra.

(8 Periods. 12 mks)

3> Hyperfine structure :

Introduction, hyperfine structure and Lande interval rule, nuclear interaction with one valence electron, hyperfine struction of two or more valence electrons, Zeeman effect in hyperfine structure, Back Goudsmit effect in hyperfine structure. (6 Periods. 10 mks)

4> Pure Rotation Spectra :

Rotation of a linear system (classical and quantum mechanical), rigid rotator, rotational energy levels and their populations, interaction of radiation with rotating molecules, rotational spectra of rigid rotators, selection rules for linear molecules, determination of moment of inertia and bond length from rotational spectra, relative intensities of spectral lines, Stark effect in molecular rotational spectra, molecular rotation-nuclear spin coupling.

(7 Periods. 12 mks)

5> Vibrational Spectra :

Vibrations of a single particle, vibrations of two particles connected by a spring (classical), Harmonic oscillator, vibrational energies of diatomic molecules, interaction of radiation with vibrating molecules, vibrational spectra of diatomic molecules, anharmonic oscillator, deduction of molecular properties from vibrational spectra of diatomic molecules. (5 Periods. 8 mks)

6> Rotation-Vibration Spectra :

Diatomic vibrating rotator coupling of rotation and vibration, rotation-vibration spectra, selection rules and transitions for the vibrating rotator, intensities in rotation and vibration spectrum, Parallel and perpendicular bands of Linear molecules, Isotope effect-vibration, rotation. (5 Periods. 8 mks)

7> Electronic Spectra of Diatomic Molecules :

Electronic energy, potential energy curves, stable and unstable molecular states, vibrational structure of electronic transitions, general formula, graphical representation, isotope effect, rotational structure of electronic spectra, the branches of band, band head formation, shading of bands : Fortrat diagram, isotope effect, intensities in electronic bands-vibrational structure-Fanck condon principle, obsorption and emission, Intensity distribution in the rotational structure, $^1\Sigma - ^1\Sigma$ transition.

(7 Periods. 12 mks)

REFERENCES :

1. Atomic Spectra - White
(For topics 1 to 3)
2. Introduction to Molecular Spectroscopy - C.M.Barrow
Mc Graw Hill, International Edition
(For topics 4 to 6)
3. Spectra of diatomic molecules - Hersberg
(For topic 7)
4. Atomic structure and chemical bond - Manas Chanda
Mc Graw Hill

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NORTH MAHARASTRA UNIVERSITY, JALGAON

M.Sc(PHYSICS) (W.e.f. from June, 1993)

PHY 302

NUMERICAL METHODS AND COMPUTER PROGRAMMING

1.COMPUTER PROGRAMMING:

A) FORTRAN-77: Charector set , Constants,Variables. Expressions (Arithmatics, Relational and Logical), Assignment statements, Input statement, output statement,control statements(GO TO, If, DO Loops)

(12 periods)

B) Subprogramme : -FUNCTION, SUBROUTINE Subprogram, Common statemet equivalanic statemt. (7 periods)

2.NUMERICAL METHODS IN FORTRAN:

In the following topic on numerical methods,students are expected to be able to write programs, subprogrsms or programs segments as well as perform numerical calculations using electronics calculators and mathematical tables.

a)Inerative methods for solution of Algebric equations-
Derivation of formula for successive Bisection, Newton Rapson method Regula false and their comparison. (6 periods)

b) Integration - Traperoidal, simpson 1/3, Simpson 3/8 Rules DErivation and Applications.

c) Interpolation:-Linear interpolation, Langrages Interpolation.

(4 periods)

d) Solution of Simulataneous equation - Guass Elimination method pivoting all conditioned equations in Guass-Seidal Iterative method.

