IIIrd & IV Semester B.E.
(Electrical & Electronics Engg.)

Prospectus No. 111711

SANT GADGE BABA AMRAVATI UNIVERSITY

(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

PRESCRIBED FOR

FOUR YEAR DEGREE COURSE

BACHELOR OF ENGINEERING

ELECTRICAL AND ELECTRONICS

ENGINEERING

THIRD & FOURTH SEMESTER

EXAMINATIONS, 2010-2011

SEMESTER PATTERN

2010

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SYLLABUS

PRESCRIBED FOR

THIRD & FOURTH SEMESTERS B.E. EXAMINATIONS

ELECTRICAL AND ELECTRONICS ENGG.

THIRD SEMESTER

3SEE 1 **MATHEMATICS-III**

SECTION-A

UNIT-I: Ordinary differential equations:- Completer solution, Operator D, Rules for finding complementary function, the inverse oprator, Rules for finding the particular integral, Method of variations of parameters, Cauchy's and Legendre's linear differential equations. Simultaneous linear differential equations with constant co-efficient, Applications to electrical circuits.

UNIT-II: Laplace transforms: definition, standard forms, properties of Laplace transform, inverse Laplace transform, initial and final value theorem, Convolution theorem, Laplace transform of impulse function, Unit step function, Laplace transforms of periodic function.

UNIT-III : a) Application of L.T. to linear differential equations with constant coefficients & Simultaneous linear differential equations.

b) Fourier transforms- Definition, standard forms, inverse Fourier transform, Properties of Fourier transforms, Convolution theorem, Fourier sine and Fourier cosine transforms and integrals.

SECTION-B

UNIT-IV : a) Difference equation:- solution of difference equations of first order, Solution of difference equations of higher order with constant co-efficients.

b) Z-transform: Definition, standard forms, Z-transform of impulse function, Unit step functions, Properties of Z transforms (Linearity,shifting, multiplication by k, change of scale), initial and final values, inverse Z-transforms (by direct division and partial fraction), Solution of difference equation by Z-transforms.

UNIT-V: Vector calculus: Scalar and vector point functions, Differentiation of vectors, Curves in space ,Gradient of a scalar point function, and their physical meaning, expansion formulae (with out proof).

UNIT-VI: Line,surface,volume integrals, irrotational and solenoidal

vector fields, Stoke's and Divergence theorem (with out proof).

BOOKS RECOMMENDED:-

1) Advanced Engineering Mathematics, – Potter, 3E, Oxford University Press, 2008

2) Mathematical Techniques – Jordan and Smith, 4/e – Oxford University Press, 2008

3) A Mathematical Companion for Science and Engineering Students – Brettenbach, Oxford University Press, 2008

4) Elements of Applied Mathematics by P.N.Wartikar and J.N.Wartikar

5) Advancing Engg. Mathematics by E.K.Kreyzig.

3SEE2 **NETWORK ANALYSIS**

SECTION-A

Unit I : a] **Terminal Element Relationships:** V-I relationship for Inductance and Capacitance- Constant Flux Linkage Theorem and Constant Charge Theorem-v-i relationship for Independent Voltage and Current Sources - v-i relationship for dependent voltage and current sources- Source Functions: unit impulse, unit step, unit ramp and inter relationship, sinusoidal input ,generalized exponential input.

b] **Basic Nodal and mesh Analysis:** Introduction, Nodal analysis, the super node, mesh analysis, the supermesh, nodal vs mesh analysis

Unit II : **Network Theorems :** Linearity and superposition, source transformations,Thevinin's theorem , Norton's theorem, Maximum power transfer theorem, Delta-wye transformations Reciprocity theorem, Milliaman's theorem, Substitution theorem, Compensation theorem, Tellegen's theorems

Unit III : **Time Domain Analysis of Circuits:** Linear Differential Equations for Series RC, Parallel RC, Series RL, Parallel RL, Series RLC, Parallel RLC and Coupled Circuits-Complete Solution for step/impulse/sinusoid voltage/current inputs-Natural Response-Transient Response-Time Constant-Rise and Fall times-Concept of d.c steady state and sinusoidal steady state-Frequency Response of simple circuits from steady state solution-Solution of two mesh circuits by differential equation method-Determination of initial conditions.

SECTION-B

Unit IV : a] **Review of Laplace Transforms:** Laplace Transform-Transform Pairs-Gate Functions-Shifting Theorem-

Solution of Differential Equations by Laplace Transforms-Initial and Final Value Theorems-Laplace Transforms of periodic signals-Inversion of transforms by partial fractions-Convolution Theorem and Convolution Integral. *(Review to be done by students. No class hour will be spent for this review.)*

b] Transformation of a Circuit into s-domain: Transformed equivalent of inductance, capacitance and mutual inductance -Impedance and admittance in the transform domain - Node Analysis and Mesh Analysis of the transformed circuit - Nodal Admittance Matrix and Mesh Impedance Matrix in the s-domain - Solution of transformed circuits including mutually coupled circuits-Input and transfer immittance functions - Transfer functions - Impulse response and Transfer function - Poles and Zeros - Pole Zero plots,

