

M.E.(FULL-TIME)/
M.TECH.(FULL-TIME)

Prospectus No.111736

संत गाडगे बाबा अमरावती विद्यापीठ
SANT GADGE BABA AMRAVATI UNIVERSITY

अभ्यासक्रमिका
(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

Prescribed for
Post Graduate Two Year Degree Course
Master of Engineering
(Full-Time)
Credit Grade System
I & II Year Examinations
2010 - 2011 & Onwards

- Branches : 1) M.E. Civil (Structural Engineering)
2) M.E. Mechanical (CAD/CAM)
3) M.E. Digital Electronics
4) M.E. Electrical (Electrical Power System)
5) M.Tech. Chemical Technology
(Membrane & Separation Tech.)
6) M.Tech. (Chemical Engg.)
7) M.E. (Computer Sc. & Engg.)
8) M.E. (Information Tech.)
9) M.E. (Electronics & Tele.)
10) M.E. (Computer Engg.)



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SANT GADGE BABA AMRAVATI UNIVERSITY AMRAVATI**SPECIAL NOTE FOR INFORMATION OF THE STUDENTS**

- (1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.
- (2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc., refer the University Ordinances Booklet the various conditions/provisions pertaining to examination as prescribed in the following Ordinances.

Ordinance No. 1	:	Enrolment of Students.
Ordinance No. 2	:	Admission of Students
Ordinance No. 4	:	National cadet corps
Ordinance No. 6	:	Examinations in General (relevent extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Improvement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute NO.18, Ordinance 2001.
Ordinance No. 9	:	Conduct of Examinations (relevent extracts)
Ordinance No. 10	:	Providing for Exemptions and Compartments
Ordinance No. 19	:	Admission of Candidates to Degrees.
Ordinance No. 109	:	Recording of a change of name of a University student in the records of the University.

Ordinance No. 6/2008	:	For improvement of Division/Grade.
Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Dineshkumar Joshi
Registrar
Sant Gadge Baba Amravati University

static var compensation (SAC), thyristor controlled series compensation (TCSC) static phase shifters (SPS), static condenser (STATCON), static synchronous series compensator (SSSC) and unified power flow controller (UPFC), modelling and analysis of FACTS controllers, control strategies to improve system stability.

SECTION-B

Power quality problems in distribution systems, Harmonics, Harmonics creating loads, modelling, harmonic propagation, series and parallel resonance, harmonic power flow, mitigation of harmonics, filters, passive filters, active filters, shunt and series hybrid filters, voltage sag and swells, voltage flicker, mitigation of power quality problems using power electronics conditioners, IEEE standards.

Books Recommended :

- 1) G.T.Heydt : Power Quality, Stars in a Circle Publication, Indiana, 1991.
- 2) E.J.E.Miller : Static Reactive Power Compensation, John Wiley & Sons, New York, 1982.
- 3) Recent Publications on Power Systems and Power Delivery.

2 SEPS 6 POWER SYSTEM LAB.-II

Identify and perform minimum 16 (sixteen) experiments based on syllabus of subjects from Semester-II.

THIRD SEMESTER

3 SEPS 1 SEMINAR AND DISSERTATION (as per given scheme)

FOURTH SEMESTER

4 SEPS 1 SEMINAR AND DISSERTATION (as per given scheme)

SYLLABUS PRESCRIBED FOR TWO YEAR P.G. COURSE IN MASTER OF TECHNOLOGY (FULL TIME) CHEMICAL TECHNOLOGY (MEMBRANE & SEPARATION TECHNOLOGY)

FIRST SEMESTER

1 MST 1 ADVANCES IN ADSORPTION AND ADSORPTION SEPARATION TECHNOLOGIES

Absorption, fundamentals, applications, multicomponent absorption, Non-isothermal absorption, mass transfer in packed towers for gas absorption, capacity, height of tower, plate towers, absorption equipments & recent developments.

Adsorption isotherm models, break through curve, steady state & unsteady state adsorption, adsorption equipments, structure of adsorbents, kinetic effects, equilibrium, non-equilibrium isothermal and non isothermal operation, regeneration of adsorbent.