(5 periods)

REFERENCE BOOK:

1.Programming with FORTRAN - Lipsehutz (Seaum series,MC Graw Hill pub)

2. Computer Programming in FORTRAN-77 :- Davis

3. Computer programming in FORTRAN-77 : Ramkumar

4. Computer programming in FORTRAN-77 : V. Rajaraman

5. Computer oriented numerical methos : V. Rajaraman

6. Introductory methods of Numerical Analysis : S.S. Sastry.

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NOTRH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc. (PHYSICS) PHY 303 A

Physics of Semiconductor Devices

(W.e.f. from June, 1993)

1> Introduction to Semicondutors :

Types of semiconductors-Elemental compounds, properties of Silicon, Germanium and Galium arsenide Semiuconductors, Direct indirect semiconductors, charge carriers Mobility and Majority carriers, Excess carriers and life time, Diffusion of carriers and Eisteins relation Intrinsic somiconductors and position of Fermi level, degenerate and non degemerate semiconductors carrier concentration in non degenerate and degenerate cases, current transport internal fielded to non uniform doping. (10 Periods. 20 mks)

2> Measurement of Electrical Parameters of Semiconductors :

Resistivity (Four Probe method) Mobility, carrier-concentration, carried types, by Hall effct Hayne-Shockly experiment for measurement of mobility of minority carries. (6 Periods. 12 mks)

3> Semiconductor Diodes :

Tunnel diode, degenerate semi-conductor, principle of operations, circuit applications.

Varactors diode, capacitance of p- n junction, Princple of operation, equivalent circuit application, rectifierdiodes dependance of current and voltage specifications, switching diodes.

Zener diodes- reverse bias breakdown Avalenche and Zener breakdown, device designfor particular breakdown voltage. (7 Periods. 14 mks)

4> Bipolar Junction Transisters :

Ebers Moll Expressions switching characteristics, transient and A.C.conditions secondary. (4 Periods. 8 mks)

5> Field Effect Transistors :

Metal semiconductor, FET metal Insulator, semiconductor, Ideal MOS capacitor, surface fieldeffect transistors. (4 Periods. 8 mks)

6> Opto Electronic Devices :

Solar cells photodetectors (4 Periods. 8 mks)

7> Power Semicondoctor Devices :

General considerations Thyristers family SCR,diac,Triac,power transistors. (5 Periods ⏤ 1Ø mks)

REFERENCES :

1. Solid state Electronic devices - B.G.Streetman
(Prentice Hall of India) 3 rd Edition.
2. Semiconductors and Electronic devices - div Bar Lov
(Prentice Hall of India) 2 nd Edition.
3. Introduction to Semiconductor devices - Lindmyor & Wringtey
4. Physics of Semiconductor devices - S.M.Sze
(Wyley Eastern, Ltd.)

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NORTH MAHARASTRA UNIVERSITY , JALGAON

M.Sc(PHYSICS (W.e.f. from June, 1993)

PHY ` ` 303 B

MICROWAVE ELECTRONICS

1. ELECTROMAGNETIC FILED AND WAVE EQUATIONS:

Intruduction to microwave freqencies. Coparison betweeen Radio and microwave frequency aspects.Electron motion in electric, magnetic and electromagnetic field. Electric and magnetic wave equations. Uniform plane wave. Plane wave propogation in free space poor conductor good conductor.Boundry conditions.Plan wave reflection normal incidence only.Pointing theorem. (10 periods. 20 Marks)

2. MICROWAVE TRANSMISSION LINE AND WAVEGUIDE:

Transmission line equation and their solution-open and terminated transmission lines. Line impedences. Line admittance. reflaction coefficient,transmission coeficient.Standing wave ratio. Smith chart.Single stub matching double stube matching.

Wave duides:-Rectangular,circular,Rectangular waveguides solutions of wave equation in rectangular co-ordinates TE and TM modes in rectangular waveguide power transmission. Power losses and excitation modes in rectangular waveguid. (10 periods. 20 marks)

3.MICROWAVE COMPONENTS:

Rectangular cavity resonator circular cavity resonator of cavity resonator re-ontract caities. E-flame (Series tee) H-plane (Shunt fee), magic tee (Hubrid tee) wave guide corners bends and twists Direectional conplers, two hole difectional couplers, Mocrowave circulars isolators. Hybrid couplers. (8 periods. 16 marks)

4.MICROWAVE GENERATORS:

Klystrons, Velocity modulation, bumching process, output power and beam loading efficienty of klysteren.