Unit V : a] Sinusoidal Steady State analysis: Introduction, characteristics of sinusoids, forced response to sinusoidal functions, the complex forcing function, The phasor, phasor relationships for R L C, impedance and admittance, sinusoidal steady state analysis with phasors.

b] Fourier Series: Fourier Series representation of non-sinusoidal periodic waveforms - Fourier Coefficients-Determination of Coefficients-Waveform Symmetry-Exponential Fourier Series-Discrete Amplitude and Phase Spectra-Steady State Solution of Circuits with non-sinusoidal periodic inputs by Fourier Series

Unit VI : Two Port Networks: two port networks-characterizations in terms of impedance, admittance, hybrid and transmission parameters-inter relationships among parameter sets-Reciprocity Theorem-Interconnection of Two port networks: Series, Parallel and Cascade - Network Functions-Pole Zero plots and steady state response from pole-zero plots.

Books Recommended :-

1) Linear Circuits – David Bell, Oxford University Press, 2008
2) Linear Circuit Analysis, 2/e – DeCarlo and Lin, Oxford University Press, 2009
3) Engineering Circuit Analysis, 6/e By Hayt & Kemmerly, TataMcgraw Hill, 2004
4) Network Analysis, By M.E. Van Valkenberg, PHI, 2005
5) Basic Circuit Theory 3/e, By Lawrence P Huelsman, PHI, 2001
6) Circuit and Network Analysis By Sudhakar Shyammohan, Tata McGraw Hill, 2005

Practical : Minimum Ten experiments based on above syllabus.

3SEE3   ENERGY RESOURCES AND GENERATION

SECTION A

Unit I : Thermal and Hydro Power plant: Selection of site, working of various parts: Economizer, air preheater, condenser, cooling tower, coal handling system, ash handling system, Classification of hydro power plant according to available head, nature of load, functions of different components and their working.

Unit II : Nuclear and Diesel Power plant: Methods of producing nuclear reactions, functions of different components of nuclear plant, functions of different components of diesel plant

Unit III : Solar Energy and its measurement: Solar constants, solar radiation at earth's surface, solar radiation geometry, solar radiation measurement, estimation of average solar radiation, solar radiation on tilted surface, principle of solar energy conversion in to heat, flat plate collectors, energy balance equation and collector efficiency

SECTION B

Unit IV : a] Fuel cells: Chemistry applied to fuel cells, principle and operation ,classification and types of fuel cells, performance characteristics of fuel cells, classification of fuel cells system

b] Wind Energy: Basic principle of wind energy conversion, wind data and energy estimation, selection of site, basic components of wind energy conversion system (WECS), classification of WEC systems, generating system, energy storage, application of wind energy.

Unit V : Ocean and tidal energy: Ocean energy resources, ocean energy routes, ocean thermal energy conversion, progressive wave, wave data collection, Basic principle of tidal power, components of tidal power plants, operation methods of utilization of tidal energy, estimation of power and energy in simple single basin tidal system

Unit VI : Other non- conventional energy resources: Operating principle of energy from biomass, energy from biogas, geothermal energy, MHD power generation, energy from urban and rural waste, mini and micro hydroelectric power generation, principle and operation of fuel cells, classification and types of fuel cells, performance characteristics of fuel cells.

Books Recommended :-

1) Conventional Energy Technology By S.B.Pandya, Tata Mc-GrawHill,

2005

2) Non Conventional Energy Resources By G.D.Rai, Khanna Publishers, 2001

3) Energy and Atmosphere By I.M.Campbell, Wiley, New York, 2006

4) Solar Energy By S.P.Sukhatme, Tata Mc-GrawHill, 2006

5) Conventional Energy Resourses By B.H.Khan, Tata Mc-GrawHill, 2003

3 SEE 4 ELECTRONIC DEVICES AND CIRCUITS
SECTION-A

UNIT-I : P-N Junction diode theory, Rectifiers - Half wave, full wave and bridge rectifier. Filters-C, LC and their analysis, Zener diode and its applications.

UNIT-II : Theory and Analysis of BI Junction transistor, 'H' Parameter, methods of biasing, their needs, 'Q' and stability factors, compensation techniques.

UNIT-III Study of typical transistor amplifer circuits
   i)   Emitter follower,
   ii)   Darlington emitter follower.
   iii)   Bootstrap emitter follower,
   iv)   RC coupled amplifier,
   v)   Transformer coupled amplifier,
   vi)   Cascaded amplifier,
   vii)   Direct coupled amplifier,
   viii) Cascade stage.

SECTION-B

UNIT-IV : Class 'A' 'B' 'AB' and 'C' amplifiers, configuration of audio amplifiers, Calculations of power gain, efficiency, dissipation and distortion, oscillators, their criteria, Hartley, Collpit and R-C oscillators, Crystal oscillator.

UNIT-V : Theory, construction and applications of Schottky diode, Tunnel diode, Varactor diode, Selenium diode, LED, Photo diode, PIN diode, photo-transistor.