BOOKS :

- 1) Chemical Engineering, Vol.I & II : Coulson & Richardson.
- 2) Handbook of Separation Techniques for Chemical Engineers : P.A.Schweitzer.
- 3) Mass Transfer Operations : R.E.Treybal.
- 4) Absorption, Fundamentals and Applications : Zarzycki R., Chacuk A.
- 5) Gas Separation by Adsorption Process : R.T.Yang.

1 MST 2 MEMBRANE SEPARATION PROCESS

Membrane transport and separation mechanism, Basic transport equations, solute transport parameters, surface force-pore flow model, prediction of membrane performance, physico-chemical criteria of membrane process, material science of RO/UF membranes, aqueous & non-aqueous solution systems, module design and analysis, membrane process design and systems, membrane process in water, waste water, biotechnology process, food industries etc., membrane bioreactor, pervaporation techniques in alcohol concentration, gas separation application, by permeation under pressure through membrane, membrane fouling and compaction, liquid membranes, pollution control by membrane process. RO treatment of non-aqueous solutions in liquid phase.

BOOKS :

- 1) RO/UF Principles and Applications : S.Sourirajan, R.Matsscera, Canada.

- 2) UF Applications Handbook : Munir Cheryon.
- 3) Membrane Separation Process : Stratumann, Germany.
- 4) Filtration and Separation : J.Wakeman, Elsevier.
- 5) Handbook of Separation Process Technology : Koros W.J., Rousseau R.W., Wiley, New York.

1 MST 3**CHEMICAL ENGINEERING ANALYSIS**

Chromatographic techniques for chemical analysis for measuring thermodynamic, kinetic & physico-chemical properties, process chromatography, production chromatography, laboratory or preparative chromatography, gas chromatography, liquid chromatography, Elution chromatography, Gas-Liquid chromatography, chromatographic equipments, process design & optimization, counter current techniques, HPLC, ion exchange chromatography, electrophoresis, electro dialysis, lypholisation, equipment, recent advances. Basic principles of mass spectrometry, its application for molecular structure determination, magnetic rosonance spectroscopy, NMR chemical shift, Fourier transfer IR, Coulometric analysis, basic of electronic circuitvy for chemical instruments, computer applications and programming in chemical analysis and instrumentation.

BOOKS :

- 1) Chromatographic Methods : Braithwaite A., Smith F.J., Chapman & Hall.
- 2) New Developments in Gas Chromatogrphy : Purnell J.H., Wiley Production Scale GC.
- 3) Preparative Liquid Chromatography : Bidlingmeyer R.A., Elsevier.
- 4) High Performance Liquid Chromatography : Brown P.R., Hartwick R.A., Wiley.
- 5) Chemical Engineering, Vol. I to IV : Coulsion V. Richardsons.
- 6) Separation Techniques : Schoew H.M., New Chemical Engg., Intersciences Pub.
- 7) Separation Processes : C.J.King, Tata McGraw Hill.
- 8) Instrumental Methods of Chemical Analysis : Willard H.N., East West Press.
- 9) Instrumental Methods of Chemical Analysis : Ewing G.W., McGraw Hill.

1 MST 4**ADVANCED ENERGY TECHNOLOGIES**

Energy intensive chemical process, energy balances, energy consumption & audit, recovery of energy, energy recovery units related to gas-gas, gas-liquid, liquid-liquid systems, waste heat recovery units, Energy planning, energy conservation.

Energy resources - conventional, non-conventional, renewable / alternate sources of energy, using water, wind, tide, solar, biomass, geothermal, etc. and their applications, energy related pollution control technologies, combustion process, removal of Nitrogen, Sulphur containing gases, acid gas removal.

BOOKS :

- 1) Chemical Technology, I to IV : Venkateshwaralu D.
- 2) Energy Conservation in Petrochemical Industries : S.B.Pandya, Tata McGraw Hill.
- 3) Conventional Energy Technology : S.B.Pandya, Tata McGraw Hill.
- 4) Practical Techniques of Saving Energy in Chemical Industry : Sitting M., Noyes Data Corp, USA.
- 5) Fuels & Fuel Technology : Francis W., M.C.Peter, Pergamon Press.
- 6) Fuel Combustion Energy Technology : S.N.Saha, Dhanpat Rai Pub. Co, New Delhi.

1 MST 5**ADVANCES IN ABSORPTION AND ADSORPTION SEPARATION TECHNOLOGIES-LAB.**

PRACTICALS : based on above syllabus.