Reflax Klystron Velocity modulation. Power output efficiency electonic admittance.

Travelling wave Tube:Construction operation.

5. MICROWAVE Semiconductor Devices:-

Microwave transistors:Principle, operation microwave charecteristics, current gain cutoff frequency, power gain

Varactor diode: Principle, opearation use of varector diode for frequency multiplication.

microwave Tunnel diode. principle of operation, microwave field effect Transistors. FETS,JFSTS,MESFETS principle of operation microwave charactoristics,drain current out off frequency.

(6 period, 12 marks)

REFERENCE BOKKS:

1. Foundation of microwave engineering - Collin R. E.
2. Introduction to microwaves - Atwater
3. Introduction to microwave - Wheeler
4. Microwave semiconductor devices and their circuit application. - Watson
5. Microwave circuits and elements - M.L.Sisodia
6. Electromagnetic fields and waves - Jorden
7. Microwave - K.C.Gupta.
8. Electronic communication - Sangeeva Gupta

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NORTH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc(PHYSICS)

PHY 303 C (W.e.f. from June, 1993)

Laser and Their Application

1. Charecteristics of Laser light. Light waves, monochromaticity, Directionality, Brightness, Interference, the laser speekly pattern, Coherence, polarization.

2. Basic Laser Principle : The Active medium, the automatic basis fpr laser action Laser pumping, creating a population inversion Optical Feedback the Laser resonator.

3. The Laser output and its modification. Absorption and emission lineshape,Brocadenning lasermodes Optical resonance, pump rate, gain oscillations, power output , gain saturation. Selection of laser emission linesintracavity elements. Q-switching and mode locking.

4. Laser exposition(Type of Laser)

Gas lasers, Doped-Insulator Lasers, Semiconductor lasers, Dye lasers, extending the range. Design features and operating charecteristics.

5. Application of Laser:-(Brief review) Holography,

civil engineering, medicine and surgery, High power laser application A power primer, material processing , laser Fusion.

REFERENCE BOOKS:-

1. An Introduction to lasers and their applications D C O shea, W-Russell and W.T. Rhodes(1977) Addision-Wesley Pyble.Col.
2. Laser Application to optics and sepectroscopy. Vol. 1, II,S.F. Jaco Bs. M. Sargent at. al. (1973).
3. Laser Application- Ed. Monte Ross, Vol. III (1977). By Academic press.

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NORTH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc. (Physics) PHY 304

List of experiments (W.e.f from June, 1993)

Special Lab.- I

Note :- At least SIX experiments from each group

Group A:

i) Wave shaping circuits.
ii) Instrumentation amplifier.
iii) PAM, PWM, PPM using IC - 555.
iv) S M P S of 5 Volt and 1 Amp.
v) Inductance Simulation.
vi) Phase detection using PLL.
vii) Optocoupler using IC -741,LED and Phototransistor.
viii) DC to DC Converter.
ix) Programmable UJT Oscillator.
x) Study of filters.(band reject and Notch filter)
xi) To study the performance of microwave components.
xii) To study horn antenna characteristics.
xiii) Susceptibility of MnSO-4 by using Guoy's method.
xiv) To study Fraunhoffer diffraction by He-Ne laser.
xv) To determine the pumping speed of rotary pump.
xvi) Study of phase diagrams by direct cooling curves.
xvii) Study of dielectric behaviour of BaTiO-3 sample.

Group B:

i) Shift register IC - 7495.
ii) UP/DOWN counter IC - 74192.
iii) Digital multiplexing (F-1 and F-2 generated by timer IC-555.)
iv) Conversion of temperature to digital signal using temperature transducer (AD 590) and 8-bit ADC.
v) Half and Full substractor.
vi) 1 : 10 line multiplexing.
vii) Study of J-K master slave flip-flop.
viii) Design, build and test a code converter circuit.
ix) To study the parity generation (odd and even) and parity checking using proper circuit.
x) To study core-loss in transformer.
xi) To study Klystron characteristics.
xii) Thin film deposition by evaporation method.
xiii) Measurement of thickness of thin film.
xiv) study of power distribution within laser beam and determine the laser beam quality.
xv) Study of flat-plate collector.
xvi) Measurements of Ultrasonic velocity in liquids.
xvii) Study of the dispersion relation for the monoatomic lattice and diatomic lattice.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc. (PHYSICS) PHY 401