UNIT-VI : FETs (JFET & MOSFET) : Types, Characteristics and parameters (u, gm & Rds), Applications of FET amplifiers, UJT: Characteristics, working, UJT as relaxation oscillator.

BOOKS RECOMMENDED:

1) Electronic Devices and Circuits 5/e – David Bell, Oxford University Press

2) Microelectronic Circuits 5/3 – Sedra nad Smith, Oxford University Press

3) Millman H. and Halkies: "Integrated Electronics", Tata Mc-Graw Hill

Book Co., New Delhi.

4) Boylestad R. and "Electronics Devices & Circuits" , Prentice Hall of India Private Limited, New Delhi (Fifth Edition), 1993.

Practical : Minimum Ten experiments based on above syllabus.

3SEE5 ELECTRICALMEASUREMENTAND INSTRUMENTATION
SECTION A

Unit I : **Measuring Instruments**: Classification, deflecting, controlling, damping, breaking torques. Basic principles of operation of Ammeter & Voltmeter: PMMC, MI, Electro dynamic, Electrostatic: construction, Principle of operation, torque equation, Scale shape, errors, merits & demerits of each type.

Unit II : **Wattmeters & Energy meters**: Electro dynamic & Induction type: construction, theory of operation, torque equation, errors & demerits, Electronic energy meter.
Analysis of three phase balanced load, Blondel's Theorem, Measurement of active & reactive power & energy in single phase & three phase circuits.

Unit III : a] **Instrument Transformer**: Need of extension of range: extension using shunt & multipliers Instrument transformers: CT & PT, Theory & construction, Phasor diagram, Ratio & Phase angle error, causes of error, applications Hall effect sensors for voltage and current measurement.

b] **Special Measuring Instruments** :- Maximum demand indicator, Trivector meter, Frequency meter, P.F. meter, Phase sequence indicator, Synchroscope, stroboscope, potentiometers.

SECTION B

Unit IV : **Measurement of circuit parameters**: Different methods of measurement of low, medium & high value of resistance, sensitivity & accuracy of different methods.
AC & DC bridges : Wheatstone, Kelvin, Maxwell, Wein, Hay, Desauty, Anderson, Schearing

Unit V : **Generalized instrumentation system** , characteristics of measurement & instrumentation system Transducers : Definition, classification, specification, selection & loading effect, Displacement, Velocity, force, & Torque transducers, Resistive, Inductive, capacitive, Strain gauge, Piezoelectric, current & voltage transducers.

Unit VI : **Transducers for pressure & temperature**: Manometer, Elastic members (Bellows, Bourdon tube, Diaphragm), RTD,

Thermocouple, Thermister, Infrared & Crystal Cathode ray oscilloscope: Time, frequency & phase angle measurement using CRO. Spectrum & Wave analyzer.

Books Recommended

1) Instrumentation for Scientists and Engineers – Turner**,** Oxford University Press, 2008
2) A Course in Electrical, Electronics Measurement and Instrumentation, By A.K.Sawhney, Dhanpat Rai & Sons, 2006
3) Electrical measurement and measuring Instruments By Golding, Wheeler Publishing, 2003
4) Electronic measurement and measuring Instruments By Cooper, 1999
5) Electronic Instrumentation By H.S. Kalsi, TMH, 2000

Practical : Minimum Ten experiments based on above syllabus.

SEMESTER : FOURTH
4SEE1   **ELECTRICAL MACHINE I**
SECTION A

Unit I :   D.C. Machines Construction, principle of operation, Emf equation, torque equation. Armature winding – Lap, wave, single layer, double layer. Armature reaction and commutation, method of improving commutation.

Unit II: D.C. Generators.

Types, characteristics and applications of d.c. shunt, series and compound generators.

Parallel operation of d.c. shunt, series and compound generators. Introduction for conducting and reporting the test on d.c. machines as per Indian standard.

Unit III: D.C. Motors

Characteristics, applications of d.c. shunt, series and compound motors, starting and speed control, losses, efficiency and testing.

SECTION-B

Unit IV: Single phase Transformer.

Heat run test, separation of core losses in to its component, parallel operation, equivalent circuit.

Autotransformer - construction, working, merits, demerits and application.

Introduction for conducting and reporting the test on transformer as per Indian standard.

Unit V: Three phase Transformer:

Construction, working, types, connections, applications, testing, parallel operation, open delta, power transformer,

distribution transformer construction.

Unit VI: Three phase to single phase, two phase, six phase, twelve phase conversion. Three-winding transformer and tap changing transformer. Wave forms of no-load current and inrush current phenomenon.

Books Recommended

1) Eelectric Machinery and Transformer, 3E – Bhag S Guru, Oxford University Press.
2) Electrical Machinery By Nagrath, Kothari, TMH, 2006
3) Advance Electrical Technology By H.Cooton, 1999
4) Substation Equipment By Satnam and Gupta, 2003

Practical : Minimum Ten experiments based on above syllabus.