1 MST 6**MEMBRANE SEPARATION PROCESS-LAB.**

PRACTICALS : based on above syllabus.

1 MST 7**SEMINAR-I**

Presentation of critical appraisal of literature survey on the topic related to recent development, advances, reserach work in the field of membrane and separation technologies.

SECOND SEMESTER**2 MST 1 ADVANCED DOWNSTREAM TECHNOLOGY FOR CHEMICAL RECOVERY AND WASTE UTILIZATION**

Centrifugal separation - theory, application, equipments, power requirement, chemical separation for Gas-Liquid system, Gas-Solid system. Super critical fluids extraction in food, pharmaceutical, environmental and petroleum applications, water treatment, desalination, Bio separation, dialysis, industrial dialysis.

Cryogenic distillation for refinery, petrochemical off gases, natural gases, gas recovery-Olefin, Helium, Nitrogen, Desulfurization - coal,

flue gases, Azeotropic & extractive distillation - residue curve maps, homogeneous azeotropic distillation, pressure swing distillation, Column sequences, hetero geneous azeotropic distillation.

Energy conservation in separation processes - energy balance, molecular sieves - zeolites, adsorption, catalytic properties, manufacturing processes, hydrogel process, application, New trends.

Separations process synthesis for nonazeotropic mixtures, non ideal liquid mixtures, separation synthesis algorithm, Ion exchange - manufacture of resins, physical & chemical properties, capacity, selectivity, application, regeneration, equipment, catalysis use.

BOOKS :

- 1) Perry's Chemical Engg. Handbook : McGraw Hill Pub.
- 2) Conceptual Design of Chemical Processes : Douglas J.M., McGraw Hill
- 3) Recent Developments in Chemical Process & Plant Design : Liu Y.A., John Wiley & Sons Inc.
- 4) Cryogenic Process Engg. : Timmerhaus K.D., Plenum Press.
- 5) Encyclopedia of Separation Technology, Vol I & II : Kirk Othmer, Wiley Interscience.

2 MST 2

INDUSTRIAL BIOTECHNOLOGY

Advanced fermentation process for industrial production, Fermentation products, Biochemistry and bio chemical engineering aspects, kinetics of growth & model of fermentation process, industrial microbiology, fermentation types and mechanism, recent development in fermentation design, measurement and control devices, instrumentation in fermenter, liquid media and air sterilization techniques, heat load of fermentation, enzyme engineering, industrial production and applications of enzymes, immobilization of enzymes of whole cells, bioenergy utilization, bioconversion of renewable resources to organic chemicals, application of biotechnology in petroleum, oil, paper, food & chemical industries, production of high value products using biotechnology, production of antibiotics, vaccine, vitamins, surfactants, polysaccharides by microbial fermentation, their isolation, purification.

BOOKS :

- 1) A Comprehensive Practise in Biotechnology : Rehrn H.J. & Reed S., Vevlacs Chemie, Weinheim.
- 2) Biochemical Engineering & Biotechnology Handbook : Atkinson B., Mavituna F., The Nature Press, New York.
- 3) Pollution Control in Process Industries : Mahajan S.P., Tata McGraw Hill.

2 MST 3

ELECTIVE

1) ADVANCED MATERIAL TECHNOLOGY

Packings in crystals, ceramic structure, silicate materials, refractory material, structure sensitive materials, polymeric materials, structure, rheology, mechanical properties, instruments used for determination of structure, detects, advances in polymeric materials, metals like carbon, steel, alloy steel, effect of cooling & heating on structure of metal structure, strengthening mechanism, rubber and composite materials.

Stress characteristics, reinforced material, plastics in packaging, containers for pharmaceutical, beverage, food, oil, detergent, etc. industries, BOPP film in food packaging, laminated, heat sealable, flame proof polyester fibers, flame retardant polyolefin fibers, polymer alloys and their applications, nylon, pc, pvc, polysulphur etc., alloys, materials of construction for handling specific chemicals, Lining of equipment, inspection & testing, corrosion, fatigue, protection & testing, nanomaterials.

BOOKS :

- 1) Process Design of Equipments, Vol. I & II : Dawande S.D., Central Techno Pub., Nagpur.
- 2) Hydrocarbon Processing- Journal
- 3) Corrosion Engineering : Fontana M.G., McGraw Hill.
- 4) Chemical Engg. - World Journal.
- 5) Chemical Age of India.