Nuclear Physics

(W.e.f. from June, 1993)

1> Nuclear Structure :

Nuclear masses and binding energies,Defination of seperation energy, Basic principles of mass spectroscopy, Neir's and Robert's mass spectroscopes, Bainbridge's and Jordon's mass spectroscopes.

Size of the nucleus, determination of radius by electron scattering method and by Coloumb energy difference method.

Nucleaur angular momentum and magnetic dipole moments, Electric quadrupole moment (classical derivation only),Quadrupole interaction energy. (10 Periods. 20 mks)

2> The Nuclear Two -Body Problem :

The Deuteron, ground state of the deuteron (Simple theory).

Nucleon-Nucleon Scattering : Phase shift analysis,scattering length, effective range,Coherent scattering by hydrogen molecule (Ortho and para hydrogen) Born approximation. (10 Periods. 20 Mks)

3> Nuclear Reactors :

Brief revision of fission chain reation, General reactor design, Nuclear reactor types,research reactor (Heterogeneous) Power reactor (Fast breeder reactor), reactors in India (Apsara,Cirus,Purnima)

(6 Periods. 12 Mks)

4> Nuclear Particle Accelarators :

The Principle of phase stability, synchro-cyclotron, Microtron, electron-synchrotron or Bevatron. (5 Periods. 10 Mks)

5> Elementary Particals :

Classification on the basis of type of interaction,quantum numbers, Isospin,strangeness,parity,Decay of elementry particles.Conservation laws and symmentry properties of elementry particles,Quark model.

(5 Periods. 1Ø mks)

6> Cosmic Rays :

Origin of cosmic Rays, primary and secondary radiations,cosmic ray showers, Geomagnetic effects,absorption of cosmic rays.

(4 Periods. 8 Mks)

REFERENCES :

1) Atomic Nucleus - R.D.Evans.
2) Nuclear Physics - D.G.Tayal.
3) An Introduction to Nuclear Physics - Bhide,Joshi.
4) Concepts of Nuclear Physics - B.L.Cohen.
5) Basic Nuclear Physics - B.N.Srivastava.
6) Introduction to Nuclear Physics - Herald Enge.
7) Introduction to Nuclear Physics - David Halliday.
8) Elements of Nuclear Physics - M.L.Pandya and Yadav.
9) Nuclear Physics - Irving Kaplan.
1Ø) Nuclear Physics - Alex E.S.Green.

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NORTH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc. (PHYSICS) PHY 402

Microprocessor

(W.e.f. from June, 1993)

1> Introduction to Microcomputor :

Memories, Microprocessor (C.P.U.), I/O devices, (2 Lectures)

2> Memory devices :

A) Biportar, Unipolar memeries, Random access memory (RAM) Read only momory (ROM,PROM,EPROM.)

B) Study ofmemory chips : 2174,2716 (6 Lectures)

3> Architecture of 8085 :

Detail block diagram with pin configuration (3 Lectures)

4> Instruction set of 8085 :

A) i) Instruction types

ii) Classification of instruction

iii) Addressing modes

iv) Instruction set of 8085.

B) Programming- simple programs use of subroutine (12 Lectures)

5> Interfacing memory and I/O devices :

Introduction

i) Address space partitioning, address deceding

ii) Momory Interfacing

iii) Lata transfer schemes.....

a) Programmed date transfer,

Synchronous transfer, Asynchronoces transfer, Interrupt driven data transfer, Intrurrupts in 8085.

b) Direct memory access data transfer: DMA transfer in an 8085 bassed system (5 Lectures)

6> Study of interfacing devices :

i) Programmatice peripheral interface (Ic 8255)

ii) Programmable interval timer (IC 8253) with programming.

iii) Keyboard ontroller and display controller (IC 8279)

(7 Lectures)

7> Inturrupts :

Need of Inturrupts; study of hardware and software Inturrupts, study of Inturrups controller (IC 8259) (2 Lectures)

8> Introduction to 8086, 80386 and 80286 in brief (2- Lectures)

REFERENCES :

1) Microprocessor Fundamentals (Schaum's series)
- Roger L. Kokhein (M.G.H.)