4SEE2   ELECTROMAGNETIC THEORY

SECTION-A

Unit I :   Review of Vector Analysis :cartesian, cylindrical and spherical co-ordinate systems, vector algebra and vector calculas. Line integral and multiple integrals. Gauss theorem.

Unit II :   Electrostatics : Coulomb's law, electric field, Gauss flux theorem in integral and differential form. Electrostatics potential, Poison and Laplace equations.

Unit III: Electrostatics fields in dielectrics : electric dipole, polarization. P and D vectors, boundary conditions. Capacitance and electrical energy.

SECTION-B

Unit IV: Magnetic fields : Biot-Stewart law, Ampere's law in integral and differential form. Contunuity equation, time of relaxation. Vector and Scaler magnetic potential, electric current, J vector.

Unit V :   Magnetic fields in materials : magnetic dipole equivalent volume and plane section curve. H vector, magnetization vector M, boundary conditions between magnetic materials, inductance, Electromagnetic Energy.

Unit VI: Maxwell equations and wave equations : Displacement current, time varying fields and Maxwell's equations, plane uniform magnetic waves. Depth of penetration poynting vector.

Books Recommended

1) Principles of Electromagnetics 4/e Mathew Sadiku, Oxford University Press

2) Engineering Electromagnetics 7/e By W.H. Hayt, TMH Publication, 2006

3) Electromagnetic Engg. V Edition By N.N.Rao, Prentice Hall, 2005

4) Applied Electromagnetics By Fawwaz T.Ulaby, Prentice Hall, 1999

4SEE3   LINEAR INTEGRATED CIRCUITS
SECTION A

Unit I :   **Op-amp Fundamentals:** Differential amplifiers, ac and dc analysis of differential amplifiers, review of operation amplifier- block diagram representation, basic configurations, ideal op-amp, negative feedback, non – ideal closed loop characteristics.

Unit II :   **Basic op-amp Circuits:** voltage follower, sign changer, adder, subtractor etc, I to V and V to I converters, current amplifiers, difference amplifiers, instrumentation amplifiers and their applications, transducer bridge amplifier.

Uniy III :   **Op-amp Parameters:** Input bias and offset current, input offset voltage, input offset error compensation, slew rate, common mode rejection ratio etc, frequency response, input and output impedance, operation limits, compensated and uncompensated op-amps, compensation techniques.

SECTION B

Unit IV :   **Non-linear Circuit Applications:** Voltage comparator and its applications, Schmitt trigger and its application, precision rectifiers, limiters, analog switches, peak detectors, sample and hold circuits, integrator and differentiator, log/antilog amplifiers, practical log/antilog circuits, analog multipliers, opamp as phase detector, op-amp electronic thermometers.

Unit V :   **Active Filters:** Classification, transfer function, butter worth filters. low pass, high pass, band pass, band stop, notch and all pass.

Unit VI : a]   **Timer:** IC 555, functional diagram, monostable and astable multivibrator.

b]   **Voltage regulators:** Series op-amp regulators, IC voltage regulators, switching regulators etc, IC 723.

Text Books

1) Op-amps and Linerar Integrated Circuits Technology, R.A.Gaikwad, PHI publication, 1999

2) Design of Operational Amplifier and Analog Integrated Circuits, S.Franco TMH Publication, 2002

References
Linear Integrated Circuits, D.Roy Chaudhari, New Age International Publisher, 2005

Practical : Minimum Ten experiments based on above syllabus.

4SEE4   SIGNALS AND SYSTEMS
SECTION A

Unit I :   **Introduction to Signals and Systems: •**Signals and Systems, Classification of Signals Classification of Systems, Systems Modeling Some Ideal Signals, Energy and Power Signals Frequency Response, Discrimination of Continuous-Time Signals Topological Models, Analysis of Continuous-Time Systems Time Domain and Frequency Domain, Properties of Elementary Signals Linear Convolution Integral, Response of Continuous-Time Systems.

Unit II :   **Fourier series and Its Properties** Fourier Transform Properties of Fourier Transform, Tables of Fourier Transform Pairs Fourier Transform of Periodic Signals, Ideal Low-Pass Filter Frequency-Domain Analysis of Systems Fourier analysis of Sampled Signals

Unit III :   **Analysis of LTI Discrete-Time Systems:** Time Domain and Frequency Domain, Properties of Discrete-Time Sequences Linear Convolution, Discrete-Time System Response

SECTION B

Unit IV :   **Sampling:** Representation of a continuous–Time Signal by its Samples; The Sampling Theorem; Reconstruction of Signals form its Samples using Interpolation; Effect of Under Sampling (Frequency Domain Aliasing); Discrete Time processing of Continuous–Time Signals

Unit V :   **The Z Transform:** The Z Transform; The Region of Convergence for the Z- Transform; Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot; Properties of Z-Transform; Analysis and Characterization of Discrete-Time LTI Systems using Z-Transform; System Transfer Function; Block Diagram Representation; The Unilateral Z-Transform; Solution of Difference Equation using the Unilateral Z-Transform.