2) ADVANCE SURFACE COATING TECHNOLOGY

Synthesis of surface coating binders like acrylics, silicones, epoxies etc., formulations of binders for different applications, inorganic binders, development in pigments in typical functional applications. Concept of eco-friendly pigments in surface coatings, different testing methods.

Books Recommended :-

- 1) Hydrocarbon Processing : Journal
- 2) Process Design of Equipments, Vol I & II : Dawande D.S., Central Techno Pub., Nagpur.
- 3) Corrosion Engineering : Fontana, M.G., McGraw Hill
- 4) Chemical Engg. : World Journal
- 5) Chemical Age of India.

3) Speciality Plastics

Polymer synthesis and characterization for high temp. application, engineering polymers, photo resist polymers in solar energy utilization, biodegradable polymers, hydrolysis and other new types of polymers.

Books Recommended :-

- 1) Chemical Engg. : World Journal
- 2) Process Design of Equipments, Vol I & II : Dawande D.S., Central Techno Pub., Nagpur.
- 3) Hydrocarbon Processing : Journal
- 4) Corrosion Engineering : Fontana, M.G., McGraw Hill
- 5) Chemical Age of India.

4) Insulation Coatings

Fundamentals of electrical insulations, classification of electrical insulation from polymeric materials, properties and structural requirements of polymeric electrical insulation, different types of polymers for electrical insulation, ingredients in formulation, formulation principles, other insulations :- thermal, aquatic and vibrational. Testing of electrical insulation and application methods of electrical insulation.

Books Recommended :-

- 1) Corrosion Engineering : Fontana, M.G., McGraw Hill
- 2) Process Design of Equipments, Vol I & II : Dawande D.S., Central Techno Pub., Nagpur.
- 3) Hydrocarbon Processing : Journal
- 4) Chemical Engg. : World Journal
- 5) Chemical Age of India.

2 MST 4 ADVANCED REACTOR DESIGN

Basic concept of design of reactors, types, optimisation techniques, multiphase reactors, multiphase reactions, heterogeneous catalytic reactions, isothermal, non isothermal, adiabatic, non adiabatic, fluidised catalytic reactor, slurry reactor, characterisation of catalysis, chemical kinetics & rate equation for homogeneous and heterogeneous reactions, chemical reaction kinetics for reactions with heat and mass transfer simultaneously, non ideal flow, fixed bed reactor - adiabatic, non isothermal, non adiabatic fixed bed, comparison of fixed, moving & fluid beds, optimization - formulation of reactor problems, use of linear programming, differential calculus, non linear programming in reactor optimization, instrumentation & control devices in chemical reactor.

BOOKS :

- 1) Chemical Reaction Engg. : Levenspiel O., John Wiley.
- 2) Chemical & Catalytic Reaction Engg. : James J. Carberry, McGraw Hill.
- 3) Chemical Engg. Kinetics : Smith J.M., McGraw Hill.
- 4) Chemical Reactor Design & Analysis : Bischoff K.B. & Forment G.F.
- 5) Optimization of Process : Edgar T.F., Himmelbloan D.M., McGraw Hill.
- 6) Elements of Chemical Reaction Engg. : Scot Fogler H.C., Prentice Hall.

2 MST 5 ADVANCED DOWNSTREAM TECHNOLOGY FOR CHEMICAL RECOVERY AND WASTE UTILIZATION-LAB.

PRACTICALS : based on above syllabus.

2 MST 6 INDUSTRIAL BIOTECHNOLOGY

PRACTICALS : based on above syllabus.

2 MST 7 SEMINAR-II

A collection of literature on a topic related to recent developments in process technology, etc., critical appraisal of literature collected, preparation of report and presentation of Seminar.

THIRD SEMESTER**3 MST 1 SEMINAR-III**

Preparation of detail report based on collection of data, experimental work, published reviews, etc. on a topic related to Project / Dissertation and presentation as Seminar.

3 MST 2 PROJECT / DISSERTATION

Literature survey on Project / Dissertation topic, planning of work, finalising materials and methodology, etc.

FOURTH SEMESTER**4 MST 1 PROJECT / DISSERTATION**

Review of Project / Dissertation data generated, experimentation, conclusion drawn, recommendations given, preparation of report, calculation, designing, etc.