2) Introduction to Microprocesser Softwar, hardware, programming by
- L.A.Leventhal (M.G.H.)

3) 8080/8085 Assembly language programming
- L.A.Leventhal (M.G.H.)

4) Microprocessor Architecture .Programming and application
- Ramesh Goankar (WEL Bombay.)

5) MC5 85 Users manual Inter Corp. USA.

6) Introduction to microprocesser
(3 rd Ed.) - A.PMathur (TMG)

7) Introduction to micorprocessor
(Vol. 1 & 2) - Adam Osborn (MGH)

8) Data manual for Microprocessor family Intel Corpusa

9) Introduction to micorprocessor - Khambate

10) Microprocessor and its applications - B.Ram

NOTRH MAHARASHTRA UNIVERSITY,JALGAON

M.Sc. (PHYSICS) PHY 403 ; (A)

Radio communication and T.V.

(W.e.f. from June, 1993)

1> Modulationn and transmilters :

Theory of amplitude, frequency and phase modulation, AM and FM modulation system, vestigial side band filters and modulation pulse modulation,block diagram of transmitter and its function, T.V.scanning synchronization of pulses, vision signal mixing , composite video signal,T.V.camera tubes, vidiocon image orthicon,m plubicon, use of frequency multipliers and duplixer, nesative polavity in T.V. transmission, information content capacity

2> Detection and Reception :

Demodulation of FM,Block diagram of T.V. recevier, tuner and mixer stage, IF amplifier, detection and video amplifier, sunc pulse seperation deflection-circuits.

3> Propagation :

Nomenclature of upper atomsphere, ionorphere grounds and space wave propagation,tropospheric and ionospheric propagation, effect of ertth's curvature,fading,duct propagations, reflection in ionosphere, MUP, critical frequencies of differen layers.

4> Antenna :

Characteristics of antenna system, wire aerials, arrays, Yagi with design,Rhobatic aerial, loop aerials pattern multiplication.

5> T.V.Communication System :

Micowave links,satellite communication.

REFERENCES:

1. Electronics(fundamentals and applications) - Ryder
   * 4 th Edition *
2. Antenna Engineering - Kraiss
3. Basic Television - Anil maini
4. Basic Television - Grob
5. Antennas - Prasad
6. Electronics and Radio Engineering - Terman

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NORTH MAHARASTRA UNIVERSITY, JALGAON

M.Sc(PHYSICS) (W.e.f. from June, 1993)

PHY 4Ø3 B

Vaccum Technology and Thin Film Physics

1. Various ranges of vaccum, conductance,impodance,speed,pump-down time and thin relations. (2 periods)

2. Pumps and Gauges for H.V. and U.H.V. : Rotary Diffisuion, Getter pumps,Evapouration, sputtenation Molecular drug,Cryogonic and orgitron pump. (6 periods)

3. Method of producing thin films: Different methods chemicals CVD, Vaccum evaporation and sputtering. Parameters governing thin films different types of sources, Working of Hig-vaccume systems, Theory of Cosine law of omission.

4. Thickness measurenments: Optical interferences techniques, Multiple beam interforometry, Tolcksky technique,Gravimatric method. (5 periods)

5. Monitoring of film thickness: Quarts crystal monitor, optiical thickness monitor. (3 periods)

6. Nucleation: Thermal accomodation coefficients, capilarity model, sperical cap and disc. Atimatic model and Comparison, varios states of growth.