Unit VI :   **Discrete Fourier Transform and Fast Fourier Transform** Representation of Discrete-Time aperiodic signals and the Discrete-Time Fourier Transform; Fourier Transform for Periodic Signals; Properties of the Discrete-Time Fourier Transform; Discrete-Time LTI Systems and Discrete-Time

Fourier Transform. Fast Fourier Transform (FFT)

Books Recommended

1) Priciples of Linear Systems and Signals, 2E(International version) – Lathi B. P., Oxford University Press

2) Priciples of Signal Processing & Linear Systems (International version) Lathi B P, Oxford University Press

3) Signals And Systems , S.Haykin, 2nd Edition, John Wiley And Sons, 1999

4) Analog And Digital Signal Processing , Ambardar A, 2/3; Thomson Learning, 2005

5) Signals and Systems, Oppenheim and Schafer, Prentice Hall of India, 2nd Edition, 1997

4SEE5　NUMERICAL METHODS AND COMPUTER PROGRAMMING

SECTIONA

Unit I : Solution of Algebraic & Transcendental equations : Floating point number representation, errors, accuracy, stability of algorithms. Bracketing methods : bisection method and False Position method.

Open methods : Newton-Raphson method, Secant method and Successive Approximation method.

Comparison of different iterative methods. Implementation of these methods in C.

Unit II : Solution of Simultaneous Algebraic equations : Iterative methods : Jacobi's method and Gauss-Seidel method. Direct methods : Gaussian elimination method & Matrix Inverse method. Finding Eigen values of a matirx, determination of largest Eigen value. Implementation of these methods in C.

Unit III : Interpolation : Evenly spaced points : formation of forward & backward difference table, Newton's forward & backward difference interpolation formulae. Unevenly spaced points : divided difference table and Newton's divided difference interpolation formula, Lagrange's method. Interpolation with Cubic splines. Implementation of these methods in C.

SECTION-B

Unit IV : Numerical Differentation and Integration : Numerical differentation : Taylor's series method, Richardson extrapolation method, numerical differentation using interpolation polynomial (first & second derivative near the begining & end of the table). Numerical Integration : Trapezoidal Rule, Simpson's Rules, Romberg method,

Gaussian quadrature method. Implementation of these methods in C.

Unit V : Solution of ordinary differential equations : Initial value problem : Taylor's series method, Runge-Kutta methods - second & fourth order, Euler's method, Euler's modified method. Solution of simultaneous & higher order differential equations using Runge-Kutta fourth order method. Stiff differential equations and their solutions. Boundary value problem : Finite difference method and Cubic spline method. Implementation of these methods in C.

Unit VI : Principles of Object Oriented Programming : OOP paradigm, basic concepts of OOP, benefits of OOP, basic data types, users defined data types, derived data types, operators and control statements.

Books Recommended

1) Numerical Methods - Principles, Analysis & Algorithms, Pal, Oxford University Press, 2008

2) Numerical Methods for Engineers and Scientists – Guha, Oxfor University Press, 2008

3) Computer Fundamentals and Programming in C – Dey and Ghosh, Oxford University Press, 2008

4) Chapra S.S. & Canale R.P. : Numerical Methods for Engineers, 4th edition, McGraw Hill.

4) Balguruswami E. : Object Oriented Programming with C++, Tata McGraw Hill, New Delhi.

5) Nakamura S. : Applied Numerical Methods in C, Prentice Hall.

6) Faires & Burden : Numerical Methods, 7th edition, Thomson Learning.

PRACTICAL : Minimum Ten programming assignments in C/ MATLAB , covering each Unit..

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SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
* ORDINANCE NO. 42 OF 2005

Examination in Environmental Studies leading to Bachelor Degree, Ordinance, 2005

Whereas it is expedient to frame an Ordinance relating to Examination in Environmental Studies leading to Bachelor Degree level, hereinafter appearing, the Management Council is hereby pleased to make the following Ordinance.

1. This Ordinance may be called "Examination in Environmental Studies leading to Bachelor Degree, Ordinance, 2005."

2. This Ordinance shall come into force from the Academic session 2005-06.

3. In this Ordinance and in other ordinances relating to the examination, unless there is anything repugnant in the subject or context :-

   (i) "Academic session" means a session commencing on such date and ending with such date of the year following as may be appointed by the Management Council.

   (ii) "Admission to an examination" means the issuance of an admission card to a candidate in token of his having complied with all the conditions laid down in the relevant ordinance, by a competant officer of the University.

   (iii) "Applicant" means a person who has submitted an application to the University in the form prescribed for admission to an examination.

   (iv) "Candidate" means a person who has been admitted to an examination by the University.

   (v) "Regular Candidate" means an applicant who has applied for admission to a Univeristy examination through an affiliated college, Department or Institute in which he/she has prosecuting a regular course of study.

   (vi) "Examinee" means a person who present himself/herself for an examination to which he/she has been admitted.

   (vii) "Examination" means an examination prescribed by the University under the relevant Ordinance.

   (viii) "External Candidate" means a candidate who is allowed to take a University examination in accordance with the provision of Original Ordinance No. 151.

   (ix) " Non-Collegiate Candidate" means a candidate who is not a collegiate candidate.

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* As amended vide Ordinance Nos. 7 of 2006 & 10 of 2007.

   (x) An "Ex-student" is a person who having once been admitted to an examination of this University, is again required to take the same examination by reason of his failure or absence thereat and shall include a student who may have joined a college, Department or Institute again in the same class.

   (xi) "Bachelor Degree Examination" means a examination leading to Bachelor Degree of the University.

   (xii) "Previous Year" means a year following by final year of Bachelor Degree.

4. Save as otherwise specifically provided, the conditions prescribed for admission to the examination under this Ordinance shall apply to all persons who wish to take the examination to the Degrees of the University mentioned in para 5 below.

5. The conditions prescribed for admission to examination under this Ordinance shall apply to following degrees of the University :-
   1) Bachelor of Arts
   2) Bachelor of Performing Arts
   3) Bachelor of Fine Arts
   4) Bachelor of Mass Communication
   5) Bachelor of Social Work
   6) Bachelor of Commerce
   7) Bachelor of Business Administration
   8) Bachelor of Science
   9) Bachelor of Computer Science
   10) Bachelor of Computer Applications
   11) Bachelor of Pharmacy
   12) Bachelor of Science (Home Science)
   13) Bachelor of Technology (Cosmetics)
   14) Bachelor of Engineering
   15) Bachelor of Engineering (Part Time) (Civil)
   16) Bachelor of Textile
   17) Bachelor of Technology (Chemical Technology)
   18) Bachelor of Technology (Chemical Engg.)
   19) Bachelor of Architecture, and
   20) Bachelor of Laws (Five Year Course)

6 i) Environmental Studies shall be a compulsory subject for a previous year examination of the following Bachelor Degrees of the University,
   1) Bachelor of Arts
   2) Bachelor of Performing Arts
   3) Bachelor of Fine Arts
   4) Bachelor of Mass Communication

5) Bachelor of Social Work
6) Bachelor of Commerce
7) Bachelor of Business Administration
8) Bachelor of Science
9) Bachelor of Computer Science
10) Bachelor of Computer Applications
11) Bachelor of Pharmacy
12) Bachelor of Science (Home Science)
13) Bachelor of Technology (Cosmetics)
14) Bachelor of Engineering (Part Time) (Civil)

ii) Environmental Studies shall be a compulsory subject for IIIrd & IVth Semester of the following Bachelor Degrees of the University,
1) Bachelor of Engineering
2) Bachelor of Textile
3) Bachelor of Technology (Chemical Technology)
4) Bachelor of Technology (Chemical Engineering)
5) Bachelor of Architecture, and

iii) Environmental Studies shall be a compulsory subject for Vth & VIth Semester of the Degree of Bachelor of Laws (Five Year Course)

iv) Students admitted to Second Year/Third Year/IVth Semester/ VIth Semester of various degree examination courses in different Faculties in the academic session 2005-06 or thereafter shall have to appear for examination in the subject Environmental Studies.

7. The main examination leading to Environmental Studies shall be held in Summer and supplementary examination in Winter every year, at such places and on such dates as may be appointed by Board of Examinations. **Explanation:-** Examination shall be conducted on the basis of one common question paper for all Bachelor Degree Examination courses irrespective of annual or semester pattern.

8. Scope of the subject for annual pattern examination and or semester pattern examination shall be as provided under the syllabus.

9. Common question paper for all courses covered under this Ordinance alongwith answer books shall be supplied by the University to the Colleges, Departments and Institutes for conducting the examination of the subject.

10. Valuation of the answer books relating to this subject shall be done at College/Department/Institution level only. Remuneration for valuation of answer books shall not be paid by the University.
Provided that prescribed evaluation fee for evaluation of each answer

book/s of an external examinee/s appeared from the examination centre shall be paid to each examination centre.

11. It shall be obligatory on the part of the College/Department/Institute to submit candidate wise following information to the University on or before the date as may be prescribed by the University :-

Sr. No.	Grade/Category	Marks secured
1.	"A"	- 60 and above
2.	"B"	- 45 to 59
3.	"C"	- 35 to 44
4.	"D"	- 25 to 34
5.	"Fail"	- 24 and below
6.	"Absent"	

12. For the purposes of teaching, learing and examination, the Committee consisting of three teachers shall be appointed by the Principal/ Head of the Department/Head of the Institution under his/her Chairmanship/ Chairpersonship. While appointing three teachers on the said committee, the Principal shall take care that the teachers to be appointed on the committee, if necessary, shall be from different faculty.

13. i) Duration of theory examination of this subject shall be three hour.
    ii) For all Bachelor Degree examinations, common question paper of 100 marks shall be provided by the University.
    iii) Distribution of these 100 marks shall be as follows :-
        a) Part-A, Short Answer Pattern   -   25 Marks
        b) Part-B, Essay type with inbuilt choice   -   50 Marks
        c) Part-C, Essay on Field Work   -   25 Marks

14. Medium of instruction shall be English or Marathi or Hindi. Question paper shall be supplied in English and Marathi and Hindi. A candidate shall have option to write answers in English or Marathi or Hindi.