7. Mechanical properties:Adhesion and its measuremets with various methods, stress measurements with various methods. (4 periods)

8. Electrical properties:- Boltzman equation, Fuch-Sondhemir theory, TCR and its variation, Resustance variation of very thin films, Hall effect. (5 periods)

9. Optical properties, Reflaction,Refraction,Fresnels coefficients, Complex refractive index, Ellipsometry Reflecting and antireflecting films. (5 periods)

REFERENCE BOOK:-

1. Hand Book of Thin film technology :- Maissel and Glang.

2. Vaccum Deposition of Thin Films :- L. Holand.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc. (Physics) (W.e.f. from June, 1993)

PHY 403 C Solar Energy

1> Importance of solar energy. World's production and reserves of commercial energy sources, India's production and reserves, energy alternatives.

2> Nature of solar radiation, sun as a fusion reactor, spectral distribution of solar radiation, seasonal variation in the solar radiation, measurement of global and diffuse solar radiation, various routes for converting solar energy into different forms.

3> Solar thermal devices :

Basic principles, different types of solar collectors, energy balance equation, heat-losses and efficiency of the solar collector. Solar cooker, domestic hot water systems, Industrial hot water system, solar dryers solar pond, solar distillation solar furnace, solar refrigeration, solar power generation.

4> Flat plate collectors :

Theory of flat plate collectors, energy balance equation, evaluation of heat losses and efficiency of solar collectors.

5> Selective coating for solar thermal devices :

Ideal characteristics of selective coating, different types of selective coating, material and techniques for making selective absorbers. effect of selective coating on the efficiency of solar thermal collectors.

6> Soalr collectors :

Point focus, line focus, soalr concentrators, cylindrical, paraboloid, compound paraboloid type solar concentrators, Fresnel lens. Theory of solar concentrators and their efficiency. Applications of solar concentrators.

7> Storage of solar energy :

Thermal storage, Electrical storage, Chemical storage, Hydro storage.

REFERENCES :

1> Solar energy thermal processes - J.A.Duffie and W.A.Beckman

(Wiley Interscience Publication, 1974)

2> Solar Energy Conversion.

(An Introductory course)

Editors:-

A.E. Dixon and J.D. Leslie

(Pergaman press)

3> Solar energy (Principles of thermal collection and storage)

- S.P. Sukhatme

(T M H , New Delhi)

4> Sun power

- J.C. Mveigh

(Pergaman press, 1983)

5> Solar energy engineering

- A.A.M. Sayigh

(Academic press, 1977)

6> Principles of solar engineering

- F. Kreith and J.F. Kreider

(McGraw Hill, 1978)

NORTH MAHARASHTRA UNIVERSITY, JALGAON

M.Sc. (Physics) PHY 404

List of experiments (W.e.f. from June, 1993)

Special Lab.- II (Microprocessor and Computer Programming)

Note :- At least SIX experiments from each group

Group A : Microprocessor

i> Read two digit hexadecimal number through keyboard and convert it into binary form.
ii> Read string through keyboard which is terminated by any specified character and reverse the string.
iii> Write a program for four digit hexadecimal counter.The counting should stop and resume by pressing any key.
iv> Temperature measurement by using ADC.
v> Read data through thumbwheel switches and display it on moniter and 7-segment display.
vi> Write a program for controlling relay switches, provide delay of one second.
vii> Average the given set or data and display the result in decimal form.
viii> Microprocessor controlling function generator (Square,Traingular and Ramp)
ix> Steeper motor speed control using microprocessor.
x> Interfacing of eight bit ADC with microprocessor.

Group B : Computer programming (FORTRAN 77)

i> To solve a third order equation using one of following method.
   a> Successive appreximation
   b> Newton Raphson method
   c> Falsi position method
ii> To integrate the given function by using Trapezoidal or Simpson rule.
iii> Interpolation using Lagranges interpolation formula. (Fitting fourth order formula)
iv> To find the solution of simultaneous linear equations by using Gauss elimination method or Gauss seidal method.
v> To solve second order differential equation by using one of the following method.
   a> Euler's method
   b> Euler's modifide method
   c> Runge-Kutta method
vi> Draw a flow chart and write a programme to calculate sine/cosine function by using Tayler's series and compare with Library function.
vii> Find the inverse of matrix using Jacobi method.