15. Examination for the subject Environmental Studies shall be compulsory for external candidates appearing as a fresh candidate at Winter and/or summer examination.

16. For teaching of the subject, there shall be atleast two hour per week. For teaching the subject to the regular candidates, a full time approved teacher of the University and or a person having Postgraduate Degree in any faculty with second class shall be considered elligible.

17. For teaching of the subject, additional fee to be charged to regular

candidate shall be as prescribed by the University.

18. Every College/ University Teaching Department shall charge additional fee of Rs. 100/- to every Student of the subject Environmental studies. Out of this Rs. 100/-, the College/University Teaching Department shall have to pay Rs. 25/- to the University as an examination fee of each candidate for the subject environmental studies.

19. The Grade secured by an examinee in the examination of this subject shall not be considered for providing the facility of A.T.K.T. in next higher class.

20. The provisions of Ordinance No. 18/2001 shall not be applicable for securing a grade or higher grade in the examination of this subject.

21. Result of the Final Year of the respective Degree shall not be declared of an examinee unless he/she secures any one of the grade in the examination of subject.

    Provided an examinee admitted to Five Year LL.B. course desiring not to continue his/her education beyond Sixth Semester of the said course shall have to secure any one of the grade in the examination of the subject otherwise his/her result of Sixth Semester for awarding B.A. degree shall not be declared.

22. Certificate shall be issued, to the successful examinees in the subject Environmental Studies, after the examination.

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ENVIRONMENTAL STUDIES

Total Marks : 100

PART-A

SHORT ANSWER PATTERN   **25 Marks**

1. **The Multidisciplinary nature of environmental studies**
   . Definition, scope and importance.
   . Need for public awareness.

                                                            (2 lecture hours)

2. **Social Issues and the Environment**
   . From Unsustainable to Sustainable development
   . Urban problems related to energy
   . Water conservation, rain water harvesting, watershed management
   . Resettlement and rehabilitation of people; its problems and concerns. Case studies.
   . Envionmental ethics : Issues and possible solutions.
   . Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
   . Wasteland reclamation.
   . Consumerism and waste products.
   . Environment Protection Act.
   . Air (Prevention and Control of Pollution) Act.
   . Water (Prevention and Control of Pollution) Act.
   . Wildlife Protection Act.
   . Forest Conservation Act.
   . Issues involved in enforcement of environmental lesislation.
   . Public awareness.   (7 lecture hours)

3. **Human Population and the Environment**
   . Population growth, variation among nations.
   . Population explosion - Family Welfare Programme.
   . Environment and human health.
   . Human Rights.
   . Value Education.
   . HIV / AIDS.
   . Women and Child Welfare.
   . Role of Information Technology in Environment and human health.
   . Case Studies.   (6 lecture hours)

PART-B
ESSAY TYPE WITH INBUILT CHOICE   50 Marks

4. **Natural resources :**
    . **Renewable and non-renewable resources :**
       . Natural resources and associated problems.
          - Forest resources : Use and over exploitation, deforestation, case studies.   Timber extraction, mining, dams and their effects on forests and tribal people.
          - Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
          - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
          - Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, case studies.
          - Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
          - Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
       . Role of an individual in conservation of natural resources.
       . Equitable use of resources for sustainable lifestyles.
                                                        (8 lecture hours)

5. **Ecosystems**
    . Concept of an ecosystem.
    . Structure and function of an ecosystem.
    . Producers, consumers and decomposers.
    . Energy flow in the ecosystem.
    . Ecological succession.
    . Food chains, food webs and ecological pyramids.
    . Introduction, types, characteristic features, structure and function of the following ecosystem :-
       - Forest ecosystem
       - Grassland ecosystem
       - Desert ecosystem
       - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
                                                        (6 lecture hours)

6. **Biodiversity and its conservation**
    . Introduction - Definition : genetic, species and ecosystem diversity.
    . Biogeographical classification of India.
    . Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
    . Biodiversity at global, National and local levels.
    . India as a mega-diversity nation.
    . Hot-spots of biodiversity.
    . Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife

       conflicts.
    . Endangered and endemic species of India.
       . Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.   (8 lecture hours)

7. **Environmental Pollution**
    . Definition
       . Causes, effects and control measures of :-
          - Air pollution
          - Water pollution
          - Soil pollution
          - Marine pollution
          - Noise pollution
          - Thermal pollution
          - Nuclear hazards
    . Solid Waste Management : Causes, effects and control measures of
       . Role of an individual in prevention of pollution.
       . Pollution case studies.
       . Diaster management : floods, earthquake, cyclone and landslides.
                                                        (8 lecture hours)

PART-C
ESSAY ON FIELD WORK   25 Marks

8. **Field work**
    . Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
    . Visit to a local polluted site - Urban / Rural / Industrial / Agricultural
    . Study of common plants, insects, birds.
    . Study of simple ecosystems - pond, river, hill slopes, etc.
                                                        (5 lecture hours)

(**Notes   :**   i)   Contents of the syllabys mentioned under paras 1 to 8 shall be for teaching for the examination based on Annual Pattern.
            ii)   Contents of the syllabys mentioned under paras 1 to 4 shall be for teaching to the Semester commencing first, and
            iii)   Contents of the syllabys mentioned under paras 5 to 8 shall be for teaching to the Semester commencing later.

LIST OF REFERENCES :-
1)   Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
2)   Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India, Email : mapin@icenet.net **(R)**
3)   Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
4)   Clark R.S., Marine Pollution, Clanderson Press Oxford **(TB)**
5)   Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T., 2001,

Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.

6) De A.K., Environmental Chemistry, Wiley Eastern Ltd.

7) Down to Earth, Certre for Science and Environment **(R)**

8) Gleick, H.P. 1993, Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p.

9) Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural Histroy Society, Mumbai **(R)**

10) Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Ca mbridge Univ. Press 1140p

11) Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi. 284 p.

12) Mckinney, M.L. & Schoch, R.M. 1996, Environmental Science Systems & Solutions, Web Enhanced Edition. 639 p.

13) Mhaskar A.K., Matter Hazardous, Techno-Science Publications **(TB)**

14) Miller T.G.. Jr., Environmental Science, Wadsworth Publishing Co. **(TB)**

15) Odum, E.P., 1971, Fundamentals of Ecology, W.B.Saunders Co., U.S.A., 574p.

16) Rao M.N. & Datta A.K.,1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.

17) Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.

18) Survey of the Environment, The Hindu **(M)**

19) Townsend C., Harper J., and Michael Begon, Essentials of Ecology, Blackwell Science **(TB)**

20) Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media **(R)**

21) Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications **(TB)**

22) Wagner K.D., 1998, Environmental Management, W.B.Saunders Co., Philadelphia, USA 499p.

23) अय्यर, नलिनी : पर्यावरण शिक्षण प्रकल्प महाराष्ट्र राज्य हिंदी साहित्य अकादमी, मुंबई **(R)**

24) Dr. Deshpande, A.P.Dr. Chudiwale, A.D., Dr. Joshi, P.P., Dr. Lad, A.B.: Environmental Studies, Pimpalapure & Co., Publishers, Nagpur. **(R)**

25) R.Rajagopalan : Environmental Studies, Oxford University Press, New Delhi, 2005 **(R)**

   (M)   Magazine
   (R)   Reference
   (TB) Textbook

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DIRECTION

No. 18/2010   Date : 11/06/2010

Subject :Schemes of teaching & examinations of IIIrd & IVth Semesters of Degree of Bachelor of Engineering (Electrical & Electronics Engineering) (Four Year Degree Course ...... Semester Pattern)

Whereas Ordinance No. 4 of 2001 in respect of Examinations leading to the Degree of (विद्युत तथा इलेक्ट्रॉनिक्स) Bachelor of Engineering (Four Year Degree Course ...... Semester Pattern), Ordinance, 2001 is in existence in the University,

AND

Whereas the schemes of teaching & examinations of Ist to IVth Semesters of Bachelor of Engineering (Electrical & Electronics Engineering) were accepted by the Academic Council vide Item No. 16 (6) C) R-1) in its meeting held on 20-02-2010 and further accepted that the schemes of teaching & examinations of Ist and IInd semesters of Bachelor of Engineering (Electrical & Electronics Engineering) course were the same as per the Bachelor of Engineering course which was common for all the branches,

AND

Whereas the schemes of teaching & examinations of IIIrd & IVth Semesters Bachelor of Engineering (Electrical & Electronics Engineering) are required to be regulated by the Regulation,

AND

Whereas the process of making the Regulation is likely to take some time,

AND

Whereas the schemes of teaching & examinations of IIIrd & IVth Semesters B.E. (Electrical & Electronics Engineering) course are to be implemented from the academic session 2010-2011,

AND

Whereas syllabus for IIIrd & IVth Semesters B.E. (Electrical & Electronics Engineering) course is to be sent for printing.

Now, therefore, I, Dr.Ku.Kamal Singh, Vice-Chancellor of Sant Gadge Baba Amravati University in exercise of powers confirmed upon me under sub section (8) of Section 14 of the Maharashtra Universities Act, 1994, hereby direct as under :-

1) This Direction shall be called "Examinations leading to the Degree of Bachelor of Engineering (Electrical & Electronics Engineering) (Four Year Degree Course ...... Semester Pattern), Direction, 2010"

2) This Direction shall come into force from the date of its issuance.

3) Schemes of teaching & examinations for IIIrd & IVth semesters of Bachelor of Engineering (Electrical & Electronics Engineering) (Four Year Degree Course ...... Semester Pattern) shall be as per "Appendix-A" appended with this Direction.

Sd/-
Dr. Kamal Singh
Vice-Chancellor